

RAPORT DE ANALIZĂ ASUPRA INFRASTRUCTURILOR DE CERCETARE EXISTENTE PAN-EUROPENE PRIVIND MANAGEMENTUL INTEGRAT AL SISTEMELOR DE TIP FLUVIU – DELTĂ - MARE

*Pachet de lucru nr. 1
Identificarea infrastructurilor de cercetare de
interes pan-european*

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1. INTRODUCERE

Acest raport are ca scop principal realizarea unei analize detaliate a situației infrastructurilor de cercetare (IC) majore de interes pan-european, precum și a celor mai importante inițiative și programe la nivel european și global, variind de la programe de cercetare privind bazinele hidrografice, mediile de tranziție – delte, lagune de coastă și zone umede de coastă și până la infrastructurile, inițiativele și programele de cercetare în domeniile maritime și costiere. Analiza cuprinde, de asemenea, o enumerare a principalelor puncte tari și puncte slabe ale viitorului centru DANUBIUS – RI, din perspectiva mijloacelor de cercetare, agendelor științifice și resurselor umane, prin comparație cu IC, programele și inițiativele existente în domeniul ciclului apei, precum și a oportunităților și amenințărilor din mediu extern.

Centrul Internațional de Studii Avansate privind Sistemele Fluviu - Deltă - Mare DANUBIUS (DANUBIUS - RI) va fi propus ca viitoare IC majoră pan-europeană a ESFRI (Forumul Strategic European pentru Infrastructuri de Cercetare) în domeniul managementului integrat al sistemelor fluviu-deltă-mare, cu accent pe macrosistemul Dunăre-Marea Neagră. Propunerea DANUBIUS-RI va trebui depusa în cadrul următoarei competiții de proiecte pentru următoarea foaie de parcurs a ESFRI (apel planificat pentru anul 2014).

Se prevede ca DANUBIUS – RI să cuprindă un Nucleu în Delta Dunării – având rolul de centru de comandă, dar și acela de locație de cercetare (prin care delta să devină un „laborator natural”) și loc în care să fie concentrate laboratoare cu dotare de excelență – precum și o serie de noduri din Europa. Aceste noduri vor da DANUBIUS-RI un caracter de infrastructură distribuită și vor avea o contribuție suplimentară în structura DANUBIUS-RI, dat fiind faptul că vor aduce împreună facilități de cercetare angajate în procese și metodologii de cercetare din întreaga Europă. Vor fi astfel aduse împreună ca noduri ale unei infrastructuri distribuite, cu nucleul central în Delta Dunării, facilitati de cercetare de excelență în diferitele probleme ale sistemelor fluviu – delta - mare.

Misiunea centrului DANUBIUS va fi aceea de a furniza soluții științifice inovative, ca răspuns la principalele provocări globale din domeniu și de a stabili cadrul pentru dezvoltarea durabilă a sistemului Dunăre – Delta Dunării – Marea Neagră, ca bună practică pentru sistemele majore de tip fluviu-deltă-mare la nivel mondial.

În cadrul procesului de pregătire, România – în calitate de inițiator al DANUBIUS - RI – va avea nevoie de sprijinul celorlalte State Membre ale UE, atât din interiorul, cât și din exteriorul Regiunii Dunării. Va fi necesar ca Statele Membre care se vor alătura demersului de dezvoltare a acestei infrastructuri să dispună de comunități de cercetare puternice, capabile să contribuie în mod substanțial la dezvoltarea DANUBIUS - RI ca IC pan-europeană distribuită. Un element important de reținut în acest demers constă în nevoia de a dezvolta DANUBIUS-RI ca infrastructură de cercetare distribuită în vederea acceptării în cadrul Foii de parcurs a ESFRI și nu ca o rețea de infrastructuri de cercetare din Regiunea

Dunării și alte locații – fiecare dintre acestea abordând aceleași teme – deoarece în acest caz ar putea fi asociată cu o „Inițiativă de Infrastructur Integrate” (I3). O eventuală confuzie din acest punct de vedere ar putea conduce la respingerea DANUBIUS-RI în cadrul viitorului apel ESFRI.

Obiectivul final al DANUBIUS - RI este de a deveni și funcționa ca Infrastructura de Cercetare pan-Europeană Distribuită cu liber bine statutat în cadrul ESFRI, de a obține statutul legal de „ERIC (European Research Infrastructure Consortium - Consorțiu pentru o infrastructură europeană de cercetare)” în calitate de entitate juridică. Pentru a îndeplini aceste obiective, este necesar ca DANUBIUS-RI să numească o echipă de management la nivel internațional, să aibă un *Consiliu Științific* și un *Consiliu General* internațional, cu participarea tuturor asociațiilor.

Prin Strategia Uniunii Europene pentru Regiunea Dunării (SUERD), DANUBIUS-RI a primit statutul de *Proiect Fanion* în cadrul Domeniului Prioritar 7 „Societatea Bazată pe Cunoaștere” a SUERD (2 octombrie 2013). La nivel național, Guvernul României consideră demersul de dezvoltare a DANUBIUS - RI și a nucleului său din Delta Dunării drept un proiect major de infrastructură de cercetare, care va permite finanțarea prin fonduri publice naționale și europene/ structurale.

2. METODOLOGICA APLICATĂ

Realizarea raportului de analiză privind infrastructurile de cercetare pan-europene, inițiativele și programele existente în domeniul gestionării ciclului apei a necesitat o componentă esențială de cercetare susținută.

În vederea îndeplinirii obiectivelor raportului, Consorțiul a aplicat mai multe instrumente de cercetare, precum analiza documentară (trecerea în revistă a literaturii de specialitate, a documentelor oficiale și a surselor de pe internet), sondaje în rândul diferitelor infrastructuri de cercetare pan-europene, întâlniri de tip atelier și schimburi de idei între membrii Consorțiului.

Pe parcursul acestui demers, cercetarea a fost structurată în 5 etape:

Etapa I: Cercetare documentară a datelor existente

În cadrul acestui proces, Consorțiul a abordat un volum semnificativ de studii descriptive și de explorare cu privire la IC, inițiativele și programele existente. În această etapă a proiectului, cercetarea a vizat următoarele componente ale infrastructurilor de cercetare pan-europene, inițiativelor și programelor existente: mijloacele, echipamentele, agenda de cercetare și resursele umane.

Analiza documentară a implicat realizarea următoarelor activități: informare asupra proiectului pentru toți membrii echipei, identificarea surselor de informații, colectarea și procesarea datelor, interpretarea și analiza datelor.

Sursele utilizate în vederea colectării informațiilor au constat din: versiunea actualizată a Cărții Albe, Cartea Albastră (dezvoltată în cadrul acestei faze), resursele internet ale infrastructurilor de cercetare pan-europene, inițiativelor și programelor existente, rapoarte oficiale publicate pe pagina de internet a Comisiei Europene și domeniul ESFRI, studii și rapoarte realizate de către membrii Consorțiului în cadrul altor proiecte.

Etapa a II-a: Cercetare cantitativă (sondaj)

În vederea completării rezultatelor cercetării cantitative, s-a optat și pentru realizarea unui sondaj în rândul participanților la unul dintre atelierelor organizate de către GEOECOMAR, în contextul acțiunilor întreprinse pentru dezvoltarea propunerii DANUBIUS - RI pentru ESFRI.

Sondajul calitativ de explorare a fost realizat în rândul participanților la atelierul cu durata de patru zile organizat de către GEOECOMAR la Sfântu Gheorghe în perioada 2 - 6 septembrie. Chestionarul a fost dezvoltat și distribuit participanților în prima zi a atelierului, iar răspunsurile au fost furnizate și colectate în următoarele trei săptămâni. Chestionarul respectiv vizează informații generale privind mijloacele infrastructurilor de cercetare pan-europene existente și expertiza în domeniul ciclului apei, cu accent pe sistemele fluviu-deltă-mare din Europa, precum și nevoile viitoare estimate.

Agenda atelierului de patru zile a cuprins următoarele teme: prezentarea DANUBIUS - RI, principalele provocări ale acestei inițiative, politica de utilizare a datelor, identificarea provocărilor societale majore,

prezentarea altor infrastructuri de cercetare de interes pan-european, inițiative, proiecte ESFRI. Atelierul a inclus și 2 (două) sesiuni paralele de câte o jumătate de zi, abordând următoarele subiecte: identificarea posibilelor sinergii, suprapuneri și diferențe între diversele inițiative (sesiunea 1) și strategii pe termen lung și sustenabilitate – efecte asupra diverselor arii tematice și priorități ale CE (sesiunea 2).

Printre respondenții la sondaj s-au numărat reprezentanți ai următoarelor organizații de cercetare:

- Institutul pentru Mediu și Dezvoltare Durabilă, Centrul Comun de Cercetare, Comisia Europeană;
- Universitatea din Helsinki, Fac. de Fizică, Secția Științe Atmosferice; Sediul principal temporar ESFRI ICOS RI;
- Wasser Cluster Lunz – de asemenea președinte IAD;
- NERC – Centrul pentru Ecologie și Hidrologie, Marea Britanie;
- Universitatea de Resurse Naturale și Științele Vieții, Viena (coordonator al Proiectului Fanion DREAM din cadrul SUERD);
- Institutul Național de Cercetare-Dezvoltare Delta Dunării – Tulcea (INCD – Tulcea), reprezentând proiectul PC7 PEGASO;
- Centre Internacional d'Investigació dels Recursos Costaners (CIIRC), Spania;
- Institutul UNESCO-IHE pentru Educație în Domeniul Apelor.

Etapa a III-a: Ateliere cu reprezentanți ai inițiativelor și infrastructurilor de cercetare pan-europene

În vederea completării informațiilor deja obținute, partenerii din cadrul Consorțiului au organizat reuniunea de tip atelier a Comitetului Internațional de Inițiativă (CII) al DANUBIUS-RI cu reprezentanții infrastructurilor de cercetare pan-europene, inițiativelor și programelor care și-au arătat interesul de a se alătura DANUBIUS-RI, în calitate sa de viitoare IC a FSEIC. Această etapă reprezintă un pas important în colectarea datelor, ca urmare a discuțiilor de grup și schimburilor de idei.

Întâlnirea de planificare a vizat dezbaterile rolului și modului de funcționare a Comitetului Internațional de Inițiativă al DANUBIUS-RI, a aspectelor principale ale structurii și rolului său, a activităților de comunicare externă și internă, precum și a pașilor următori. Reuniunea a fost prezidată de către Dr. Michael Schultz, Președinte al CII DANUBIUS-RI. Toate materialele de prezentare, precum și minuta întâlnirii au fost utilizate în elaborarea diferitelor secțiuni ale raportului.

Etapa a IV-a: Procesarea, analiza și interpretarea datelor

În cadrul etapei de analiză și procesare a datelor, informațiile și datele colectate din mai multe surse au fost procesate într-o manieră standardizată, folosind un set de criterii predefinite.

Consoțriul a dezvoltat o serie de instrumente de procesare și interpretare a datelor. A fost dezvoltat un set de fișe de date privind 61 de infrastructuri, inițiative și programe, acoperind sfera relevantă de facilități, inițiative și programe de cercetare la nivel european și internațional și cuprinzând următoarele seturi de date: nume, categorie, statut, localizare, obiective, descriere, resurse umane și agendă științifică.

A fost dezvoltat un fișier Excel, unde au fost stocate, transpuse și sintetizate/evaluate datele de intrare din fișele privind infrastructurile, programele și inițiativele, în vederea obținerii unei imagini de ansamblu care să servească celor două obiective principale: o înțelegere comună asupra elementelor identificate și facilitarea analizei și interpretării datelor. Consoțriul a dezvoltat următorul set de criterii pentru analiza și interpretarea datelor în vederea analizei SWOT:

o criterii de identificare și evaluare a punctelor tari:

1. *Avantajele IC pan-europene,*

- *Infrastructuri, vizând: echipamente/mijloace/resurse științifice majore; infrastructuri electronice (date, sisteme de calcul și software); resurse bazate pe cunoaștere (colecții, arhive, date științifice); orice altă infrastructură cu caracter unic, esențială pentru atingerea excelenței în activitatea de cercetare;*
 - *Agenda științifică;*
 - *Acreditări, certificări;*
 - *Resurse umane, vizând: reputație; experiență; abilități (de management, în domeniul științific); calificări;*
 - *Localizare geografică;*
 - *Date financiare/scurgeri de numerar;*
2. *Care sunt avantajele competitive ale infrastructurilor?*
 3. *Sunt proiectate și operate astfel încât să atragă/găzduiască cei mai buni cercetători (infrastructuri cu liber acces)?*
 4. *Care este nivelul de calitate din perspectiva următoarelor aspecte ale activității acestora: științific, educațional, tehnologic și de management (ridicat, mediu și scăzut).*
 5. *Posibilele efecte/implicații pozitive asupra viitorului centru DANUBIUS - RI?*

o criterii de identificare și evaluare a punctelor slabe:

1. *Dezavantaje/deficiențe ale infrastructurilor de cercetare pan-europene:*

- *Infrastructuri, vizând: echipamente/mijloace/resurse științifice majore; infrastructuri electronice (date, sisteme de calcul și software); resurse bazate pe cunoaștere (colecții, arhive, date științifice); orice altă infrastructură cu caracter unic, esențială pentru atingerea excelenței în activitatea de cercetare;*
- *Agenda științifică;*
- *Acreditări, certificări;*
- *Resurse umane, vizând: reputație; experiență; abilități (de management, în domenii științifice); calificări;*
- *Localizare geografică;*
- *Date financiare/scurgeri de numerar.*

2. *Care sunt deficiențele din punct de vedere al poziției concurențiale?*

3. *Care sunt vulnerabilitățile cunoscute ale acestora?*

4. *Posibilele efecte/implicații negative asupra viitorului centru DANUBIUS - RI?*

○ criterii de identificare și evaluare a oportunităților:

1. *Care sunt vulnerabilitățile infrastructurilor competitorilor?*

2. *Care sunt tendințele stabilite prin documentele de programare?*

3. *Care sunt influențele globale?*

4. *Care sunt provocările științifice globale cărora trebuie să le răspundă aceste infrastructuri?*

5. *Care sunt elementele infrastructurilor de cercetare pan-europene care le vor ajuta să devină o forță motrice vitală din punct de vedere al cercetării și inovării, precum și din punct de vedere socio-economic?*

6. *Dezvoltarea și inovarea tehnologică în domeniul managementului integrat al sistemelor de tip fluviu-deltă-mare.*

7. *Localizare geografică;*

8. *Parteneriate, rețele, agenții de finanțare?*

○ criterii de identificare și evaluare a amenințărilor:

1. *Care sunt efectele potențiale din punct de vedere politic?*

2. *Care sunt efectele potențiale din punct de vedere legislativ?*

3. *Care sunt efectele potențiale din punct de vedere al mediului?*

4. *Sprijin financiar durabil?*
5. *Care sunt posibilele obstacole de depășit?*
6. *Există puncte slabe insurmontabile?*

Etapa a V-a: Redactarea raportului științific

Instrumentele de cercetare și sursele de informații menționate mai sus au furnizat date de intrare solide pentru elaborarea diferitelor secțiuni ale raportului, inclusiv cele privind analiza SWOT și seturile de concluzii și recomandări formulate în legătură cu propunerea de proiect DANUBIUS - RI pentru ESFRI.

Prezentul document de analiză constituie un material relevant, care evidențiază principalele constatări și variabile incluse în analiza SWOT.

Analiza SWOT ne-a permis să formulăm un set relevant de concluzii și recomandări esențiale pentru dezvoltarea ulterioară a centrului DANUBIUS, raportul constituind – în consecință – un solid studiu de caz. Cercetarea întreprinsă a relevat informațiile esențiale privind infrastructurile existente de cercetare de interes pan-european, nișa respectivă, complementaritățile și prioritățile viitorului centru DANUBIUS.

3. CONSTRÂNGERI ALE RAPORTULUI DE ANALIZĂ

Pe parcursul acestui demers, Consorțiul a formulat următoarele ipoteze și constrângeri în ceea ce privește raportul final:

- Raportul de analiză asupra infrastructurilor de cercetare pan-europene privind managementul integrat al sistemelor de tip fluviu-deltă-mare din Uniunea Europeană trebuie utilizat în integralitatea sa și nu parțial.
- Informațiile cuprinse în prezentul document se bazează pe eforturile de cercetare și analiză întreprinse de către consorțiu și se consideră a fi corecte, constituind informații oficiale privind infrastructurile de cercetare pan-europene, programele și inițiativele existente. Conținutul raportului de analiză poate suferi modificări și nu trebuie considerat a fi garantat în nici o circumstanță.
- Conținutul prezentului raport de analiză a fost elaborat pe baza surselor de informații existente, și anume: informații de interes public (paginile de internet ale infrastructurilor de cercetare/ programelor/ inițiativelor de interes pan-european), răspunsurile primite în urma *sondajului privind infrastructurile de cercetare existente și expertiza în domeniul ciclului apei la nivel european*, distribuit participanților la atelierul de patru zile organizat la Sfântu Gheorghe în perioada 2 - 6 septembrie, minutele întâlnirilor și prezentările din cadrul evenimentelor organizate de către GEOECOMAR și INSB (atelierul din Sfântu Gheorghe – județul Tulcea, Ședința CII desfășurată la București, în perioada 7 - 8 noiembrie), Cartea Albă, alte informații de interes public obținute pe parcursul acestui proces (a se consulta secțiunea *Bibliografie*).
- Raportul de analiză se bazează pe informațiile disponibile referitoare la centrul DANUBIUS - RI, așa cum este descris în Cartea Albă, versiunea 7 (fără informații de tip cantitativ).
- În cadrul acestui demers, Consorțiul a realizat analizele SWOT privind Centrul DANUBIUS - RI în raport cu infrastructurile existente de cercetare pan-europene, inițiativele și programele europene și globale în domeniul gestionării ciclului apei.
- Autorii nu își asumă responsabilitatea privind aspectele de natură juridică.

4. CENTRUL PENTRU STUDII AVANSATE “DANUBIUS”

4.1. DESCRIEREA CENTRUL PENTRU STUDII AVANSATE “DANUBIUS”

Centrul Internațional pentru Studii Avansate a Sistemelor Fluviu-Delta-Mare “DANUBIUS-RI” este o inițiativă românească de a crea o nouă infrastructură care va reprezenta atât un Centru Internațional de cercetare pentru sisteme Fluviu-Delta-Mare cât și un Pol Internațional de Excelență pentru cercetare și inovare în management și dezvoltare durabilă a zonelor umede și a ecosistemelor fluviu-delta-mare.

O abordare integrată a anumitor probleme și aspecte legate de sistemele fluviu-delta-mare este din ce în ce mai necesară, chiar dacă numeroasele organizații de cercetare, având ca obiect de activitate studierea fluviilor, estuarelor, deltelor și oceanelor, desfășoară proiecte multidisciplinare în acest domeniu, la nivel european. Acest lucru este necesar pentru că ecosistemele de la interfața apă-uscat reprezintă zone foarte bogate din punctul de vedere a biodiversității, care furnizează servicii esențiale și sunt (încă) caracterizate de procese dinamice. De asemenea, impactul acțiunilor antropice asupra sistemului este important, acestea exercitând o presiune semnificativă și din ce în ce mai intensă, asupra funcționării sistemelor naturale (vulnerabile). Toți acești factori trebuie considerați părți integrante ale ecosistemului, fiind foarte important să fie identificate și apoi promovate inițiative pentru asigurarea durabilității (regionale), a protecției mediului și a dezvoltării socio-economice în mod optim.

Inițiativa va răspunde în principal cerințelor a două strategii importante din Europa, pentru viitor, cu privire la mediu, schimbări climatice și biodiversitate, folosind sistemul ca model Dunare – Delta Dunării – Marea Neagră:

- Strategia Europeană Orizont 2020 și
- Strategia Uniunii Europene pentru Regiunea Dunării.

Strategia cu un rol major în promovarea viitorului centru este Strategia Uniunii Europene pentru Regiunea Dunării, elaborată de Comisia Europeană în 2010 și adoptată în aprilie 2011, pe baza contribuțiilor statelor riverane, care a fost creată luându-se în considerare argumente socio-economice și geopolitice, cu atât mai mult cu cât Regiunea Dunării reprezintă 1/5 din teritoriul UE. Această strategie reprezintă un instrument comun pentru cooperare macroregională în Uniunea Europeană, în care sunt invitate să participe cele 14 state membre și trei state din Bazinul Dunării. Centru internațional răspunde uneia din acțiunile majore, ale Planului de Acțiune al Strategiei – crearea unui centru internațional pentru studii avansate în Regiunea Dunării.

În octombrie 2013, DANUBIUS-RI a obținut statutul de **Proiect Fanion** în Strategia de Dezvoltare a Comisiei Europene pentru Regiunea Dunării.

De asemenea, proiectul este considerat de către Guvernul României/Ministerul Educației Naționale ca fiind un Proiect Major care va fi co-fințanțat din fonduri publice în următoarea perioadă, 2014-2020, prin Fondurile Structurale și de Investiții ale României.

3.1. Descrierea Infrastructurii

Infrastructura Centrului Internațional pentru Studii Avansate a Sistemelor Fluviu-Delta-Mare "DANUBIUS-RI" va cuprinde:

- un sediu central în Delta Dunării, la Murighiol, pe o suprafață de 10 ha, și
- o rețea de noduri distribuite în Europa, care reprezintă de fapt facilități de top și/sau centre de excelență în cercetare pentru sisteme acvatice.

Locația sediului central a fost selectată din 11 situri din Rezervația Biosferei Delta Dunării. Sediul central va fi situat pe malul drept al bratului Sfântu Gheorghe, în Rezervația Biosferei Delta Dunării, la Murighiol. Această locație facilitează accesul de pe drumul național și de pe Dunare, oferă acces imediat în Delta Dunării și facilitează accesul în zona de coastă și pe cursul inferior al Fluviului Dunarea. Consiliul local Murighiol a aprobat 10 hectare de teren pentru construirea centrului.

Această abordare (nucleu central+noduri), propusă de inițiatorii noii infrastructuri, oferă șansa de a grupa cele mai bune facilități și competențe din Europa și de a susține un efort concentrat (pe plan internațional) pentru înțelegerea, caracterizarea și gestionarea sistemelor fluviu+delta+mare la nivel global.

Prin această inițiativă, oportunitățile oferite de cercetarea în laboratorul natural 'sistemul Fluviul Dunarea – Delta Dunării – Marea Neagră' va fi maximizată prin construirea capacităților cu o nouă infrastructură de cercetare și prin implicarea activă a cercetătorilor și a instituțiilor atât din țară cât și din străinătate. Acesta va furniza rezultate cu un beneficiu real pentru populația din macro-regiunea Danure-Marea Neagră, care vor fi transferabile și altor sisteme fluviu-delta-mare.

Centrul internațional va funcționa ca o Infrastructură Distribuie de Cercetare pan-europeană, având unitatea de coordonare în Delta Dunării, la Murighiol, cu:

- o unitate/centru administrativă;
- locație pentru noi laboratoare de cercetare (sediul va reprezenta o poartă deschisă către laboratorul natural Delta Dunării);
- facilități pentru educație.

Nucleul central va comunica cu nodurile distribuite din Europa, reprezentate de facilitatile/centrele de excelenta in cercetare pe domenii specifice.

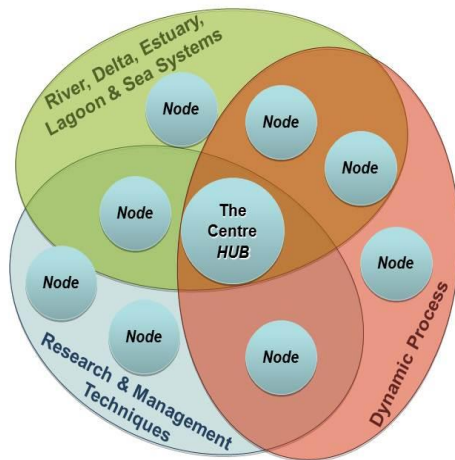


Figura 1. Diagrama care prezintă conceptul centrului ,DANUBIUS-RI' (nucleu central + noduri)

Centrul va funcționa ca o platforma de dialog permanent între toate partile implicate pentru a identifica și hotărî asupra felului optim de folosire a resurselor naturale din zonele sensibile din punct de vedere ecologic, fără a perturba funcționarea sau structura ecosistemului.

Nodurile vor fi reprezentate de facilitati de top și centre de excelenta care au ca obiect de activitate procese, cercetare și/sau ofera acces la alte macrosisteme comparabile (sau parti din acestea). Toate nodurile sunt conectate între ele în mod direct și de asemenea prin/si cu sediul centrului.

Structura centrului cu un nucleu fizic (sediul) în Delta Dunării și noduri distribuite în Europa (atat în cadrul cât și în afara Regiunii Dunării) va oferi cele mai bune expertize și capacitati științifice din Europa, atat pentru macrosistemul Fluviu Dunărea – Delta Dunării – Marea Neagră cât și pentru alte macrosisteme similare la nivel global. Expertiza internaționala adunata sub umbrela acestui Centru, cu expertiza în științele mediului, vietii, pamantului și cele socio-economice va oferi o baza excelenta pentru dezvoltarea unei structuri care să lucreze pentru dezvoltarea durabila a sistemelor fluviu-delta-mare.

Crearea DANUBIUS-RI va cuprinde 3 faze, în perioada 2013 – 2020 (pe baza studiului de fezabilitate și a materialelor care vor rezulta din proiectele FP7 DANCERS FP7, după intrarea pe lista ESFRI, a proiectului Horizon 2020 care va fi dedicat DANUBIUS-RI pentru Faza Pregătitoare.

- **Faza 1 – 2013-2016**

Prima faza consta in constructia infrastructurii de baza a nucleului de la Murighiol – „statia de teren”, care va avea:

- Facilitati de cazare si depozitare
- Laboratoare
- Echipament de birou.

In aceasta etapa va fi de asemenea necesara dezvoltarea legaturilor cu alte infrastructuri si facilitati de cercetare, nationale si internationale, implicate in studii ale macrosistemelor fluviu-delta-mare.

La finalul acestei faze, centrul va avea deja o facilitate moderna, pan-europeana, pentru studii complexe in teren a sistemului Dunarea – Delta Dunarii – Marea Neagra.

In aceasta faza se prevede constructia a ~70 % din totalul cladirilor planificate a fi construite. Acestea sunt:

a. **Cladiri destinate activitatilor de cercetare in sistemul fluviu – delta – mare:**

- Laboratoare pentru procesarea primara a probelor colectate din teren;
- Laboratoare pentru analiza probelor care trebuie realizate imediat sau pentru probe care nu pot fi transportate la alte laboratoare fara a fi deteriorate;
- Facilitati de stocare pentru probe geologice si biologice;
- Facilitati pentru stocarea pe termen lung a probelor – o litoteca;
- Ateliere pentru construirea si repararea echipamentului de teren
- Spatii pentru pastrarea in bune conditii a echipamentelor de lucru.

b. **Cladirea administrativa a centrului si cladire de birouri pentru cercetatori.**

c. Cladiri care sa contina sali de conferinte, sali pentru intalniri/cursuri, biblioteca, centru IT (ex. un centru de „cloud computing”), etc.;

d. Cladiri pentru cazarea

- cercetatorilor,
- personalului tehnic
- personalului adimnistrativ,
- studentilor si
- vizitatorilor.

Alti pasi importanti de urmat, prevazuti in Faza 1 a constructiei includ:

- inzestrarea centrului cu echipament pentru probare si observatii in situ, inclusiv echipament automat si echipament pentru monitorizare pe termen lung care va fi amplasat in apa (brate, lacuri, canale, etc.).

- Furnizarea și instalarea de echipament științific în laboratoare pentru procesarea primară a probelor și analize imediate.
- Echiparea clădirilor administrative și de birouri și a celor pentru conferințe, centru de calcul și cazare;
- Furnizare de facilități tehnice și logistice pentru centru, care să corespundă celor mai noi standarde ale strategiilor de management ecologic pentru:
 - Alimentare cu apă,
 - Alimentare cu energie electrică,
 - Tratarea apei reziduale/uzate;
 - Debarcader pentru vasele și barcile de cercetare ale Centrului.

Faza 2 – 2016-2018

A doua fază a construcției presupune furnizarea, instalarea și testarea echipamentelor de înaltă tehnologie, specializate, care vor forma o infrastructură europeană modernă de prim nivel la scară globală, dedicată studiilor inter și multi-disciplinare a factorilor complecși care controlează starea mediului și evoluția sistemelor fluviu – delta – mare.

Lista detaliată a laboratoarelor specializate, de înaltă tehnologie, facilități/dispozitive/echipamente de modelare fizică, facilități de tip mezocosm, cât și echipamentul specializat pentru aceste laboratoare, va rezulta din Proiectul de Fază Pregătitoare a DANUBIUS-RI după acceptarea pe lista ESFRI.

Faza 3 – 2018-2020

Cea de a treia fază a construcției va consta în dezvoltarea infrastructurii, în conformitate cu nevoile identificate în viitoarea Fază Pregătitoare (și/sau viitoare alte categorii de proiecte – cu parteneri internaționali) și acestea vor fi reprezentate de facilități și capacități de vârf la nivel global, dar și de nave de cercetare pentru studiul fluviului, deltei și mării:

- O navă de cercetare mare, complet echipată, multifuncțională pentru mare (aprox. 2,000 – 2,500 t) și
- O navă de cercetare de mici dimensiuni pentru fluviu, delta și zona costieră.

Nava maritimă va fi parte a flotei de cercetare europene, navă de serviciu a Uniunii Europene pentru cercetările din Marea Neagră.

Educația/programul de strategie și infrastructura lui specifică va fi dezvoltată prin colaborări cu universități, unități de cercetare – dezvoltare, alte proiecte ESFRI, infrastructuri europene și regionale,

precum și cu alte institutii care vor lua parte la activitățile Centrului Internațional Dunarea pentru Studii Avansate în Sistemele Fluviu – Delta – Mare.

4.2. Descrierea agendei științifice

Noua Infrastructura de Cercetare distribuită va fi dedicată studierii sistemelor fluviu - delta - mare, și își propune să reunească echipe de cercetători trans și interdisciplinare (din toate domeniile), cu experiența necesară pentru a rezolva problemele legate de sistemele rau-delta-mare. Aceste sisteme complexe și dinamice trebuie să fie mult mai bine cunoscute, caracterizate și comunicate, dificultățile de monitorizare și managementul acestor sisteme (la scară întregului bazin și în timp real) trebuie rezolvate, trebuie să fie dezvoltat un management integrat și flexibil în scopul de a evalua și analiza râurile, delta, litoralul și marea aflată sub influența fluviului ca pe o singură entitate.

Din punct de vedere științific, este necesară o abordare profundă a problemelor specifice și a înțelegerii unor aspecte legate de sistemele fluviu-delta-mare, cu toate că la nivel european există mai multe organizații sau inițiative active în domeniul specific științelor de cercetare multi-disciplinară cu privire la râuri, delte și mare (doar segmente ale sistemelor integrate fluviu-delta-mare). DANUBIUS-RI va oferi o perspectivă integratoare asupra sistemului fluviu- delta-mare, fiind o platformă unică și transdisciplinară în domeniu, care va integra cunoștințele existente din diferite discipline, precum cele din științele pământului, ecologie, științele vieții și științele socio-economice. DANUBIUS-RI va facilita și coordona activități și proiecte de cercetare și va oferi o infrastructură pentru a implementa și menține puncte de monitorizare în întregul sistem al bazinului hidrografic până spre zona de mare adâncă. De asemenea, centrul va asigura calitatea datelor colectate, stocarea și diseminarea acestora.

Pentru a răspunde la diverse probleme legate de managementul integrat și eficient al sistemelor rau-delta/estuar-mare, o serie de **provocări științifice majore la nivel global** trebuie să fie abordate, cum ar fi:

- înțelegerea genezei și evoluției naturale a macrosistemelor Fluviu -Delta-Mare;
- cuantificarea impactului schimbărilor antropice asupra sistemelor Fluviu–Delta-Mare;
- determinarea vulnerabilității și/sau a modificărilor suferite de către sistemele Fluviu–Delta-Mare ca urmare a schimbărilor climatice;
- caracterizarea ciclurilor biogeochimice în întregul macrosistem Fluviu/Rau-Delta-Mare;
- management integrat avansat cu privire la inundații/secete catastrofale cu hazard potențial asupra întregului macrosistem Fluviu/Rau-Delta-Mare;
- investigarea consecințelor deteriorării fizice a structurilor morfologice și a habitatului (ex. canalizări, indiguiri, baraje) și determinarea măsurilor pentru refacerea hidromorfologiei naturale;

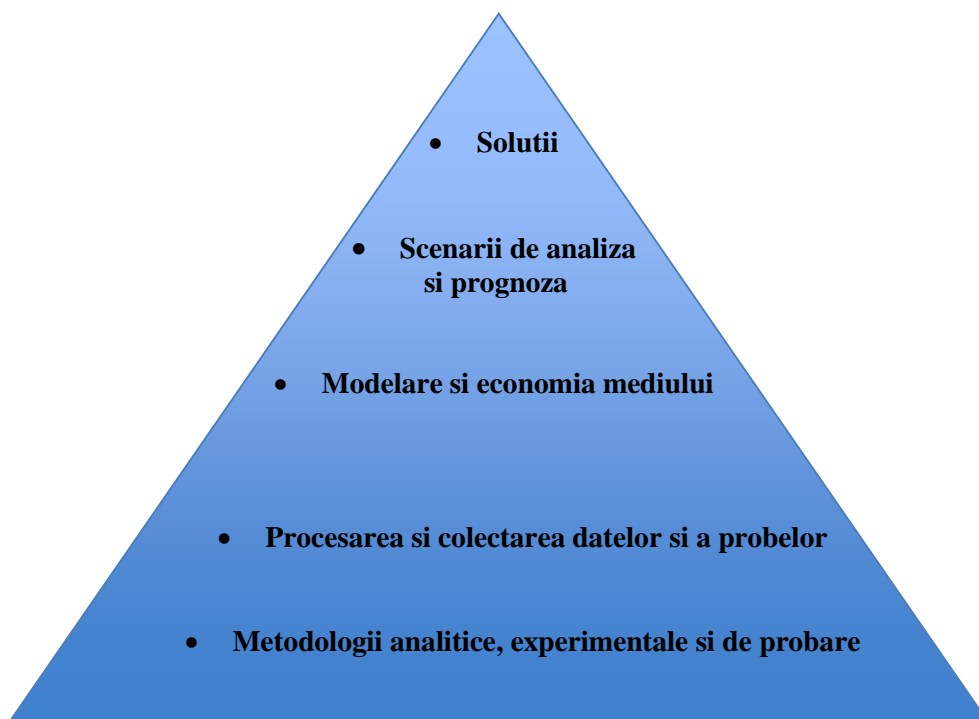
- conservarea si refacerea biodiversitatii din macrosistemele Fluviu/Rau-Delta-Mare;
- imbunatatirea si protejarea bunurilor si serviciilor furnizate de macrosistemele Fluviu-Delta-Mare;
- dezvoltarea solutiilor de management pentru cadrul politic existent si de viitor (de exemplu Directiva Cadru Apa a Comisiei Europene);
- acordarea de expertiza stiintifica pentru dezvoltarea, imbunatatirea si testare de politici si norme de protectia mediului.

DANUBIUS-RI se va implica in programe majore de cercetare a macrosistemelor fluviu-delta-mare care vor raspunde la aceste provocari stiintifice complexe. Capacitatile stiintifice de baza ale DANUBIUS-RI vor cuprinde o piramida a cunoasterii pe care se va baza managementul eficient, integrat, al macrosistemului fluviu-delta-mare.

Potentialul stiintific al Centrului va include (vezi figura 2):

- o infrastructura adecvata de monitorizare, in care se va face colectarea de date si probe complexe si in mod continuu;
- capacitatea de a dezvolta metodologii analitice si experimentale noi si avansate;
- dezvoltarea si aplicarea de modele noi si imbunatatite de mediu din macrosistemele rau-delta-mare, care sa permita elaborarea de predictii;
- dezvoltarea si aplicarea unei abordari noi si performante in ceea ce priveste economia mediului pentru a putea evalua legatura dintre societate si mediu;
- identificarea solutiilor de management pe baza prognozei detaliate si analizei de scenarii cu privire la viitoarele schimbari de mediu.

Figura .1 Diagrama potentialului stiintific al Centrului



In partea superioara a diagramei se poate observa posibilitatea identificarii solutiilor specifice si adecvate pe baza celor mai solide date disponibile si a intelegerii stiintifice ca urmare a activitatii DANUBIUS-RI1 mai sus mentionate.

Pentru stabilirea agendei stiintifice, Centrul isi propune sa se adreseze temelor de cercetare care sunt in prezent de interes (vezi Cartea Alba), precum:

1- Caracterizarea sistemelor (inclusiv Geneza si Evolutia macrosistemelor fluviu-delta-mare):

- influenta proceselor geodinamice asupra macrosistemelor fluviu-delta-mare;
- paleoclimatul, paleolimnologia si paleogeografia regionala, hidrologia, transportul de sedimente, ciclurile biogeochimice, hidrogeologia si morfo-dinamica;
- analiza evolutiei ecosistemelor.

2- Modificarile globale (inclusiv impactul Schimbarilor Climatice)

- evaluarea schimbarilor din structura si functionalitatea ecosistemelor ca urmare a influentelor naturale si antropice;
- evaluarea in timp real si continuu a calitatii mediului; dezvoltarea unui sistem de avertizare complex care sa vina in ajutorul managementul riscurilor;
- recomandari si norme pentru imbunatatirea nivelului ecologic al ecosistemelor cu probleme de functionare si conservarea speciilor pe cale de disparitie si a habitatului lor.

3- Managementul flexibil si durabil al macrosistemelor fluviu-delta-mare.

- metode si modele de dezvoltare durabila pe baza abordarii generale interdisciplinare;

- remediarea sistemului in contextul schimbarilor climatice (ca urmare a influentei climatice si antropice);
- evaluarea schimbarilor sociale ale comunitatilor locale pentru dezvoltare durabila.

Centrul va dezvolta si utiliza alte metode fata de cele folosite pana acum in care, in mod traditional, activitatile de cercetare asupra acestor sisteme erau efectuate separat pe diverse discipline. Aceste noi metode privesc o abordare multi- si transdisciplinara, ca urmare a integrarii mai multor discipline apropiate ca sa poata fi determinate solutii generale cu echipe de cercetatori din diverse ramuri.

Cateva exemple cu teme specifice de cercetare sunt detaliate in Tabelul 1 de mai jos.

Tabel 1. Exemple de topici de cercetare specifice propuse in conformitate cu necesitatile actuale identificate in macrosistemul Dunare – Delta – Marea Neagra.

TOPICI DE CERCETARE SPECIFICE propuse de Centru	
Caracterizarea sistemului	
Originea si evolutia sistemului Dunare – Delta Dunarii – Marea Neagra	<ul style="list-style-type: none"> - geneza fluviului si a bazinului; - structura geologica; - influenta dinamicii crustei pamantului asupra evolutiei fluviului; - interactiunea dintre fluviu si mare (relatia dintre variatia nivelului marii si conditiile din alte bazine de sedimentare); - formarea deltei; - evolutia depocentrelor, etc.
Procesele geodinamice	<ul style="list-style-type: none"> - neotectonica; - procesele de ridicare din zona de orogen si formarea si evolutia teraselor fluviului; - subsidenta si compactarea sedimentelor; - corelarea cu evolutia sistemului.
Hidrologie, hidrodinamica, hidrogeologie si sedimentologie	<ul style="list-style-type: none"> - variatia debitului lichid si solid din sistemul fluviu-delta-mare; - ciclul de sedimentare (sursa – transport – depunere); - bio- si geo-chimia apei si sedimentelor din intregul sistem; - procesele hidrodinamice la interactiunea rau-mare si in zonele lacustre.

Evaluarea si functionarea ecosistemului	<ul style="list-style-type: none"> - evaluarea stării biotice si abiotice a ecosistemelor fluviu-delta-mare; - poluarea sistemului, eutrofizare, toxicitate, biodiversificare; - evaluarea ciclului hranei, dinamica speciilor si functionarea ecosistemului; - fluxuri de gaze cu efect de sera in zone umede, lacuri si mare.
- Schimbari de mediu	
Monitorizarea in-situ a ecosistemului	<ul style="list-style-type: none"> - evaluarea în timp real si permanentă a calității mediului in sistemul fluviu-delta-mare - instalarea de noi tipuri de senzori si echipamente on-line (inclusiv tehnici de micro-si mezocosm); - utilizarea de biomarkeri; - stabilirea seriilor de date pentru analiza pe termen lung a modificarilor din ecosistem.
Monitorizarea terestra si teledetectie	<ul style="list-style-type: none"> - caracterizarea uscatului si a apei din sistemele fluviu-delta-mare, monitorizarea schimbarilor morfologice si hidrologice, studierea si monitorizarea curentilor și a cursului apei, eutrofizarea, dinamica sedimentelor si morfologia albiei raului.
Geo-hazard si evaluarea riscurilor	<ul style="list-style-type: none"> - evaluarea fenomenelor extreme si a factorilor de declansare, naturali si antropici la diferite scari, cum ar fi: inundatii, secete, alunecări de teren, furtuni; - cutremure; - instabilitati de panta (a sedimentelor) continentală; - geohazardele datorate prezentei gaz-hidratilor in sedimente.
Modelarea, simularea si testarea ipotezelor	<ul style="list-style-type: none"> - instrumente de predictie pentru evaluarea reactiei mediului inconjurator; - modelarea schimbarilor climatice si de mediu, inclusiv impactul asupra sistemelor fluviu-delta-mare; - efectele evenimentelor extreme asupra sistemului; - impactul cresterii nivelului mării.

Impactul antropic asupra ecosistemului	<ul style="list-style-type: none"> - degradarea ecosistemului ca urmare a activitatii antropice; - evaluarea dinamicii sociale a comunităților locale și identificarea oportunităților economice pentru o dezvoltare durabilă fara degradarea biodiversității.
- Management flexibil si durabil	
Managementul flexibil al ecosistemului	<ul style="list-style-type: none"> - Asigurarea bazei stiintifice pentru managementul durabil al sistemelor rau-delta-mare, folosind metode si modele adecvate.
Refacerea si conservarea mediului	<ul style="list-style-type: none"> - imbunatatirea conditiilor de mediu, refacerea habitatelor, bioremediere, remedierea conexiunilor; - recomandari pentru conservarea speciilor pe cale de disparitie si a habitatelor afectate; - implementarea legislatiei UE; - evaluarea speciilor invazive din afara sistemului.
Inventarierea si evaluarea resurselor naturale	<ul style="list-style-type: none"> - Studii avansate pentru managementul durabil al resurselor biotice si abiotice prin dezvoltare bazata pe cunoastere si utilizarea unor metode si modele noi (de exemplu, evaluarea beneficiilor ecosistemului).
Evaluarea scenariilor de dezvoltare pentru utilizare durabila	<ul style="list-style-type: none"> - Abordare interdisciplinara si generala pentru dezvoltarea de noi strategii pentru management durabil. Dezvoltarea de metode pentru crearea si testarea de sisteme de sprijin in luarea deciziilor (DSS) si pentru analiza multicriteriala ca fundamentare in luarea deciziilor.

In plus fata de aceste subiecte stiintifice si manageriale, este preconizat ca DANUBIUS-RI va juca un rol important in:

- **Facilitarea si promovarea educatiei:**
 - o Sustinerea programelor de mediu internationale si nationale cu aria de studiu in cadrul macrosistemelor fluviu-delta-mare;
 - o Educatie in domeniul mediului pentru cresterea gradului de constientizare in ceea ce priveste problematica din sistemele fluviu-delta-mare.
- **Sustinerea legilor si a regulamentelor in domeniul mediului:**

- Promovarea unei baze stiintifice in vederea imbunatatirii metodelor si a instrumentelor de testare a cadrului legislativ specific, pentru mmai buna implementare a politicilor UE;
- **Dezvoltarea de produse si tehnologii ecologice inovatoare:**
 - Concentrarea eforturilor in vederea valorificarii resurselor naturale in sistemele fluviu-delta-mare in conformitate cu directiile dezvoltarii durabile.
- **Dezvoltarea tehnologiilor inovatoare de cercetare-dezvoltare, a echipamentelor si tehnicilor informatice si comunicare de date (IT&C):**
 - Metode inovative de monitorizare, masurare si modelare
 - Noi metode de colectare a datelor, prelucrare, stocare si transfer, unde este necesara dezvoltarea de noi capacitati tehnice si IT&C.
- **Dezvoltarea unei meta-baze de date integrand literatura existenta in domeniu (si date istorice) cat si date proprii din cadrul programelor ce se vor desfasura in cadrul centrului, in colaborare cu partenerii existenti, in arealul Dunare-Marea Neagra.**

Descrierea Managementului DANUBIUS-RI

Din perspectiva resurselor umane, centrul va cuprinde:

- **O echipa de management, constand in**
 - la nivel strategic:
 - Presedinte – Director general;
 - Comitet de coordonare.
 - la nivel operational:
 - sefi de departamente,
 - grupuri de lucru
 - echipe de sprijin.
 - la nivel de sprijin:
 - consiliul consultativ international (incluzand cercetatori de valoare, precum si reprezentanti ai altor posibili beneficiari / utilizatori)

Comitetul Director al centrului este organul executiv, care va lua deciziile DANUBIUS-RI. Aceasta va conduce toate activitatile si va fi responsabil pentru strategia, implementarea si functionarea centrului. Acesta va fi sprijinit de consiliul consultativ international.

Comitetul Director va cuprinde un presedinte, un vicepresedinte si 5 sau 7 membri (inclusiv directorul general al DANUBIUS-RI). Membrii comitetului vor fi numiti pentru a asigura functionarea optima si eficienta a centrului, pastrand in acelasi timp un echilibru rezonabil intre mediile stiintifice diferite, formare si aptitudini.

- **Gupurile si echipele de lucru**

Echipele de lucru vor dezvolta activitatile stiintifice ale centrului, care sunt axate pe directiile principale stabilite de catre Comitetul Director. Structura trebuie sa fie flexibila, cu o participare activa a personalului tehnic, pentru a asigura intretinerea infrastructurii de cercetare. Fiecare grup de lucru va fi condus de un cercetator reputat care ar trebui sa lucreze la un proiect bine definit, pentru o durata limitata.

In plus fata de cercetatori, grupurile de lucru vor fi sprijinite de:

- doctoranzi si post-doctoranzi care abordeaza probleme stiintifice de interes;
- personal stiintific la inceput de cariera, care conduc o activitate de cercetare independenta, sub supravegherea unui cercetator cu renume;
- cercetatori care colaboreaza in zone specifice ale unui proiect pentru o perioada limitata de timp.

La aceasta etapa, sunt avute in vedere doua sectiuni permanente ale centrului, si anume "activitatile IT" si "educatie", pentru a asigura continuitatea.

Pozitia de Director General, precum si toate pozitiile din cadrul departamentelor de servicii vor fi permanente, anuntate si recrutate in plan international. Noul management public va opera pentru a minimiza birocratia si a creste motivatia si eficienta costurilor.

Pozitiile de membri ai comitetului director si consiliul consultativ international nu necesita o prezenta personala permanenta la sediul central.

- **Echipele stiintifice si de cooperare**

Ca infrastructura de cercetare de varf (dar si de educatie si inovare) pentru stiintele naturale si socio-economice, DANUBIUS-RI va imbunatati transferul de cunostinte in acest domeniu prin colaborarea stransa cu organizatiile de cercetare si educatie existente.

DANUBIUS-RI va avea printre parteneri o retea stransa de institutii pan-europene si universitati inca de la inceput, astfel incat va beneficia din start de o expertiza deja disponibila. Acesta va coopera cu alte echipe de cercetare pentru a aborda problemele semnificative in macrosistemele fluviu-delta-mare, cum ar fi reducerea biodiversitatii, identificarea de solutii "ecologice" pentru dezvoltarea economica, si buna administrare a resurselor limitate in acelasi timp cu cresterea populatiei.

Cercetatori de varf vor fi invitati sa formeze echipe de baza pentru a lucra in programele de cercetare ale Centrului. Prezenta lor va atrage cercetatori tineri, precum si studenti cu studii

universitare finalizate sau/si in curs de finalizare care doresc sa castige experienta in aceste domenii atractive si pe tematici pline de provocari stiintifice. Probele necesare pentru aceste studii vor fi prelevate, pastrate si analizate in cadrul DANUBIUS-RI sau in laboratoarele altor organizatii de cercetare.

Platforma de educatie oferita de DANUBIUS-RI va oferi o valoare adaugata semnificativa prin crearea unui forum pentru schimbul de cunostinte intre cercetatori si intre cercetatori si studenti. In acest sens, forumul va promova proiecte de cooperare, in special intre echipe din estul si vestul Europei. Cursuri intensive, scoli de vara, conferinte si seminarii vor fi mecanisme importante si valoroase de diseminare a cunostintelor. Mai mult decat atat, Centrul va creste gradul de constientizare a valorii mediului natural si rolul sau in bunastarea oamenilor, prin excursii ecologice si discutii destinate comunitatilor locale, profesori sau turisti.

Alte oportunitati semnificative sunt oferite prin legaturile cu Reteaua Universitatilor de la Marea Neagra. Aceasta retea cuprinde peste 100 de institutii de invatamant superior din regiunea Marii Negre (incluzand Turcia, Georgia, Armenia, Azerbaidjan, Ucraina, Moldova, Romania, Bulgaria, Grecia, Albania, Serbia) si este coordonata de Universitatea "Ovidius" din Constanta, Romania.

DANUBIUS-RI va construi pe baza proiectelor, atat nationale cat si internationale, mai ales europene si in principal Programele Cadru (HORIZON 2020). Acesta va initia in continuare si va participa la proiecte din internationale prin cooperarea cu alte organizatii de cercetare majore recunoscute in domeniile lor. Institute romanesti de cercetare relevante si organizatii importante care se ocupa cu studierea si monitorizarea macro-sistemului fluviului Dunare - Delta Dunarii - Marea Neagra vor fi gasi in DANUBIUS-RI o platforma importanta de lucru si educatie.

De asemenea, DANUBIUS-RI va coopera in mod activ cu organizatiile nationale si internationale care sunt desemnate cu gestionarea ecologica si durabila a elementelor specifice fluviului Dunarea - Delta Dunarii - Marea Neagra, prin stabilirea de comun acord a planurilor pentru a rezolvare a unora dintre cele mai importante provocari in macrosistemul Dunare - Marea Neagra.

5. INFRASTRUCTURI DE CERCETARE PAN-EUROPENE RELEVANTE PENTRU CENTRUL DE STUDII AVANSATE „DANUBIUS”

Infrastructura propusa, DANUBIUS-RI, este dedicata studiului fenomenelor complexe care guverneaza sistemele fluviu-delta-mare. De asemenea, DANUBIUS-RI isi propune sa ofere solutii durabile pentru situatii speciale si fenomene de criza care au loc la nivelul respectivului sistem complex.

Macrosistemul Dunare-Delta Dunarii-Marea Neagra este considerat semnificativ, fiind un caz stiintific care exemplifica perfect principalele probleme care in general, pot aparea in sisteme mari de tip rau-delta-mare, intrucat macrosistemul Dunare-Delta Dunarii-Marea Neagra este un laborator natural capabil sa furnizeze informatie stiintifica de interes real pentru comunitatile locale, informatie care poate fi transferata catre alte sisteme mari fluviu-delta-mare din lume.

Pregatirea unei propuneri de succes pentru ca DANUBIUS-RI sa devina o infrastructura de cercetare pan-europeana implica o buna intelegere a cadrului European existent. Ca urmare trebuie considerate in analiza nu doar infrastructurile de cercetare de tip ESFRI existente ci si alte infrastructuri, initiative si programe europene si mondiale. Aceasta analiza exhaustiva are ca scop final o pozitionare cat mai exacta si mai realista a DANUBIUS-RI in peisajul actual al infrastructurilor pan-Europene de cercetare (definirea domeniului specific, a nisei in care se incadreaza DANUBIUS-RI).

5.1. Descrierea cadrului existent

Cadrul institutional si legal

De la bun inceput trebuie subliniat faptul ca atunci cand este discutata guvernanta unei infrastructuri de cercetare din Roadmap-ul ESFRI, rezolvarea problemelor complexe de management reprezinta cea mai mare provocare . Aceste probleme complexe de management implica o varietate de aspecte de la rezolvarea problemelor zilnice privind constructia infrastructurii de cercetare, pana la alinierea obiectivelor infrastructurii la interesele nationale si la cele internationale. In timp ce primele probleme de management sunt mai usor de gestionat, urmarind ciclul de viata logic al unei infrastructuri de cercetare ESFRI (pregatire, constructie, operabilitate/functionare si deactivare), celelalte implica managerierea politicilor nationale, realizarea de strategii/politici transnationale si Europene precum si negocieri internationale.

Aspectele legale care privesc infrastructurile de cercetare includ in principal solutionarea problemelor care privesc forma legala identificata si agreata de catre parteneri pentru realizarea infrastructurii de cercetare si pentru asigurarea operabilitatii acesteia.

Actualmente exista diverse tipuri de instrumente legale care sunt luate in considerare atunci cand se realizeaza o infrastructura de cercetare si care variaza de la Consortiu European pentru Infrastructura de Cercetare (ERIC) la proiecte specifice sub EMBL, asociatii internationale (AISBL) si societati

nationale cu raspundere limitata (GmbH). Alegerea unui anumit instrument legal depinde foarte mult de tipul de parteneriat din cadrul infrastructurii de cercetare (daca participa state sau unitati de cercetare), de posibilitatea de a beneficia de scutirea de TVA (care asigura castiguri economice importante in etapa de constructie si operare a infrastructurii de cercetare), de capacitatea membrilor de a suporta participarea la o astfel de entitate legala in conformitate cu legislatiile si regulamentele nationale in vigoare si de modalitatea in care se garanteaza sustinerea financiara pe termen lung, pentru investitii comune.

Alegerea unei anumite forme legale implica stabilirea unui set de limitari la nivel de guvernanta infrastructurii de cercetare (la nivel decizional), anumite responsabilitati si angajamente pentru membrii structurii precum si modalitatile de raportare de la nivelul infrastructurii. Exista, de asemenea, necesitatea respectarii anumitor reguli de derulare a cheltuielilor specifice infrastructurii de cercetare

In conformitate cu rapoartele ESFRI pe 2012 desi alegerea formei legale de guvernare potrivite pentru o infrastructura de cercetare de tip ESFRI este destul de lunga, necesitand un timp destul de mare pentru ca toti partenerii sa agreeze forma aleasa, pana in acest moment alegerea formei legale nu s-a dovedit a fi un impediment in construirea si functionarea infrastructurilor de cercetare.

Infrastructurile de cercetare ESFRI –instrumente de cunoastere si dezvoltare

In efortul de transformare a economiei UE in cea mai eficienta si dinamica economie mondiala bazata pe cunoastere este esential ca cercetatorii europeni sa aiba acces la infrastructuri/facilitati de cercetare de varf. Atunci cand trebuie asigurat progresul stiintific si tehnologic pentru a sprijini dezvoltarea socio-economica principalul rol, alaturi de oameni, il au infrastructurile de cercetare care sunt capabile sa asigure servicii unice pentru utilizatori din diferite tari aducand impreuna diferite parti interesate in gasirea de solutii durabile pentru problemele societatii moderne.

Intrucat granitele cercetarii se modifica continuu si de maniera exponentiala, si cum tehnologia moderna evolueaza din ce in ce mai rapid, infrastructurile de cercetare devin, progresiv, din ce in ce mai complexe si, de consecinta si mai costisitoare, ceea ce determina ca o astfel de investitie sa fie mai presus de puterea financiara a unui singur grup de cercetare, regiune, stat etc.

Dupa cum este subliniat si in rapoartele ESFRI, inovarea se poate produce numai in conditiile in care este asigurat accesul facil la infrastructuri de inalta performanta; infrastructurile de cercetare se afla din punct de vedere al cunoasterii la intersectia dintre cercetare, educatie, si inovare, producand cunoastere prin cercetare, diseminand-o prin educatie si aplicand-o prin inovare. Infrastructurile de cercetare sustin crearea unui nou mediu de cercetare in care toti cercetatorii-fie cei care lucreaza in cadrul propriilor institute de cercetare, fie cei care lucreaza in cadrul unor initiative stiintifice nationale sau internationale- au acces comun la facilitati stiintifice unice sau distribuite (care includ date, instrumente,

prelucrare computerizata si comunicare) indiferent de locatia in care se afla respectivul cercetator. Ca urmare costurile globale pentru astfel de proiecte de anvergura necesita eforturi comune din partea mai multor state Europene.

Definitia infrastructurilor de cercetare

Termenul de infrastructura de cercetare se refera la facilitatile, resursele si serviciile corespunzatoare utilizate de catre comunitatea stiintifica pentru a realiza cercetari de nivel ridicat in domeniile stiintifice corespunzatoare, de la sociologie la astronomie, de la genomica la nanotehnologie. Trebuie mentionat si faptul ca infrastructurile de cercetare nu sunt raspunzatoare doar pentru descoperirile stiintifice si dezvoltarea tehnologica, ci influenteaza in egala masura, atat capacitatea, concentrarea/atragerea celor mai buni cercetatori din lume, cat si construirea legaturilor dintre comunitatile stiintifice, societate si diverse domenii stiintifice.

Tipuri de infrastructuri de cercetare ESFRI

Infrastructurile de cercetare pot fi :

- ‘unice’ (o resursa unica intr-o singura locatie), ca si exemple sunt infrastructurile de cercetare unice de dimensiuni mari, colectiile, habitatele specifice, biblioteci, baze de date, arhive biologice etc.
- ‘distribuita’ (o retea de resurse, echipamente, etc. distribuite geografic); o infrastructura distribuita Europeana este o infrastructura de cercetare cu o forma legala comuna si un comitet managerial unic raspunzator pentru intreaga infrastructura de cercetare si cu o structura de conducere/cu o guvernanta care include, printre altele o Strategie si un Plan de Dezvoltare precum si un punct de acces pentru utilizatori, desi facilitatile de cercetare sunt distribuite din punct de vedere geografic. Infrastructurile de cercetare distribuite functioneaza ca o structura unica in timp ce isi mentine functiile definitorii pentru orice infrastructura de cercetare: accesul la facilitatile de cercetare, rol semnificativ educational, furnizor de servicii pentru nevoile societatii. Aceste functii includ, de asemenea, si cadrul detaliat prin care este permisa utilizarea infrastructurii distribuite de catre cercetatori si studenti din diferite tari in mod eficient si intr-o coordonare unitara.
- ‘virtuala’ (serviciile sunt furnizate electronic); activitatea e-infrastructurilor vizeaza noi medii de cercetare in care “comunitatile virtuale” de cercetatori sunt abilitati sa exploateze in comun toate facilitatile tehnice pe care ecosistemul stiintific european le detine. E-infrastructurile pot fi considerate, de asemenea, infrastructuri distribuite. Specificitatea acetui tip de infrastructuri virtuale vine din faptul ca acestea sunt

elementele cheie in definirea unui proiect foarte bun, care sa indeplineasca conditiile de a fi acceptat in foaia de parcurs (roadmap-ul) ESFRI.

5.2. Prezentarea generala a principalelor infrastructuri si initiative

Atunci cand s-a efectuat analiza structurilor si iniciativelor care pot avea un impact in constructia Centrului de Studii Avansate DANUBIUS-RI au fost considerate nu doar centrele ESFRI ci si alte structuri finantate de catre CE cum sunt Initiativele de Infrastructuri Integrate (I3) atat cele existente cat si cele care au functionat in trecut, analiza efectuandu-se pentru ultimii 10 ani, Activitati Integrate, Infrastructuri majore regionale. De asemenea au fost luate in analiza si initiative globale, programe permanente, politici si sisteme unitare majore. Astfel, au fost analizate si initiativele comune, europene, de tip Joint Programming Initiatives si globale, cum sunt sistemele european si global de observatoare tip GEO, GEOSS si GOOS, precum si institutii internationale de tip UNESCO (UNESCO-IHE, UNESCO-IOC, etc.).

O prezentare generala a distributiei infrastructurilor si iniciativelor analizate in functie de tipul de proiect este data in figura 3.

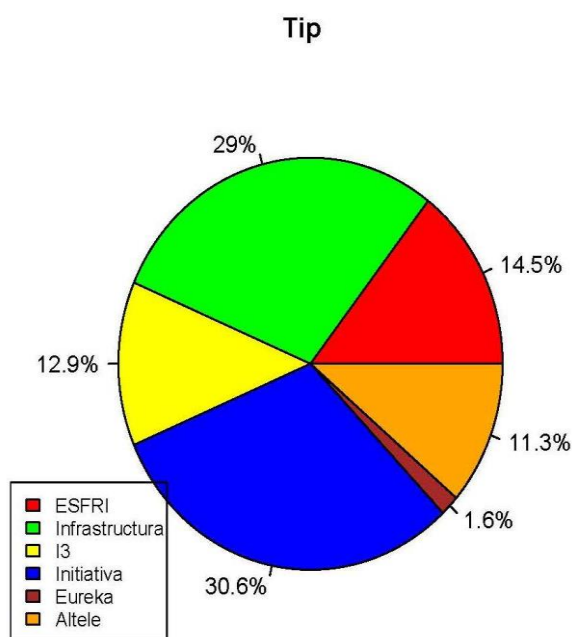


Figura 3. Distributia infrastructurilor, iniciativelor si politicilor analizate relevante pentru DANUBIUS

Structurile analizate (in continuare sunt date exemple pentru fiecare categorie) au fost cele care isi desfasoara activitatea in domeniile stiintifice corespunzatoare pilonilor care definesc activitatea viitorului Centru International de Studii Avansate pentru sisteme rau-delta-mare, DANUBIUS, si

anume: Mediu si Stiintele Pamantului, Stiintele Vietii si Socio-Economie. Analiza a fost realizata in functie de ceea ce se preconizeaza ca va fi contributia Centrului la dezvoltarea cunoasterii, furnizarea de solutii pentru situatiile de criza care apar in macrosisteme complexe definite de interfata rau, zona umeda, mediu marin in contextul unei cresteri continuee a presiunilor asupra ecosistemelor (schimbari climatice, efecte antropice, etc) si al pierderii biodiversitatii specifice acestor macrosisteme. Ca urmare analiza centrelor ESFRI cu impact asupra DANUBIUS a fost realizata din perspectiva colaborarilor posibile, complementaritatilor, valorii adaugate la cunoastere si a evitarii suprapunerii si duplicarii de eforturi si competente dintre DANUBIUS si structurile analizate.

Au fost luate in considerare si aspectele privind implementarea in timp, acesta fiind argumentul care sta la baza analizei initiativelor permanente, precum si a celor care sunt in procesul de implementare (avand astfel potentialul de a deveni parteneri DANUBIUS sau competitor cu DANUBIUS) sau a celor care s-au incheiat. Acestea din urma pot juca rol de furnizor de informatie respectiv, de instrumentatie, identificandu-se parti din ele - corespunzatoare criteriului de performanta - care pot fi incluse, in viitor, in comunitatea DANUBIUS-RI.

Stadiul actual, din punct de vedere al fazei de implementare in care se afla proiectul, al tuturor structurilor si initiativelor analizate este prezentat in figura de mai jos.

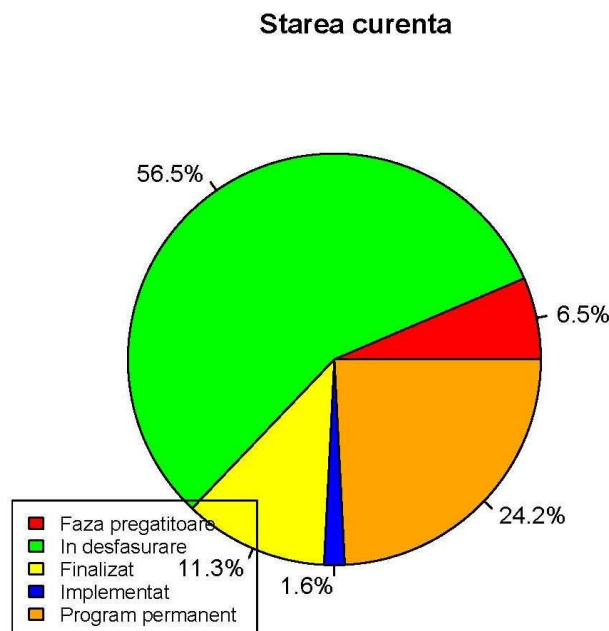


Figura 4. Stadiul actual de implementare a structurilor relevante pentru DANUBIUS

5.3. Analiza infrastructurilor de cercetare, programelor si initiativelor Europene si globale

Analiza infrastructurilor majore, programelor si initiativelor, atat la nivel european a fost realizata din punctual de vedere al misiunii acestora, obiectivelor, stadiului actual de dezvoltare/implementare si, cel mai important, din punctual de vedere al pozitiei acestora in raport cu DANUBIUS-RI. Analiza detaliata este prezentata in anexele la acest raport, unde sunt prezentate in detaliu fiecare dintre structurile analizate (fisele corespunzatoare fiecărei infrastructuri), modul de analiza, si observatiile corespunzatoare (constatarile facute).

In acest subcapitol se prezinta succinct infrastructurile majore, programele si initiativele care se relationeaza cu DANUBIUS-RI la nivel european si global.

Proiecte ESFRI

Proiecte ESFRI in coordonarea grupului de lucru Strategii de Mediu

EMSO implica instalarea de platforme submarine de monitorizare permanenta ale fundului mării si coloanei de apa in marile si oceanele care circumscriu Europa. Obiectivele EMSO in legatura cu Marea Neagra fusesera de a conecta aceasta mare cu celelalte observatoare incepand cu a doua jumate a decadei 2020. Proiectul de infrastructura MARINE GEOHAZARD, care a insemnat dezvoltarea unui sistem de alertare in timp real pentru partea de nord -vest a Marii Negre a insemnat plasarea a cinci platforme submarine de monitorizare permanenta care au ca functii de baza cele standardizate de catre EMSO, si care sunt dedicate studiilor specific mediului Marii Negre si problemelor caracteristice acestei zone. MARINE GEOHAZARD a fost creat cu sprijinul direct al EMSO, coordonatorul EMSO fiind membru in comitetul international de coordonare a MARINE GEOHAZARD si participand la toate stadiile de realizare a proiectului.

EPOS acopera domeniul de cercetari geologice, geofizice, geodinamice, seismice si de vulcanologie de la nivel european, integrand observatoarele existente, retelele de masura si statiile de monitorizare. In ceea ce priveste DANUBIUS-RI, EPOS are un rol important in studiul dinamicii si stabilitatii crustei terestre din zona macrosistemului rau-delta-mare. Aceasta retea a fost dezvoltata in Romania ca parte a proiectului de infrastructura MARINE GEOHAZARD si este actualmente contributia GeoEcoMar la proiectul EPOS (parte a contributiei Romaniei la EPOS, sub coordonarea generala a Institutului National de Fizica Pamantului). Pontica poate fi, astfel, un nod comun intre EPOS si DANUBIUS-RI.

EURO ARGO este un proiect ESFRI care vizeaza intelegerea profunda a miscarilor marine si oceanice si impactul schimbarilor climatice. Este contributia europeana la initiativa globala ARGO. Au fost identificate doua lacune majore in competentele EURO ARGO, care vor fi acoperite de DANUBIUS-RI ca parte a obiectivelor acestuia. Nicio sonda ARGO nu a fost lansata la apa in zona de nord-vest a Marii Negre si nu exista informatii privind procesele de la zona de contact dintre Dunare si Marea Neagra. EURO ARGO necesita, in afara aspectelor de localizare geografica, si realizarea de experimente in zonele de interactiune dintre fluvii si mari.

SIOS (Sistemul de Observatoare Integrate din Arhipelagul Svalbard) este un proiect ESFRI care, in ceea ce priveste ciclul apei, are ca obiectiv principal cercetarea proceselor de inghet si managementul situatiilor de risc generate de gheata, subiect care nu este abordat corespunzator in nicio alta structura/infrastructura de cercetare din Europa. Gheata/inghetul sunt fenomene majore in ciclul apei care sunt studiate corespunzator si permanent doar la nivelul statiilor de cercetare din zona polara si sub-polara si pot avea efecte devastatoare in sistemele fluviu-mare si din alte parti ale Europei.

ICOS (Sistemul de Monitorizare Integrata a Amprenteii de C) este un proiect ESFRI prin care se urmareste monitorizarea permanenta emisiilor de gaze cu efect de sera, amprenteii de C (emisii de CO₂ in atmosfera) atat la nivel continental cat si marin, prin observatoare amplasate corespunzator. ICOS monitorizeaza atat emisiile de gaz rezultate ca urmare a activitatilor umane cat si cele datorate fenomenelor naturale. O lacuna majora a ICOS este reprezentata de faptul ca nu se realizeaza o monitorizare permanenta a emisiilor de gaze din delte, lagune si alte zone umede costiere.

LIFEWATCH, Infrastructura Stiintifica si Tehnologica pentru Biodiversitate si Observatoare, este o structura ESFRI de tip e-infrastructura care concentreaza informatii asupra ecosistemelor specifice si biodiversitatii din diferite zone continentale. In raport cu DANUBIUS-RI trebuie mentionat ca LIFEWATCH nu are, la acest moment, informatii integrate asupra biodiversitatii specific zonelor complexe rau-delta-mare, aceasta fiind aria de expertiza de complementaritate intre cele doua infrastructuri de cercetare.

Proiecte ESFRI derulate sub supravegherea grupului de lucru strategic de Biologie si Stiinte Medicale

ANAEE (Infrastructura pentru Analiza si Experimentarea Ecosistemelor) este un proiect ESFRI acceptat in cadrul planului de lucru sub coordonarea comuna a grupurilor BMS-ENV SWG. ANAEE are ca scop dezvoltarea unui set coordonat de platforme experimentale de-a lungul Europei pentru a analiza, identifica si prognoza raspunsurile ecosistemelor la schimbarile de mediu si de utilizare a terenurilor, si care nu are facilitati dedicate zonelor umede de coasta si deltelor.

EMBRC, centrul european de resurse biologice marine, este o infrastructura ESFRI care este formata dintr-un consorțiu de laboratoare cheie specializate in biologie marina si biologie moleculara, capabile sa ofere acces la o gama larga de medii si ecosisteme costiere si marine. Pentru a intelege nevoile EMBRC privind zona costiera –marina din NV Marii Negre, zona pentru care EMBRC nu are competentele necesare, trebuie ca aceste aspecte sa fie discutate in detaliu. DANUBIUS-RI trebuie sa ofere exact ceea ce ii lipseste respectivei facilitati.

ELIXIR este o infrastructura europeana a Stiintelor Vietii cu expertiza in informatii biologice, mai exact un proiect de infrastructura distribuita de cercetare ESFRI cu centrul in Marea Britanie si noduri in intreaga Europa.

Este de asemenea important ca, atunci cand se realizeaza o analiza a infrastructurilor de cercetare pan europene cu scopul de a defini exact pozitia unei noi astfel de infrastucturi in peisajul existent, sa fie luate in analiza si topicile transversale, care relationeaza cu interesul social global. Din perspectiva functionalitatii ecosistemelor, serviciile ecosistemelor din zonele umede au o influenta majora la nivelul sanatatii comunitatilor/populatiei. Pana la aceasta data comunitatile din zonele umede sunt asociate cu probleme de sanatate specifice: epidemii infectioase specifice arealului umed, dificultati in asigurarea conditiilor de igiena corespunzatoare, accesul diminuat la serviciile sanitare in timpul perioadelor de inundatii care impiedeca transporturile si comunicatiile. De asemenea, intrucat aceste zone sunt, in general, zone defavorizate exista intotdeauna un risc de patologii psiho-sociale ca urmare a relocatiei populationale in functie de evolutia resouselor specifice. Ca urmare sanatatea este o componenta importanta in fluxul care defineste ciclul apei, astfel incat exista actiuni, politici si programe locale, nationale si regionale in care managementul riscurilor de sanatate este adresat in stransa corelatie cu managementul riscurilor de mediu.

Prin urmare complementaritati si conexiuni interdisciplinare pot fi identificate intre DANUBIUS-RI si alte infrastructuri de cercetare distribuite din domeniul bio-medical, care pot actiona ca si vehicul de transfer al cunoasterii intre domenii stiintifice, asa cum este centrul ESFRI BBMRI (Infrastructura de cercetare Bio-banci si Resurse Bio-moleculare) sau cum sunt organizatiile internationale ca ICGEB (Centrul International de Inginerie Genetica si Biotehnologie). BBMRI este o infrastructura pan-europeana distribuita care asigura accesul la noi bio-banci si colectii de probe biologice care sunt considerate materii prime esentiale pentru dezvoltarea cunoasterii in domeniul biotehnologiei, sanatatii, in general in domeniul larg care defineste Stiintele Vietii. ICGEB este o structura dedicata cercetarilor avansate si training-ului in biologie moleculara si biotehnologie, avand ca scop dezvoltarea tehnicilor de varf in domeniul biomedical, biofarmaceutic, de productie a biopesticidelor, de protectie a mediului si de remediere

Programe europene de initiativa comuna – Joint Programming Initiatives

Conceptul de program comun a fost introdus de Comisia Europeana in Iulie 2008 pentru a sustine implementarea spatiului european de cercetare. Obiectivul programului comun a fost acela de a “creste valoarea finantarii din fonduri nationale si europene de cercetare printr-o planificare comuna si concertata, prin implementarea si evaluarea programelor de cercetare nationala”.

Initiativele programelor comune (JPI) reprezinta actiuni luate de regula in intampinarea provocarilor majore ale cercetarii europene de catre statele membre, de multe ori cu sprijinul Comisiei Europene. JPI se concentreaza asupra: agendei strategice si de inovare, potentialului uman si infrastructurilor de

cercetare. Cele mai multe JPI-uri au susținut faptul că aspectele infrastructurilor de cercetare trebuie să fie tratate în coordonare cu ESFRI – împreună cu diferitele grupuri strategice de lucru ale acestuia.

Pentru misiunea DANUBIUS-RI, două dintre inițiativele JPI sunt de interes major: JPI Oceans și JPI Water Challenges. JPI Climate s-a autorestrâns la studierea schimbărilor de climă, meteorologice și aspectele legate de climă, și s-a concentrat foarte puțin asupra studiului impactelor generate de aceste schimbări. JPI pentru biologie sunt grupate din punct de vedere al securității alimentare și sănătății.

Atunci când analizăm legătura dintre JPI și proiectele ESFRI, se poate observa că cele mai multe JPI sunt acoperite, JPI Climate de ICOS, SIOS, ESCAT 3D, JPI pentru alimentație și agricultură - de către ANAEE, LIFEWATCH și ELIXIR, în timp ce JPI Oceans este acoperit de ESMO și EURO ARGO. Nici un proiect major ESFRI RI nu acoperă JPI Water Challenges.

Inițiative de Infrastructura Integrată (I3)

Inițiativele de Infrastructura Integrată (I3) joacă un rol important în peisajul european al infrastructurilor de cercetare. Proiectele de tip I3 analizate în acest raport se ocupă de părți diferite ale ciclului apei, precum și de subiecte referitoare la ecologie și biodiversitate.

Inițiativele I3 grupează împreună facilitățile majore din întreaga Europă în cadrul diverselor teme, iar prin desfășurarea de cercetare comună și prin organizarea de oportunități de acces transnaționale comune, dezvoltă puternic spațiul european de cercetare. În unele cazuri, inițiative de succes repetate au stat la baza unor noi proiecte ESFRI. Cu toate acestea, lipsa de finanțare permanentă este o problemă cheie pentru sustenabilitatea acestor rețele de infrastructuri de cercetare.

Proiecte de tip I3 precum HYDRALAB pot fi considerate potențiali colaboratori majori, altele (precum EXpeER, EurAqua, GROOM and Upgrade Black Sea Scene) au potențialul de a deveni noduri sau furnizori de servicii, în timp ce altele (ca de exemplu Eurofleets) pentru care planurile viitoare sunt încă neclare, pot deveni colaboratori, dar și noduri sau chiar concurenți pentru competiții viitoare de intrare în Roadmap-ul ESFRI. Atenție deosebită trebuie acordată fiecărui proiect de tip I3 prezentat în anexele atașate, în perspectiva faptului că cei mai mulți dintre viitorii parteneri, colaboratori, noduri, furnizori de servicii dar și concurenți vor proveni, cel mai probabil, din cadrul acestui tip de inițiative.

Inițiative și programe europene, altele decât ESFRI și I3

Centrul Comun de Cercetare al Comisiei Europene (JRC), mai precis Institutul de Mediu și Sustenabilitate de la Ispra, din Italia, a lansat în 2013 o inițiativă de mare anvergură încercând să ajute la rezolvarea unor probleme majore din zona Dunării, așa cum au fost acestea identificate în strategia

europena pentru Regiunea Dunarii (SUERD). Aceasta initiativa a JRC-ului, numita de “de sprijin stiintific pentru regiunea Dunarii” este format din 6 clustere, dedicate rezolvarii problemelor specifice considerate a fi critice in zona. Unul dintre acestea, Water Nexus, se ocupa cu multe dintre tipurile de activitati prevazute pentru DANUBIUS-RI.

Europa sustine dezvoltarea initiativei COPERNICUS, fosta GMES, sistemul global de monitorizare pentru mediu si securitate. GMES este o initiativa comuna a Comisiei Europene si a Agentiei Spatiale Europene, avand scopul de a atinge capacitatea autonoma si operationala a Europei de observare a Sistemului Pamant. Toate proiectele ESFRI ENV existente se leaga de GMES in mod similar cu cel in care va trebui sa se lege si DANUBIUS-RI.

Pe langa COPERNICUS, exista o serie de initiative europene majore de interes pentru dezvoltarea DANUBIUS-RI, atat din punct de vedere al potentialului de a deveni noduri, cat si din punct de vedere al comunitatii de utilizatori.

Reteaua SedNet este o grupare profesionala care se ocupa de managementul sedimentelor transportate de apa de la izvoarele din munti, prin rauri/delte/estuare/lagune catre zona costiera si ulterior pana in zonele abisale ale marilor.

O serie de proiecte finantate la nivel national si initiative regionale din Europa sunt de importanta majora pentru DANUBIUS-RI, datorita potentialului lor de a dezvolta noduri pentru infrastructura distribuita.

GLOBALAKES este un proiect finantat de Consiliul de Cercetare al Mediului Natural (NERC) din Marea Britanie, care foloseste teledetectia pentru a analiza starea mediului in lacuri de pe 5 continente. Coordonatorii GLOBOLAKES, Universitatea din Stirling, Marea Britanie, sunt membri ai CII al DANUBIUS-RI si implicati in dezvoltarea ideii DANUBIUS-RI inca din perioada de elaborare a Cartii Albe.

RITMARE – proiectul de cercetare italian asupra mării, in valoare de peste 100M de euro, (finantat de Ministerul de Cercetare si Invatamant Superior al Italiei) este implementat de un consortiu coordonat de ISMAR (Institut de Cercetare Marina al CNR) si implica participanti majori din zona rau-mare din Italia, cum sunt INGV, OGS, ISPRA. RITMARE dezvolta capabilitati majore in zona sistemului Pad – delta Padului – Adriatica, a lagunelor Venetia, Marano si Grado, precum si in partea de NV a Marii Adriatice.

Observatorul Sedimentar al Ronului (RSO) este o initiativa franceza care se ocupa cu managementul integrat al sedimentelor de-a lungul fluviului Ron – Delta Ronului – Marea Mediterana si care are inca un potential major de a deveni nod.

DREAM este primul proiect de infrastructura de cercetare care a obtinut statutul de Proiect Fanion (flagship) in cadrul strategiei UE a regiunii Deltei Dunarii. DREAM este dedicat in majoritate dezvoltarii de infrastructuri de cercetare care se ocupa in principal cu ingineria hidraulica, precum si cu

modelarea fizica. Centrul de baza, care va fi localizat in Viena este format dintr-o facilitate majora care permite modelarea fizica in laboratoare capabile sa reproduca experimente intr-un flux de 10 metri cubi de apa pe secunda. Cel de-al doilea nod DREAM va fi construit la Novi Sad, Serbia si consta dintr-un vas cu capabilitati a studia *in situ* caracteristicile si structura sedimentelor albiei. Cel de-al treilea nod DREAM, in Romania, va fi localizat in Delta Dunarii, ca parte comuna cu DANUBIUS-RI.

Initiative internationale, programe si institutii

Viziunea pentru DANUBIUS-RI il prevede ca o infrastructura cu rol major in managementul integrat al sistemului fluviu-delta-mare la nivel global. De aceea o atentie speciala trebuie atribuita unora dintre programele internationale, initiativele sau institutiile majore care sunt capabile sa sustina cresterea DANUBIUS-RI la nivel global, si care sunt de asemenea capabile sa ii sustina sustenabilitatea.

DANUBIUS-RI, imediat dupa ce va fi acceptat pe Roadmap-ul ESFRI, trebuie sa continue cu stabilirea de legaturi stranse cu GEO, GEOS, GOOS, UNESCO-IOC, s.a.m.d – in calitate de furnizor major de date, precum si de actor cheie in masuratorile in-situ. Majoritatea acestor organizatii sunt dezvoltate pentru domeniul marin deoarece si la nivel global, comunitatea marina este mai bine dezvoltata fata de comunitatea care se ocupa cu studiul ecosistemelor de apa dulce si a zonelor de tranzitie de la apa dulce la apa sarata.

Institutiile si initiativele Natiunilor Unite (altele decat IOC) joaca un rol important in promovarea DANUBIUS si sustinerea sa catre o existenta durabila. In consecinta, IGBP, IUCN, GEF, UNEP, UNDP sunt programe UN cu care trebuiesc formate legaturi puternice inca de la inceput, din stadiul de faza pregatitoare a lui DANUBIUS-RI.

O atentie speciala este acordata UNESCO-IHE (Institutul UNESCO al Apei cu sediul central in Delft, Olanda) care a fost unul dintre cei mai puternici sustinatori ai lui DANUBIUS-RI inca de la inceputul elaborarii Cartii Albe. UNESCO-IHE – ca participant major in domeniul de educatie al apei si managementul integrat al sistemelor fluviu-mare la nivel mondial este un partener esential pentru DANUBIUS-RI. Datorita dimensiunii sale si a importanței globale , acesta nu poate primi calitatea de nod – ci trebuiesc intocmite in parteneriat acorduri speciale, pentru a putea beneficia la maxim de capacitatile acestuia.

Contacte stranse trebuiesc stabilite cu LOICZ – in primul rand datorita faptului ca DANUBIUS-RI ofera competentele cele mai potrivite in domeniul de aplicatie al lui LOICZ in zonele de interactiune fluviu-mare. Cu toate acestea, aceste contacte, chiar daca au fost stabilite cu ceva vreme in urma, sunt pentru moment inactive datorita procesului de mutare al sediului central LOICZ din Germania in Irlanda.

Pe langa institutiile si initiativele oficiale globale (cele de mai sus fiind doar cateva exemple), un rol esential este jucat de Delta Alliance, o initiativa globala grupand de buna voie participanti importanti,

care opereaza in cele mai mari delte ale lumii. Aceasta initiativa internationala, in contrast cu altele, este bazata pe guvernanta, fiind organizata ca un angajament voluntar intre parteneri.

5.4 Constatari privind principalele lacune identificate la nivel european si tipuri de colaborari prevazute

Pornind de la principalele tematici stiintifice ale DANUBIUS-RI, asa cum au fost stabilite in Cartea Alba si dupa efectuarea unei analize detaliate, imaginea generala a potentialelor interactiuni intre DANUBIUS-RI (ca infrastructura pan-europeana distribuita functionand ca un centru cu un nucleu central in conexiune cu noduri distribuite) si infrastructurile, programele si initiativele analizate este prezentata in figura de mai jos.

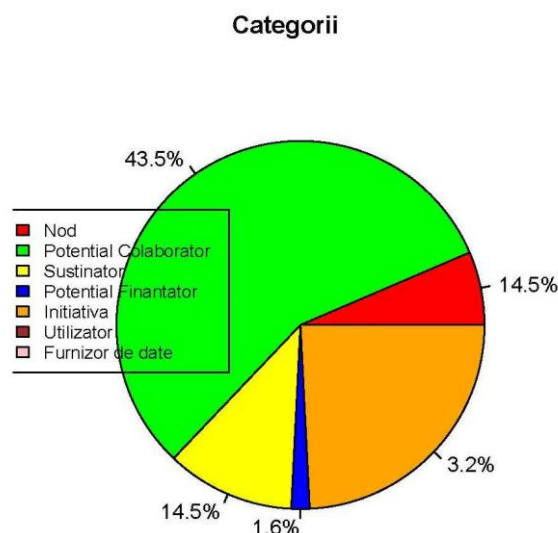


Figura 5. Repartitia structurilor, iniciativelor si programelor relevante analizate, din punct de vedere al nivelului potential de inter-relatie cu DANUBIUS-RI.

Atunci cand analizam global rezultatele, este de remarcat faptul ca ca exista dovezi substantiale care sustin necesitatea construirii unei infrastructuri de cercetare pan-europene dedicate tuturor aspectelor legate de ciclul apei, in mod special managementului integrat al sistemului fluviu-delta-mare. Pana in acest moment nu exista nici un astfel de ESFRI RI pe aceasta tema.

JPI Water Challenges este singurul JPI lipsit de sprijinul si cooperarea unei infrastructuri de cercetare de tip ESFRI ENV.

Numeroasele eforturi de a studia sistemele fluviu-delta-mare au avut in general aceeasi abordare sectoriala. Au pornit fie de la izvoarele raurilor si s-au oprit la gurile de varsare in mare, ori au pornit din domeniul marin spre uscat, oprindu-se de asemenea la gurile de varsare in mare ale raurilor. Este nevoie de un sistem de studiere in mod unitar a

proceselor care au loc într-un sistem fluviu-delta-mare de la izvoare și până spre zonele adânci ale marilor.

Eforturile existente de a aborda managementul integrat al sistemelor fluviu-delta-mare ca atare au fost extrem de puține și s-au încheiat datorită lipsei unei infrastructuri de cercetare dedicate, susținute financiar în mod permanent.

Din perspectiva UE, provocările sunt recunoscute și sunt deja în vigoare sau în curs de dezvoltare strategii pentru a atinge acest scop. Numeroase infrastructuri, inițiative și programe descrise în anexe dovedesc că există o bază semnificativă de plecare, pe care se pot construi infrastructuri distribuite de cercetare de importanță globală.

În ceea ce privește contextul regional, deși Dunărea este cel mai important râu din lume, nu există nici o infrastructură de primă clasă care să se ocupe de ciclul apei în această regiune. Existența EUSDR cu un interes dedicat în ceea ce privește dezvoltarea unei IC distribuite care să se ocupe de problemele legate de apă transformă această lipsă într-un mare avantaj.

În contextul schimbărilor climatice nu doar necesitățile de cercetare, dar și serviciile operaționale pentru alți utilizatori au arătat necesitatea unei infrastructuri sustenabile pentru observații permanente sau de lungă durată. Pentru numeroasele infrastructuri de acest tip acce[te]rate de către ESFRI pe hărțile de parcurs succesive, din 2006 și 2008 Comisia Europeană a susținut faza lor pregătitoare.

În ceea ce privește cunoștințele în domeniul geodinamicii, hidrologiei, hidrodinamicii și sedimentologiei, geo-hazardelor, a observatoarelor de lungă durată pentru ecologia sistemului fluviu-delta-zona costieră, precum și de evaluare a riscului și a schimbărilor climatice, din analiză se evidențiază faptul că cele mai bune exemple de bune practici în domeniu provin de la structurile din domeniul marin, care s-au organizat și coordonat mult mai bine în comparație cu cele dedicate mediilor de apă dulce și mediilor de tranziție (lagune, delte).

6. ANALIZA SWOT privind domeniile științifice ale infrastructurilor de cercetare pan-europene

6.1. Analiza punctelor tari și punctelor slabe

PUNCTE TARI	PUNCTE SLABE
<ol style="list-style-type: none">1. DANUBIUS - RI va constitui una dintre cele mai importante infrastructuri majore în domeniul sistemelor de tip fluviu-deltă-mare;2. DANUBIUS - RI va fi principala IC pan-europeană distribuită, care va completa lacunele existente în studiile privind sistemele de apă dulce și zonele de interacțiune fluviu-mare;3. Nucleul central al DANUBIUS - RI va fi localizat în Murighiol și va facilita accesul la laboratorul natural al sistemului Dunăre – Delta Dunării – Marea Neagră în vederea observațiilor <i>in-situ</i>;4. DANUBIUS-RI propune o abordare științifică integratoare a aspectelor specifice privind sistemele fluviu-deltă-mare;5. Platformă unică și trans-disciplinară ce integrează cunoștințele actuale în domenii precum științele pământului, mediului, vieții și socio-economice;	<ol style="list-style-type: none">1. Activitățile desfășurate în prezent nu beneficiază de același nivel de implicare și sprijin din partea diferitelor infrastructuri de cercetare pan-europene și inițiatorului de proiect, în ceea ce privește sprijinul financiar și politic și planificarea strategică;2. Acțiunile directe în legătură cu nucleul central al DANUBIUS - RI s-au concentrat mai mult asupra comunităților de cercetare și mai puțin asupra factorilor de decizie la nivel politic;3. Riscul apariției dezacordului între diferitele tipuri de organizații de cercetare, care vor fi invitate să devină noduri pentru nucleul central al DANUBIUS-RI;4. Existența competitorilor care promovează activitățile de cercetare în domeniul gestionării ciclului apei;5. Existența competitorilor ce urmăresc să obțină statutul ESFRI/FSEIC;

6. DANUBIUS-RI va acoperi decalajul existent între comunitățile științifice din domeniul apelor dulci și marine;
7. Agendă științifică multidisciplinară a IC (caracterizare sistem, schimbări de mediu, management adaptiv și sustenabil), asigurând unicitatea acesteia în raport cu celelalte IC existente;
8. Nucleul central DANUBIUS - RI va asigura mijloace de cercetare (laboratoare, spațiu de depozitare, cazare) în apropierea laboratorului natural în vederea analizării probelor sensibile;
9. Nucleul central DANUBIUS - RI va fi ușor accesibil pe cale rutieră și pe Dunăre;
10. DANUBIUS - RI este considerat de către Guvernul României – Ministerul Educației Naționale ca fiind un proiect major pentru finanțare din fonduri publice în perioada 2014 – 2020, prin Fondurile Structurale și de Investiții Europene 2014 – 2020 (FSIE) pentru România;
11. DANUBIUS - RI reprezintă unul dintre Proiectele Fanion în contextul Strategiei Uniunii Europene pentru Regiunea Dunării (în cadrul DP7 „Societatea Bazată pe Cunoaștere a

6. Lipsa unei imagini detaliate privind structura nodurilor și conexiunilor dintre noduri și centru;
7. Comunitate de cercetare fragmentată în domeniul apelor dulci;
8. Absența unor abilități relevante de excelență în macro-regiunea Dunăre-Marea Neagră;
9. Distanța mare dintre nucleul central DANUBIUS - RI și principalul aeroport internațional (București);
10. Nu s-a dobândit experiență anterioară la nivel național în coordonarea activităților de pregătire și implementare a proiectelor ESFRI ENV;
11. Insuficiența informațiilor cantitative privind personalul și infrastructura DANUBIUS - RI.

Strategiei UE pentru Regiunea Dunării” (2 octombrie 2013));

12. Organizațiile care susțin CII DANUBIUS beneficiază de experiență relevantă, capacități excelente (din punct de vedere managerial, al resurselor umane, științific), fiind implicate în diverse inițiative în domeniul sistemelor fluviu-deltă-mare la nivel național și internațional;
 13. DANUBIUS - RI a atins un anumit nivel de maturitate (identificarea posibililor colaboratori, dezvoltarea Cărții Albe, Cărții Albaste, organizarea de grupuri de lucru cu reprezentanți ai instituțiilor de cercetare pan-europene relevante, scrisori de manifestare a interesului din partea organizațiilor de cercetare pan-europene și internaționale, planificarea pașilor următori);
 14. Capacitatea DANUBIUS - RI, ca infrastructură cu acces deschis, de a iniția tipuri personalizate de colaborare cu alte infrastructuri de cercetare pan-europene/ programe/ inițiative (furnizare/ utilizare de date, furnizare de servicii, stabilirea de rețele);
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15. DANUBIUS - RI va facilita și promova o platformă educațională și un forum pentru schimbul de cunoștințe, dedicate oamenilor de știință și studenților;
 16. Dunărea este cel mai „internațional” fluviu din lume, al cărui bazin hidrografic cuprinde 19 țări;
 17. Nucleul central al DANUBIUS - RI va genera efecte de antrenare asupra comunității locale (noi oportunități de afaceri pentru investițiile private, crearea de noi locuri de muncă, dezvoltarea abilităților, platformă pentru educație și instruire, protecția mediului);
 18. Nucleul central al DANUBIUS - RI va genera impact economico-social pe toată zona Dunării de Jos, a Deltei Dunării și a coastei de N-V a Mării Negre (piața muncii, infrastructură generală și servicii, populație și demografie, calitatea vieții – sănătate, educație, ecologia zonei);
 19. DANUBIUS - RI va genera rezultate de cercetare transferabile altor sisteme majore de tip fluviu-deltă-mare;
 20. DANUBIUS - RI va oferi asistență legislativă privind protecția mediului (legi, regulamente și norme).
 21. Existența aeroporturilor Constanța și Tulcea în apropierea nucleului central al DANUBIUS - RI.
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6.2. Analiza oportunităților și amenințărilor

OPORTUNITĂȚI	AMENINȚĂRI
<ol style="list-style-type: none"> 1. Oportunitatea de acceptare în cadrul viitoarei foi de parcurs a ESFRI/FSEIC; 2. SUERD sporește oportunitățile de accesare de fonduri pentru DANUBIUS, în calitate de Proiect Fanion în cadrul DP7 „Societatea bazată de cunoaștere”; 3. Oportunitatea colaborării nucleului central al DANUBIUS-RI pe proiecte în zona Mării Negre; 4. Oportunitatea colaborării cu organizații de cercetare din Statele Membre, țările candidate și cele asociate la UE; 5. Existența unui anumit grad de fragmentare la nivelul rețelei pan-europene de infrastructuri de cercetare, inițiative și programe în domeniul gestionării ciclului apei, din perspectiva obiectivelor vizate, intereselor, agendelor de cercetare, priorităților de cercetare, ceea ce va reclama activități intensive pentru stabilirea și adoptarea unei agende științifice comune; 6. O nevoie reală la nivelul comunității de cercetare a UE de a răspunde principalelor provocări științifice globale în 	<ol style="list-style-type: none"> 1. DANUBIUS - RI vizează statutul de ERIC; 2. Entitatea juridică europeană nu este încă definită complet (nu există deocamdată nici un ERIC operațional); 3. Existența anumitor discrepanțe între agendele de cercetare naționale; 4. Existența anumitor discrepanțe între sistemele naționale de finanțare din Europa; 5. Riscul de a nu aborda în mod corespunzător gama largă și diferitele tipuri de organizații în vederea obținerii și asigurării sustenabilității pe termen lung; 6. În contextul global al restrângerii resurselor financiare disponibile, centrul și nodurile DANUBIUS - RI se vor confrunța cu provocări reale în obținerea asistenței financiare din partea organismelor politice și altor agenții de finanțare, în contextul aderării la foaia de parcurs a FSEIC; 7. Natura specifică a locației stabilite pentru nucleul central DANUBIUS – RI poate implica anumite provocări în

domeniul managementului integrat al sistemelor de tip fluviu-deltă/estuar-mare;

7. În calitate de State Membre UE, România și partenerii săi afiliați pot accesa diferite surse de finanțare disponibile la nivelul UE, dedicate obiectivului tematic al strategiei Europa 2020 – *consolidarea cercetării, dezvoltării și inovării*, precum și obiectivelor *Strategiei Europene pentru Regiunea Dunării (SUERD)*;
8. Existența la nivelul UE, în cadrul SUERD, a altor trei infrastructuri de cercetare (DREAM, DANUBE FUTURE, DRRIF), care pot deveni, pe viitor, colaboratori ai centrului DANUBIUS- RI (proiecte fanion în cadrul SUERD);
9. Centrul DANUBIUS - RI va contribui semnificativ la dezvoltarea Regiunii Dunării, furnizând soluții pentru o serie de provocări societale (în speță, protecția mediului) și generând efecte colaterale pe termen lung;
10. DANUBIUS - RI poate oferi asistență pentru educație în contextul Rețelei Universităților de la Marea Neagră – o rețea de peste 100 de instituții de învățământ superior din Regiunea Mării Negre (Turcia, Georgia, Armenia, Azerbaidjan, Ucraina, Moldova, România, Bulgaria, Grecia,

ceea ce privește colectarea sistematică a datelor, mijloacele de depozitare și accesul.

Albania, Serbia), coordonată de către Universitatea

„Ovidius” din Constanța, România;

11. Oportunitatea de a face parte dintr-o rețea europeană de laboratoare vii;

12. Absența unei inițiative concurente la nivelul țărilor riverane Dunării care să vizeze agenda științifică a DANUBIUS - RI;

13. DANUBIUS - RI beneficiază de sprijinul deplin al factorilor de decizie naționali;

14. Sprijin declarat din partea organismelor internaționale (UNESCO – IHE, ICGEB) privind dezvoltarea viitoare a DANUBIUS - RI.

7. CONCLUZII ȘI RECOMANDĂRI

In contextul global al reducerii resurselor financiare, propunerea DANUBIUS-RI va trebui să parcurgă o perioadă complicată, în care să poată dezvolta o poziție convingătoare pentru a primi sprijinul agenților de finanțare a cercetării în vederea includerii pe foaia de parcurs ESFRI la următoarea competiție. De aceea, am analizat situația infrastructurilor de cercetare la nivel european, dar nu numai. Am luat în discuție infrastructurile de cercetare pan-europene, atât cele de pe lista ESFRI, dar și altele, precum inițiativele de infrastructuri integrate (I3, finanțate de către CE – DG R&I), alte infrastructuri și inițiative europene și regionale, precum și inițiativele și programele globale considerate semnificative pentru tematica DANUBIUS-RI. Această analiză a evidențiat unele zone neacoperite din punct de vedere al tematicii, care se potrivesc foarte bine cu agenda științifică a DANUBIUS-RI.

Astfel, în ceea ce privește situația infrastructurilor de cercetare din Europa există o lipsă clară de - dar și necesitatea de a avea - o structură pan-europeană dedicată ciclului apei, în special pentru managementul integrat al sistemelor fluviu-delta-mare. Acest lucru poate fi observat prin lipsa unei tematici asemănătoare pe lista proiectelor deja acceptate pe foaia de parcurs a ESFRI, pe lista celor susținute de către Inițiativele Comune de Programare a Cercetării (JPI), precum și la nivel mondial. Există asemenea structuri și inițiative la nivel regional (OSR, RITMARE), dar acestea trebuie să fie organizate în aceeași infrastructură de cercetare distribuită. DANUBIUS-RI se dovedește astfel a fi cea mai bună soluție pentru gruparea acestor inițiative într-o infrastructură distribuită de cercetare pan-europeană, care ar putea contribui la poziționarea fruntei științei europene la nivel mondial.

În ceea ce privește contextul regional, chiar dacă Dunărea este cel mai internațional fluviu din lume, nu există nici o infrastructură de cercetare care să se ocupe cu integral cu studiile privind managementul integrat al Dunării – Deltei Dunării și Marii Negre. Existența Strategiei UE pentru Regiunea Dunării, cu un punct dedicat, în ceea ce privește dezvoltarea unei IC distribuite care să se ocupe de probleme legate de managementul apei, transformă această lacună într-un mare avantaj pentru DANUBIUS-RI.

Pășii de urmat, în vederea integrării cu infrastructurile ESFRI, precum și cu alte infrastructuri, inițiative și programe europene, regionale sau globale.

DANUBIUS-RI și proiectele ESFRI existente

Proiecte ESFRI sub supervizarea Grupului Strategic de Lucru pentru Mediu

EMSO. Construcția proiectului MARINE GEOHAZARD a fost făcută cu sprijinul direct EMSO. Coordonatorul proiectului EMSO a fost membru al consiliului de direcție internațional, participând în toate etapele proiectului. S-a decis, prin urmare, ca platformele submarine ale MARINE GEOHAZARD

constituie nodul comun al EMSO si DANUBIUS-RI (ca observatoare pentru platforma continentală si marea adancă, parte a macrosistemului Dunare- Delta - Marea Neagra). La sfarsitul lunii noiembrie 2013 EMSO a semnat o scrisoare de sprijin pentru DANUBIUS-RI.

EPOS impartaseste cu DANUBIUS-RI acelasi interes in studiul dinamicii crustale pentru margini continentale, in regiunea fluviu-delta-mare (partea terestra). Reteaua Pontica studiaza dinamica crustala si are 18 statii GNSS care acopera toate punctele importante in regiunea Delta Dunarii -Dunare -Marea Neagra din Dobrogea. Aceasta retea a fost dezvoltata in Romania, ca parte a proiectului de infrastructura MARINE GEOHAZARD, si poate fi considerata drept contributia GeoEcoMar la proiectul EPOS (parte a contributiei Romaniei la EPOS, sub coordonarea generala a Institutului National de Fizica Pamantului). Pontica poate fi, astfel, nodul comun intre EPOS si DANUBIUS-RI .

In ceea ce priveste EURO ARGO, exista doua aspecte care lipsesc in prezent din competentele sale si care pot fi acoperite de catre DANUBIUS-RI. Pe de o parte, este vorba despre lipsa oricarei balize ARGO in partea de NV a Marii Negre, ceea ce inseamna necunoasterea proceselor complexe din zona de interactiune dintre Dunare si Marea Neagra. Pe de alta parte, EURO ARGO trebuie sa acopere cu balizele specifice zonele de interactiune fluvii - mari. Ambele aspecte sunt principalele directii ale argumentelor pentru negociere dintre DANUBIUS-RI si EURO ARGO. Acestea sunt totodata punctele-cheie pentru care sprijinul EURO ARGO poate fi obtinut pentru DANUBIUS-RI . Discutiile cu echipa de management EURO ARGO au inceput spre directiile mai sus mentionate.

SIOS. In viitor, ca lider mondial care se ocupa cu ciclul apei, DANUBIUS-RI trebuie sa se ocupe de aspectele managementului fenomenelor periculoase legate de inghet. Consideram ca acest subiect poate – sio trebuie sa devina un punct comun cu proiectul ESFRI SIOS, care are o experienta semnificativa in acest domeniu si conditii permanente de studiu pe tot parcursul anului. Discutiile urmeaza sa fie incepute.

Dupa discutiile bilaterale cu echipa de coordonare a proiectului ICOS, s-a convenit faptul ca DANUBIUS-RI sa contribuie la acoperirea unei competente inca ne-dezvoltate: dezvoltarea unei capacitati de monitorizare permanenta a emisiilor de gaze cu efect de sera in delte si alte zone umede costiere. Astfel, exista posibilitatea de a dezvolta o retea de turnuri de observare ICOS in Delta Dunarii ca punct comun intre DANUBIUS-RI si ICOS. Discutiile sunt in curs de desfasurare.

LIFEWATCH. Facilitatile care se vor ocupa cu studiul biodiversitatii in Delta Dunarii pentru DANUBIUS-RI, dar nu numai acestea, sunt cele care trebuie sa furnizeze informatii prin intermediul infrastructurii electronice, spre LIFEWATCH. Avand in vedere problemele actuale ale LIFEWATCH (pana la trimiterea spre Comisia Europeana a draftului ERIC), nu au fost inca stabilite contacte oficiale pe aceasta tema. Discutiile vor fi coordonate de catre partenerii romani din LIFEWATCH – si din consortiul DANUBIUS-RI, INSB,

Proiecte ESFRI sub supervizarea Grupului de Lucru Strategic pentru Biologie si Stiinte Medicale

In ceea ce priveste conexiunile dintre DANUBIUS-RI si ANAEE, un sit experimental in Delta Dunarii poate reprezenta punctul comun intre cele doua proiecte. Discutiile au inceput deja cu coordonatorul ANAEE la ultima reuniune ESFRI ENV.

EMBRC. Oportunitatile oferite de DANUBIUS-RI trebuie sa fie prezentate proiectului ESFRI EMBRC, deoarece exista un potential deosebit de colaborare, prin studierea mediilor dulcicole, de tranzitie si a celor costiere. Discutiile trebuie pornite, in scopul de a intelege nevoile EMBRC privind partea marina-de coasta din NV Marii Negre, care lipseste in prezent din randul competentelor lor, precum si a mediilor deltaice. DANUBIUS-RI trebuie isi dezvolte competente pe pe domeniile mai sus mentionate neacoperite de catre EMBRC ca punct de legatura intre cele doua infrastructuri.

ELIXIR si DANUBIUS-RI au agende complementare si o colaborare clara trebuie dezvoltata prin discutarea, identificarea si convenirea asupra punctelor comune de interes.

DANUBIUS-RI si Initiativele de Programe Comune ale agentilor de finantare a cercetarii din Europa (Joint Programming Initiatives - JPI)

In legatura cu misiunea DANUBIUS-RI , doua sunt initiativele JPI de interes major: JPI OCEANS si JPI Water Challenges. In timp ce JPI Oceans este acoperit pana acum in principal de EMSO si EURO ARGO (din randul proiectelor ESFRI ENV) si EMBRC (din randul celor ESFRI BMS), nu exista niciun proiect ESFRI care sa raspunda cerintelor specifice ale JPI Water Challenges. Acesta este motivul pentru care consideram DANUBIUS-RI - cu agenda sa, dedicata aspectelor legate de ciclul apei , mai ales managementului integrat al sistemelor fluviu- delta -mare, de a fi cea mai potrivita Infrastructura de Cercetare pentru a fi sustinuta si dezvoltata in cooperare cu JPI Water Cycle pentru acceptarea de catre ESFRI .

Discutiile pe aceasta tema cu reprezentantii Comitetului Executiv al WATEur (proiect tip CSA dedicat JPI Water) sunt in derulare si sunt pe calea cea buna. JPI Water a recunoscut existenta DANUBIUS-RI ca propunere importanta pentru scopurile sale si exista un interes important privind dezvoltarea DANUBIUS-RI, in stransa cooperare cu JPI Oceans. JPI Water a anuntat existenta DANUBIUS-RI si in cel mai recent numar al Buletinului Informativ al proiectului.

In scopul de a creste viteza si intensitatea colaborarii, reprezentantii romani in JPI Water si WATEur l-au adoptat pe Dr. Adrian Stanica in echipa acestui proiect si au planificat negocieri directe in urmatoarea adunarea generala WATEur.

DANUBIUS-RI si Initiativele de Infrastructuri Integrate (I3)

In relatie cu DANUBIUS-RI, I3-urile analizate pot avea pozitii diferite in functie de statutul si agenda fiecaruia.

Proiecte I3 precum fi HYDRALAB pot fi considerate colaboratori majori pentru viitor, altele (cum ar fi EXpeER, EurAqua, GROOM si Upgrade Black Sea Scene) au potentialul de a deveni furnizori de noduri de excelenta, in timp ce altele (cum ar fi exemplul Eurofleets) pentru care planurile de viitor sunt inca neclare, pot deveni colaboratori, dar si nod comun, furnizori de servicii sau chiar competitori pentru urmatoarea etapa de apel pentru a intra pe harta de parcurs ESFRI. Fiecare proiectm I3 din anexe a fost tratat cu atentie, deoarece cei mai multi viitori parteneri, colaboratori, furnizori de de nod dar si competitori vin cel mai probabil din acest tip de initiative.

DANUBIUS-RI si Programele si Initiativele Europene, altele decat ESFRI si I3

Datorita activitatilor prevazute de JRC Water Nexus, precum si de obiectivul principal al DANUBIUS-RI, o colaborare stransa trebuie dezvoltata intre cele doua. Concurenta se poate dovedi a fi mai mult decat periculoasa pentru DANUBIUS-RI, in timp ce o colaborare va da DANUBIUS-RI in mod semnificativ mai multa forta si vizibilitate, atat in regiunea Dunarii, precum si in Europa.

O intalnire intre Ministrul Roman al Invatamantului Superior si Cercetarii si Directorul General al JRC a avut loc in primavara acestui an. Dupa aceasta intalnire directa au urmat vizite intre personalul DANUBIUS-RI si directorul general adjunct al JRC, Directorul General al Institutului pentru Mediu si Dezvoltare Durabila si coordonatorul JRC – WaterNexus, pe parcursul anului 2013. Unul dintre chestionarele pe care se bazeaza analiza din acest raport a fost furnizat de catre coordonatorul JRC Water Nexus, cu acordul oficial al institutiei sale. Pentru a obtine sprijin pentru DANUBIUS-RI, e necesara mentinerea unor legaturi permanente cu JRC.

Europa sustine dezvoltarea COPERNICUS, fostul GMES (Reteaua de Monitorizare Globala pentru Mediu si Securitate). GMES este o initiativa comuna a Comisiei Europene si Agentiei Spatiale Europene, cu scopul de a atinge o capacitate autonoma si operationala de observare a tuturor elementelor Sistemului Pamant. Toate proiectele ESFRI ENV existente sunt in relatie directa cu cu COPERNICUS / GMES in calitate de furnizori de date si schimb de informatii. Acest tip de colaborare trebuie dezvoltat si pentru DANUBIUS-RI. Propunerea pentru ESFRI trebuie sa contina elemente care

sa prezinte in mod explicit legaturile dintre DANUBIUS-RI si COPERNICUS, precum si valoarea adaugata a DANUBIUS-RI pentru COPERNICUS.

Rolul SedNet ca retea de utilizatori pan-europeni pe tematica comuna cu cea a Centrului este de o importanta majora pentru dezvoltarea DANUBIUS-RI. SedNet este capabila de a contribui la dezvoltarea infrastructurii spre excelenta in cercetare si educatie. Prin urmare, acorduri detaliate trebuie sa fie facute cu coordonatorii SedNet in legatura cu dezvoltarea si implementarea DANUBIUS-RI. Coordonatorul SedNet a acceptat sa contribuie la dezvoltarea propunerii DANUBIUS-RI.

O serie de proiecte finantate pe plan national si initiative din Europa sunt de importanta majora pentru DANUBIUS-RI – datorita potentialului lor de a dezvolta noduri ale infrastructurii distribuite.

GLOBOLAKES este un proiect de cercetare, finantat de NERC (Consiliul Cercetarii Mediului Inconjurator, Natural Environment Research Council engl.), in Marea Britanie, dedicat analizei prin teledetectie starii mediului lacurilor de pe 5 continente. Coordonatorul GLOBOLAKES, Universitatea din Stirling, Marea Britanie, este membru al CII (Comitetul International de Initiativa) al DANUBIUS-RI si este in echipa de initiativa a acestui proiect inca din perioada elaborarii Cartii Albe. Exista de partea GLOBOLAKES un mare interes pentru crearea si promovarea unui nod al DANUBIUS-RI, folosind facilitatile si echipamentele utilizate in GLOBOLAKES, cu privire speciala catre lacurile din zona costiera si lagune.

RITMARE, ca infrastructura semnificativa de cercetare la nivel regional (marile Italiei) este de interes major pentru DANUBIUS-RI, datorita potentialului ei de a deveni un nod important. In timpul discutiei bilaterale cu reprezentantul DANUBIUS-RI la Venetia, in noiembrie 2013, echipa de coordonare a RITMARE si-a exprimat interesul in a lucra impreuna pentru crearea DANUBIUS-RI, ca o infrastructura de cercetare distribuita, cu conditia de a dezvolta un nod de excelenta prin proiectul RITMARE.

Rhone Sedimentary Observatory (RSO) are facilitati care au potentialul de a deveni nod al infrastructurii de cercetare distribuite. Vor fi initiate discutii cu reprezentantii francezi ai RSO, dar numai dupa intalniri si acorduri stabilite in prealabil cu IFREMER, cel mai mare institut de cercetare marina din Europa si totodata unul dintre actorii care sustin DANUBIUS-RI pe plan European.

In ceea ce priveste DREAM, o atentie speciala trebuie acordata acestui proiect. Ambele fiind proiecte majore de Infrastructura de Cercetare (IC) care au fost desemnate Proiecte Fanion in Strategia Uniunii Europene pentru Regiunea Dunarii, este clar ca DANUBIUS si DREAM trebuie sa colaboreze indeaproape. Nodul comun din Delta Dunarii este un semn al acestei colaborari. Cu toate acestea, trebuie avut in vedere ca, daca DREAM decide sa candideze pentru statutul ESFRI, Forumul nu va

accepta niciodata doua propuneri de IC din aceasi regiune cu subiecte complementare, si va decide probabil pentru integrarea celor doua.

Pentru a incerca o rezolvare a problemei, Coordonatorul DREAM a fost inclus in Comitetul International de Initiativa (CII) al DANUBIUS-RI. Discutii preliminare bilaterale intre reprezentantii romani si austrieci in ESFRI si ESFRI ENV au avut loc, pentru a incerca gasirea celei mai bune modalitati de cooperare. O intalnire bilaterala intre coordonatorii romani ai DANUBIUS-RI si coordonatorii austrieci ai DREAM este planificata sa aiba loc in ianuarie 2014, pentru a identifica cele mai potrivite cai de colaborare si/sau integrare.

DANUBIUS-RI si Initiativele, Programele si Institutiile Internationale

Viziunea DANUBIUS-RI este de a deveni o infrastruktura cu un rol major in managementul integrat al sistemelor fluviu-delta-mare la nivel global. De aceea o atentie speciala trebuie acordata unor programe, initiative si institutii internationale care vor putea sprijini cresterea lui DANUBIUS-RI intr-o pozitie de importanta globala, si care-i vor putea sprijini si evolutia ulterioara.

DANUBIUS-RI, imediat ce va fi acceptat pe harta de parcurs a ESFRI, trebuie sa inceapa sa stabileasca colaborari cu GEO, GEOS, GOOS, UNESCO-IOC, et al., – in calitatea sa de furnizor principal de date si actor cheie pentru masuratorile in-situ. Va trebui

Institutiile si Initiativele Natiunilor Unite (si altele decat IOC) au un rol major in promovarea si sustinerea durabilitatii centrului DANUBIUS-RI. Astfel, IGBP, IUCN, GEF, UNEP, UNDP sunt programe ONU cu care trebuiesc legate colaborari de la inceputul Fazei Pregatitoare a DANUBIUS-RI.

O atentie speciala este acordata UNESCO-IHE (UNESCO Institute of Water Education, cu sediul in Delft, Olanda), care a fost si ramane unul dintre sustinatorii DANUBIUS-RI de la elaborarea Cartii Albe. UNESCO-IHE – ca actor important in educatia pentru apa si management integrat al sistemelor fluviu-delta-mare pe plan mondial reprezinta un partener al DANUBIUS-RI. Datorita dimensiunilor si importantei lui pe plan mondial, nu poate fi constituit intr-un nod, dar trebuiesc realizate acorduri bilaterale pentru a-i putea folosi capacitatile.

Contacte trebuie de asemenea stabilite cu LOICZ (Land Ocean Interactions in the Coastal Zone) – cum DANUBIUS-RI va avea competente care vor intra in domeniul de activitate al LOICZ – pentru zonele de interactiune fluviu-mare. Cu toate acestea, aceste contacte, chiar daca au fost stabilite cu ceva timp in urma, nu sunt active, datorita mutarii fostului reprezentant LOICZ pe langa DANUBIUS-RI la alta institutie si a faptului ca in prezent sediul LOICZ se va transfera din Germania in Irlanda.

In afara de institutiile si initiativele globale oficiale (cele de mai sus fiind doar cateva exemple), un rol cheie este jucat de DeltaAlliance, o initiativa globala care grupeaza actori importanti care opereaza in cele mai mari delte ale lumii. Acesta Initiativa Internationala, in contrast cu celelalte, este bazata pe

asocierea directa si cu liber consimtamant, fiind organizata ca un acord voluntar intre parteneri. Dezvoltarea unei „aripi” in Delta Dunarii (desi este intarziata din lipsa de finantare) sub auspiciile DANUBIUS-RI va da acces si la alte „aripi”-delte (10delte de pe 4 continente).

Planuri si recomandari privind politica echipei de coordonare a DANUBIUS-RI catre statele europene

Cum scopul principal al DANUBIUS-RI este sa fie inclus pe viitoarea foaie de parcurs a ESFRI la urmatorul apel, o atentie speciala trebuie acordata tarilor cu un rol activ atat in ESFRI cat si in ESFRI ENV SWG. Reamintim ca propunerea trebuie sustinuta in plen de catre minim trei state membre ESFRI. De aceea trebuie pregatite din timp acordurile care trebuie stabilite intre Guvernul Romaniei si fiecare dintre potentialii parteneri inca de pe acum. Aceste acorduri nu necesita pentru moment o implicare financiara.

Acordurile care trebuie incheiate cu sustinatorii DANUBIUS privesc atat tari care pot furniza Noduri dar si tari care decid sa participe in DANUBIUS prin comunitatile de utilizatori.

O caracteristica speciala care trebuie avuta in vedere pentru propunerea DANUBIUS este ca acest centru nu este dedicat macrosistemului Dunare – Delta Dunarii – Marea Neagra, dar foloseste acest sistem pentru a testa si rezolva provocarile managementului integrat al sistemelor fluviu-delta-mare, provocari care sunt valabile oriunde in lume, in sisteme similare.

In ceea ce priveste dezvoltarea DANUBIUS-RI ca Infrastructura de Cercetare distribuita, pan-europeana, cu un sediu central in Delta Dunarii si noduri in tarile Europei, trebuie mentionat ca, inafara de Austria nicio alta tara dunareana nu are reprezentanti atat in ESFRI cat si in ESFRI ENV SWG. Acesta este o problema de importanta majora pentru definirea strategiei pentru a fi acceptati pe harta de parcurs.

Tarile din Regiunea Dunarii

Austria. Avand in vedere ca acesta este singura tara din regiunea Dunarii activa in ESFRI si ESFRI ENV, o atentie speciala trebuie acordata dezvoltarii relatiilor dintre Romania si Austria si sustinerii Austriei in ceea ce priveste DANUBIUS-RI. Discutiile ar trebui sa aiba loc urgent, pentru a se ajunge la un acord privind o politica comuna de dezvoltare a DANUBIUS-RI si DREAM, cele doua Proiecte Fanion de infrastructuri de cercetare ale SUERD. Un interes major pentru dezvoltarea unui nod de excelenta in ecologia apelor dulci a fost exprimat de WCL. Trebuie mentionat faptul ca WCL comunica in permanenta cu BOKU, coordonatorul DREAM. O intalnire a fost planificata pentru ianuarie 2014, in Viena.

Bulgaria. Cu contributia lor la infrastructura de cercetare dezvoltata in timpul proiectului de cooperare transfrontaliera Romania – Bulgaria, MARINE GEOHAZARD, partenerii bulgari contribuie cu infrastructura de pe teritoriul lor atat la reseaua EUXINUS cat si la sistemul PONTICA, ambele facand

parte din DANUBIUS-RI ca puncte de contact cu doua proiecte ESFRI. Discutiile preliminare pentru prezentarea DANUBIUS-RI cat si participarea Bulgariei la CII reprezinta primi pasi, dar colaborarea cu aceasta tara este lenta.

Moldova – prin Academia de Stiinte poate deveni o parte majora a DANUBIUS-RI, prin intermediul comunitatii de utilizatori si poate fi implicata in viitorul „laborator natural” reprezentat de partea finala a cursului inferior al Dunarii si Delta Dunarii. Totusi, nu este inca parte a ESFRI.

Ucraina este al doilea stat pe al carui teren se intinde Delta Dunarii si orice plan de a dezvolta un „laborator natural” trebuie sa includa si aceasta tara. Comunitatea de utilizatori a fost implicata in etapa de elaborare a Cartii Albe si are si un reprezentant in CII. Planurile de dezvoltare a Deltei ca „laborator natural” trebuie facute avandu-se intotdeauna in vedere ca o parte a acesteia se afla pe teritoriul ucrainean si ca trebuie mentinut un contact permanent cu aceasta tara. Totusi, trebuie precizat ca Ucraina nu este reprezentata in ESFRI si, avand in vedere evenimentele recente, pare a se indeparta de posibilitatea de a folosi fonduri structurale.

Serbia este una dintre tarile Dunarii care a aratat entuziasm pentru construirea DANUBIUS-RI si Universitatea din Novi Sad vrea sa gazduiasca un nod. Prezenta Serbiei in DANUBIUS-RI este binevenita atat pentru excelenta stiintifica cat si pentru pozitia geografica (pe cursul mediu al Dunarii). Serbia nu este reprezentata in ESFRI.

Ungaria este de asemenea interesata sa faca parte din DANUBIUS-RI si interesul vine de la doua grupuri de cercetare, unul din Universitatea “Eotvos Lorand”, din Budapesta (interactiunea apelor de suprafata si a celor freatice in bazinul de receptie al Dunarii) si Universitatea Istvan Szechenyi of Gyor (ecologia cursului mediu al Dunarii). Ungaria, reprezentata in trecut atat in ESFRI cat si in ESFRI ENV cu o puternica participare, nu mai este reprezentata in prezent in aceste intalniri. Discutii bilaterale sunt totusi programate.

Tari din afara Regiunii Dunarii

Marea Britanie. O sustinere deosebita a venit din partea Marii Britanii pentru crearea si dezvoltarea lui DANUBIUS-RI, atat in timpul elaborarii Cartii Albe cat si de la inceputul realizarii Propunerii ESFRI. Reprezentantii Marii Britanii in CII au lucrat pentru stabilirea unei intalniri cu NERC in ianuarie 2014 (cel mai probabil 23-24 ianuarie), care sa implice si Centrul pentru Ecologie si Hidrologie al NERC, la care va fi ceruta sustinerea oficiala a Marii Britanii in ESFRI si ESFRI ENV.

Irlanda, prin intermediul University College Cork, Centrul de Cercetare Costiera si Marina, si-a aratat interesul in a fi parte din DANUBIUS-RI si o intalnire oficiala va fi tinuta in Dublin, pentru a castiga sustinerea acestei tari in ESFRI si ESFRI ENV. Partenerii irlandezi sunt interesati de toate aspectele lui DANUBIUS-RI, cu o atentie speciala pentru zone umede costiere. Un punct important este viitoarea

gazduire a LOICZ in University College Cork, care va impulsiona rolul partenerilor irlandezi in DANUBIUS-RI la nivel european si international.

Italia este una dintre tarile mari ale UE, de la care sustinerea nu este usor de obtinut, datorita peisajului intern fragmentat. In luna noiembrie 2013, sustinerea a fost obtinuta de la echipa de coordonatori ai EMSO (infrastructura gazduita de catre Institutul de Geofizica si Vulcanologie). Discutiile bilaterale si negocierile s-au desfasurat cu parteneri din ISMAR- CNR (coordonatorii RITMARE) spre dezvoltarea unui nod al DANUBIUS-RI, si pentru identificarea modurilor de a colabora cu OGS si CONISMA, avand ca scop final obtinerea sustinerii Italiei in ESFRI si ESFRI ENV.

Spania este una dintre tarile la care DANUBIUS-RI va cauta sprijin, datorita prezentei ei in CII a CIIRC (Centrul de Cercetari si Inginerie Costiera, Univ. Politehnica din Barcelona), cu o bogata expertiza si facilitati deosebite in sistemele fluviu-dela-mare ale fluviilor Ebro si Llobregat. Discutiile bilaterale cu partenerii spanioli au fost incepute cu scopul de a obtine sprijinul oficial al Spaniei la ESFRI.

Franta, cu IFREMER, cel mai mare institut de cercetari marine din Europa, a fost implicata in initiativa DANUBIUS-RI inca din etapa de elaborare a Cartii Albe. Coordonatorii DANUBIUS-RI au decis sa foloseasca parteneriatul strategic intre IFREMER si GeoEcoMar si sa planifice o intalnire bilaterala cu Presedintele IFREMER pentru a stabili intr-o maniera detaliata conditiile cerute de Franta pentru acordarea sustinerii pentru DANUBIUS-RI. O atentie speciala trebuie acordata faptului ca probabil Franta vrea sa promoveze o alta propunere pe harta de parcurs a ESFRI ENV.

Grecia, prin intermediul Centrului Grec de Cercetare Marina, este reprezentata in CII. Reprezentantii acestei tari au dezvoltat cu institutiile din Romania o cooperare de lunga durata, lucrand in cercetarea zonei de NV a Marii Negre si in zona de interactiune cu Dunare – Mare de peste un deceniu. Date fiind aceste lucruri, partenerii greci pot fi convinsi sa sustina propunerea DANUBIUS-RI in ESFRI, dar, avand in vedere criza financiara care a lovit Grecia, aspectele legate de obligatiile financiare nu trebuie puse in discutie in acest moment. O intalnire a fost programata a se defasura in timpul Conferintei ICRI, gazduita de Grecia in perioada 2-4 Aprilie, 2014, sub presedintia Greciei, in Atena.

Olanda este tara care gazduieste DELTARES, una dintre cele mai mari institutii care se ocupa cu studiul sistemelor fluviu-delta/estuare/lagune-sisteme costiere din intreaga lume. Recent (octombrie 2013) DELTARES a decis sa se alature DANUBIUS-RI si sa-si trimita reprezentanti in CII. Discutiile cu acestia trebuiesc incepute in vederea obtinerii sustinerii Olandei in ESFRI si in Grupul Strategic de Lucru Mediu. Datorita alaturarii recente la grupul de initiativa (ca pol major de expertiza in dezvoltarea durabila a zonelor umede costiere), niciun plan detaliat nu a fost facut deocamdata cu acestia.

Norvegia. Discutiile cu aceasta tara au inceput la intalnirea din luna septembrie 2013 de la Sf. Gheorghe, la care a participat si reprezentantul Norvegiei in ESFRI ENV. Totusi, discutiile avanseaza lent, pentru ca exista inca nevoia de a identifica actorii principali si punctele comune de interes. O oportunitate pentru a strange legaturile cu partenerii norvegieni a aparut prin Joint Call SEE 2014. Cel putin o

propunere condusa de GeoEcoMar se va ocupa cu elaborarea si dezvoltarea infrastructurii necesara pentru a construi „Laboratorul Natural Delta Dunarii – Zona de NV a Marii Negre”, unul dintre scopurile lui DANUBIUS-RI. Discutiile suplimentare pentru obtinerea sustinerii Norvegiei sunt in desfasurare dar procesul trebuie accelerat.

Germania este un stat important atat in Europa cat si in Regiunea Dunarii (chiar daca in Regiunea Dunarii participa doar prin 2 landuri). Din pacate, in ultima perioada partenerii germani implicati la inceput la scrierea Cartii Albe a DANUBIUS-RI fie s-au retras din activitate, fie si-au schimbat locul de munca sau chiar tara de resedinta. Prin urmare, este necesar un proces rapid si intens pentru a stabili contacte pentru succesul DANUBIUS-RI, atat in landurile din Regiunea Dunarii cat si in alte institutii de excelenta in cercetarea fluviilor/lagunelor/mediului costier si marin. Stabilirea acestor contacte este o prioritate majora a echipei de initiativa DANUBIUS-RI.

Recomandari, dupa cum reies din analiza SWOT

- Eforturile ar trebui sa se concentreze pentru a obtine sustinerea agentilor de finantare la nivel national si international, pentru ca obtinerea finantarii pentru o mare infrastructura de cercetare este o adevarata provocare in contextul socio-economic actual;
- Sediul central si nodurile DANUBIUS-RI ar trebui sa se concentreze atat pe excelenta in cercetare cat si pe furnizarea de servicii (furnizor), pentru a obtine durabilitate;
- Investitii si masuri ar trebui sa se ia pe viitor la aeroportul din Tulcea sau la cel din Constanta, pentru ca se asteapta o crestere a activitatii aeroportului cand centrul DANUBIUS-RI va incepe sa functioneze;
- In procesul de pregatire a propunerii DANUBIUS-RI, atat Romania in calitate de initiator si coordonator, cat si celelalte state membre ale Consorțiului, trebuie sa-si concentreze contributiile, pentru a elabora DANUBIUS-RI ca pe infrastructura de cercetare pan-europeana distribuita, si nu ca pe o propunere tip I3 - Initiativa de Infrastructuri Integrate, pentru ca aceasta ar insemna excluderea din competitia pentru intrarea pe roadmap-ul (foaia de parcurs) a ESFRI;

8. ANEXE

8.1. Analiza infrastructurilor de cercetare, inițiativelor și programelor relevante din domeniul ciclului apei (fluvii, lacuri, delte, estuare, lagune, zone umede, mări) la nivel european și mondial

8.1.1. Anexa 1 – Lista infrastructurilor de cercetare, inițiativelor și programelor relevante din domeniul ciclului apei la nivel european și mondial

Items analyzed	Type of Item	Status of the project	Category of infrastructure	Water cycle coverage
Copernicus EEOP	2 - Infrastructure	3 - Ongoing	8 - scientific data provider	6 - River-Delta-Sea
DABLAS	4 - Initiative/policy	3 - Ongoing	5 - Initiative	6 - River-Delta-Sea
Delta Alliance	4 - Initiative/policy	3 - Ongoing	3 - Supporter	2 - Delta -Estuary
DIANE CM	4 - Initiative/policy	4 - Finalized	2 - Potential collaborator	4 - River -delta
EurAqua	2 - Infrastructure	3 - Ongoing	2 - Potential collaborator	4 - River -delta
GEF	4 - Initiative/policy	6 - Permanent programme	4 - Potential funder	6 - River-Delta-Sea
GEO	4 - Initiative/policy	6 - Permanent programme	6 - User of infrastructure/data	6 - River-Delta-Sea
GEOSS	4 - Initiative/policy	6 - Permanent programme	5 - Initiative	6 - River-Delta-Sea
HydralabIV	3 - I3 (integrated infrastructure initiative)	3 - Ongoing	2 - Potential collaborator	6 - River-Delta-Sea
ICPDR	4 - Initiative/policy	6 - Permanent programme	6 - User of infrastructure/data	4 - River -delta
IHE UNESCO	6 - Other	6 - Permanent programme	2 - Potential collaborator	6 - River-Delta-Sea
JPI Water	4 - Initiative/policy	3 - Ongoing	3 - Supporter	6 - River-Delta-Sea

Items analyzed	Type of Item	Status of the project	Category of infrastructure	Water cycle coverage
Mesoaqua	2 - Infrastructure	4 - Finalized	2 - Potential collaborator	6 - River-Delta-Sea
RSO	2 - Infrastructure	3 - Ongoing	1 - Node	6 - River-Delta-Sea
SedNet	4 - Initiative/policy	3 - Ongoing	2 - Potential collaborator	6 - River-Delta-Sea

Items analyzed	Type of Item	Status of the project	Category of infrastructure	Water cycle coverage	Major scientific equipment/facilities/resources;	Major scientific equipment/facilities/resources;
BS Strategy	4 - Initiative/policy	6 - Permanent programme	3 - Supporter	3 - Sea/oceans	4 - not applicable	4 - not applicable
BSC	4 - Initiative/policy	6 - Permanent programme	6 - User of infrastructure/data	3 - Sea/oceans	4 - not applicable	4 - not applicable
DAB LAS	4 - Initiative/policy	3 - Ongoing	5 - Initiative	6 - River-Delta-Sea	4 - not applicable	4 - not applicable
Delta Alliance	4 - Initiative/policy	3 - Ongoing	3 - Supporter	2 - Delta-Estuary	4 - not applicable	2 - partially complementary
DIA NE CM	4 - Initiative/policy	4 - Finalized	2 - Potential collaborator	4 - River-delta	1 - single	2 - partially complementary
GEF	4 - Initiative/policy	6 - Permanent	4 - Potential funder	6 - River-Delta-Sea	4 - not applicable	4 - not applicable

Items analyzed	Type of Item	Status of the project	Category of infrastructure	Water cycle coverage	Major scientific equipment/facilities/resources;	Major scientific equipment/facilities/resources;
		programme				
GEO	4 - Initiative/policy	6 - Permanent programme	6 - User of infrastructure/data	6 - River-Delta-Sea	4 - not applicable	4 - not applicable
IAD	4 - Initiative/policy	6 - Permanent programme	6 - User of infrastructure/data	1 - River	4 - not applicable	2 - partially complementary
ICPDR	4 - Initiative/policy	6 - Permanent programme	6 - User of infrastructure/data	4 - River-delta	4 - not applicable	2 - partially complementary

Items analyzed	Type of Item	Status of the project	Category of infrastructure	Water cycle coverage
Copernicus EEOP	2 - Infrastructure	3 - Ongoing	8 - scientific data provider	6 - River-Delta-Sea
EurAqua	2 - Infrastructure	3 - Ongoing	2 - Potential collaborator	4 - River -delta
MesoAqua	2 - Infrastructure	4 - Finalized	2 - Potential collaborator	6 - River-Delta-Sea
RSO	2 - Infrastructure	3 - Ongoing	1 - Node	6 - River-Delta-Sea

Items analyzed	Type of Item	Status of the project	Category of infrastructure	Water cycle coverage	Scientific agendaWater cycle System characterization	Scientific agendaEnvironmental change on water basins	Scientific agendaAdaptive and sustainable management of river-delta-sea systems
Danubia	4 - Initiative/policy	6 - Permanent programme	8 - scientific data provider	1 - River	2 - partially covered	3 - partially covered	4 - partially covered
IAD	4 - Initiative/policy	6 - Permanent programme	6 - User of infrastructure /data	1 - River	2 - partially covered	3 - partially covered	4 - partially covered
Delta Alliance	4 - Initiative/policy	3 - Ongoing	3 - Supporter	2 - Delta - Estuary	2 - partially covered	4 - fully covered	4 - partially covered
ACQUEAU	5 - Eureka	6 - Permanent programme	3 - Supporter	3 - Sea/oceans	2 - partially covered	3 - partially covered	4 - partially covered
BlackSeaScene	3 - I3 (integrated infrastructure initiative)	4 - Finalized	1 - Node	3 - Sea/oceans	2 - partially covered	4 - fully covered	4 - partially covered
BS Strategy	4 - Initiative/policy	6 - Permanent programme	3 - Supporter	3 - Sea/oceans	2 - partially covered	3 - partially covered	5 - fully covered
BSC	4 - Initiative/policy	6 - Permanent	6 - User of	3 - Sea/	2 - partially covered	4 - fully covered	5 - fully covered

Items analyzed	Type of Item	Status of the project	Category of infrastructure	Water cycle coverage	Scientific agendaWater cycle System characterization	Scientific agendaEnvironmental change on water basins	Scientific agendaAdaptive and sustainable management of river-delta-sea systems
		programme	infrastructure/data	oceans			
Assesment	3 - I3 (integrated infrastructure initiative)	3 - Ongoing	2 - Potential collaborator	3 - Sea/oceans	2 - partially covered	3 - partially covered	4 - partially covered
Ecop	2 - Infrastructure	4 - Finalized	8 - scientific data provider	3 - Sea/oceans	2 - partially covered	3 - partially covered	4 - partially covered
EMOD Net	6 - Other	3 - Ongoing	2 - Potential collaborator	3 - Sea/oceans	2 - partially covered	3 - partially covered	4 - partially covered
EMBR C	1 - ESFRI	2 - Preparatory phase	2 - Potential collaborator	3 - Sea/oceans	2 - partially covered	3 - partially covered	4 - partially covered
EMSO	1 - ESFRI	2 - Preparatory phase	2 - Potential collaborator	3 - Sea/oceans	2 - partially covered	3 - partially covered	4 - partially covered
ERVO	2 - Infrastructure	3 - Ongoing	2 - Potential collaborator	3 - Sea/oceans	2 - partially covered	3 - partially covered	4 - partially covered

Items analyzed	Type of Item	Status of the project	Category of infrastructure	Water cycle coverage	Scientific agendaWater cycle System characterization	Scientific agendaEnvironmental change on water basins	Scientific agendaAdaptive and sustainable management of river-delta-sea systems
EU RO Arg o	1 - ESFRI	3 - Ongoing	2 - Potential collaborator	3 - Sea/oceans	2 - partially covered	3 - partially covered	4 - partially covered
Eur oflets	3 - I3 (integrated infrastructure initiative)	4 - Finalized	2 - Potential collaborator	3 - Sea/oceans	2 - partially covered	3 - partially covered	1- not covered
Eur oflets2	3 - I3 (integrated infrastructure initiative)	3 - Ongoing	2 - Potential collaborator	3 - Sea/oceans	2 - partially covered	3 - partially covered	1- not covered
Fix O3	3 - I3 (integrated infrastructure initiative)	3 - Ongoing	8 - scientific data provider	3 - Sea/oceans	2 - partially covered	3 - partially covered	1- not covered
GO OS	4 - Initiative/policy	6 - Permanent programme	6 - User of infrastructure /data	3 - Sea/oceans	2 - partially covered	3 - partially covered	4 - partially covered
IOC UN ESC O	6 - Other	6 - Permanent programme	3 - Supporter	3 - Sea/oceans	2 - partially covered	3 - partially covered	4 - partially covered
JC OM	6 - Other	6 - Perm	6 - User	3 - Sea/	2 - partially covered	3 - partially covered	1- not covered

Items analyzed	Type of Item	Status of the project	Category of infrastructure	Water cycle coverage	Scientific agendaWater cycle System characterization	Scientific agendaEnvironmental change on water basins	Scientific agendaAdaptive and sustainable management of river-delta-sea systems
MO PS		anent programme	of infrastructure /data	oceans			
JPI Oceans	4 - Initiative/policy	3 - Ongoing	3 - Supporter	3 - Sea/oceans	2 - partially covered	3 - partially covered	4 - partially covered
Marine Geo Hazard	2 - Infrastructure	5 - Implemented	1 - Node	3 - Sea/oceans	1- not covered	3 - partially covered	4 - partially covered
Mar iNet	2 - Infrastructure	3 - Ongoing	6 - User of infrastructure /data	3 - Sea/oceans	2 - partially covered	1- not covered	1- not covered
MA RS	2 - Infrastructure	3 - Ongoing	2 - Potential collaborator	3 - Sea/oceans	2 - partially covered	3 - partially covered	4 - partially covered
Med Wet	4 - Initiative/policy	6 - Permanent programme	2 - Potential collaborator	3 - Sea/oceans	2 - partially covered	3 - partially covered	6 -not applicable
RIT MA RE	2 - Infrastructure	3 - Ongoing	1 - Node	3 - Sea/oceans	2 - partially covered	3 - partially covered	4 - partially covered

Items analyzed	Type of Item	Status of the project	Category of infrastructure	Water cycle coverage	Scientific agendaWater cycle System characterization	Scientific agendaEnvironmental change on water basins	Scientific agendaAdaptive and sustainable management of river-delta-sea systems
SEADATANET	2 - Infrastructure	3 - Ongoing	2 - Potential collaborator	3 - Sea/oceans	2 - partially covered	3 - partially covered	1- not covered
GROOM	3 - I3 (integrated infrastructure initiative)	3 - Ongoing	8 - scientific data provider	3 - Sea/oceans	2 - partially covered	3 - partially covered	1- not covered
EMODnet	4 - Initiative/policy	3 - Ongoing	6 - User of infrastructure /data	3 - Sea/oceans	2 - partially covered	3 - partially covered	4 - partially covered
DIANECM	4 - Initiative/policy	4 - Finalized	2 - Potential collaborator	4 - River - delta	2 - partially covered	3 - partially covered	4 - partially covered
Eur Aqua	2 - Infrastructure	3 - Ongoing	2 - Potential collaborator	4 - River - delta	2 - partially covered	3 - partially covered	4 - partially covered
ICPDR	4 - Initiative/policy	6 - Permanent programme	6 - User of infrastructure /data	4 - River - delta	2 - partially covered	3 - partially covered	4 - partially covered
JERICO	3 - I3 (integrated)	3 - Ongoing	2 - Potential	5 - Coast and	2 - partially covered	3 - partially covered	1- not covered

Items analyzed	Type of Item	Status of the project	Category of infrastructure	Water cycle coverage	Scientific agendaWater cycle System characterization	Scientific agendaEnvironmental change on water basins	Scientific agendaAdaptive and sustainable management of river-delta-sea systems
	infrastructure initiative)		collaborator	estuary			
LOI CZ	4 - Initiative/policy	3 - Ongoing	2 - Potential collaborator	5 - Coast and estuary	2 - partially covered	3 - partially covered	4 - partially covered
Copernicus EE OP	2 - Infrastructure	3 - Ongoing	8 - scientific data provider	6 - River-Delta-Sea	2 - partially covered	3 - partially covered	4 - partially covered
DA BL AS	4 - Initiative/policy	3 - Ongoing	5 - Initiative	6 - River-Delta-Sea	2 - partially covered	3 - partially covered	4 - partially covered
GE F	4 - Initiative/policy	6 - Permanent programme	4 - Potential funder	6 - River-Delta-Sea	2 - partially covered	3 - partially covered	4 - partially covered
GE O	4 - Initiative/policy	6 - Permanent programme	6 - User of infrastructure /data	6 - River-Delta-Sea	2 - partially covered	3 - partially covered	4 - partially covered
GE OSS	4 - Initiative/policy	6 - Permanent programme	5 - Initiative	6 - River-Delta-Sea	2 - partially covered	3 - partially covered	4 - partially covered

Items analyzed	Type of Item	Status of the project	Category of infrastructure	Water cycle coverage	Scientific agendaWater cycle System characterization	Scientific agendaEnvironmental change on water basins	Scientific agendaAdaptive and sustainable management of river-delta-sea systems
Hydrala bIV	3 - I3 (integrated infrastructure initiative)	3 - Ongoing	2 - Potential collaborator	6 - River-Delta-Sea	3 - fully covered	3 - partially covered	1- not covered
IHE UNESCO	6 - Other	6 - Permanent programme	2 - Potential collaborator	6 - River-Delta-Sea	3 - fully covered	3 - partially covered	4 - partially covered
JPI Water	4 - Initiative/policy	3 - Ongoing	3 - Supporter	6 - River-Delta-Sea	2 - partially covered	3 - partially covered	4 - partially covered
Mesoaquua	2 - Infrastructure	4 - Finalized	2 - Potential collaborator	6 - River-Delta-Sea	2 - partially covered	3 - partially covered	1- not covered
RSO	2 - Infrastructure	3 - Ongoing	1 - Node	6 - River-Delta-Sea	2 - partially covered	3 - partially covered	4 - partially covered
SedNet	4 - Initiative/policy	3 - Ongoing	2 - Potential collaborator	6 - River-Delta-Sea	2 - partially covered	3 - partially covered	4 - partially covered
GloboLakes	6 - Other	3 - Ongoing	1 - Node	7 - Lakes	2 - partially covered	3 - partially covered	4 - partially covered

Items analyzed	Type of Item	Status of the project	Category of infrastructure	Water cycle coverage	Scientific agendaWater cycle System characterization	Scientific agendaEnvironmental change on water basins	Scientific agendaAdaptive and sustainable management of river-delta-sea systems
LaguNET	2 - Infrastructure	3 - Ongoing	1 - Node	8 - Lagoons	2 - partially covered	3 - partially covered	4 - partially covered
AnaEE	1 - ESFRI	2 - Preparatory phase	2 - Potential collaborator	9 - Other	2 - partially covered	3 - partially covered	1- not covered
CIRCLE 2	2 - Infrastructure	3 - Ongoing	8 - scientific data provider	9 - Other	2 - partially covered	4 - fully covered	4 - partially covered
EASTNMR	2 - Infrastructure	3 - Ongoing	1 - Node	9 - Other	2 - partially covered	3 - partially covered	1- not covered
Eelixir	1 - ESFRI	2 - Preparatory phase	2 - Potential collaborator	9 - Other	4 -not applicable	3 - partially covered	6 -not applicable
ExpereER	3 - I3 (integrated infrastructure initiative)	3 - Ongoing	2 - Potential collaborator	9 - Other	4 -not applicable	5 -not applicable	4 - partially covered
HydroNet	6 - Other	4 - Finalized	1 - Node	9 - Other	2 - partially covered	3 - partially covered	1- not covered
ICOS	1 - ESFRI	3 - Ongoing	2 - Potential	9 - Other	1- not covered	3 - partially covered	1- not covered

Items analyzed	Type of Item	Status of the project	Category of infrastructure	Water cycle coverage	Scientific agendaWater cycle System characterization	Scientific agendaEnvironmental change on water basins	Scientific agendaAdaptive and sustainable management of river-delta-sea systems
			collaborator				
IUCN	6 - Other	6 - Permanent programme	3 - Supporter	9 - Other	4 -not applicable	3 - partially covered	4 - partially covered
JPI Climate	4 - Initiative/policy	3 - Ongoing	3 - Supporter	9 - Other	4 -not applicable	3 - partially covered	4 - partially covered
Life III	2 - Infrastructure	4 - Finalized	2 - Potential collaborator	9 - Other	1- not covered	3 - partially covered	1- not covered
Life watch	1 - ESFRI	3 - Ongoing	2 - Potential collaborator	9 - Other	2 - partially covered	3 - partially covered	1- not covered
LT ER	2 - Infrastructure	3 - Ongoing	1 - Node	9 - Other	2 - partially covered	3 - partially covered	4 - partially covered
SIO S	1 - ESFRI	3 - Ongoing	2 - Potential collaborator	9 - Other	2 - partially covered	3 - partially covered	4 - partially covered
UN EP	6 - Other	6 - Permanent programme	4 - Potential funder	9 - Other	1- not covered	3 - partially covered	4 - partially covered

Items analyzed	Type of Item	Status of the project	Category of infrastructure	Water cycle coverage	Scientific agendaWater cycle System characterization	Scientific agendaEnvironmental change on water basins	Scientific agendaAdaptive and sustainable management of river-delta-sea systems
EP OS	1 - ESFRI	3 - Ongoing	2 - Potential collaborator	9 - Other	1- not covered	1- not covered	4 - partially covered

Items analyzed	Type of Item	Water System characterization	Water cycle	Environmental change on water basins	Adaptive and sustainable management of river-delta-sea systems
BlackSeaScene	3 - I3 (integrated infrastructure initiative)	2 - partially covered	partially covered	4 - fully covered	4 - partially covered
Assemble	3 - I3 (integrated infrastructure initiative)	2 - partially covered	partially covered	3 - partially covered	4 - partially covered
Ecoop	2 - Infrastructure	2 - partially covered	partially covered	3 - partially covered	4 - partially covered
EMBR C	1 - ESFRI	2 - partially covered	partially covered	3 - partially covered	4 - partially covered
EMSO	1 - ESFRI	2 - partially covered	partially covered	3 - partially covered	4 - partially covered
ERVO	2 - Infrastructure	2 - partially covered	partially covered	3 - partially covered	4 - partially covered
EURO Argo	1 - ESFRI	2 - partially covered	partially covered	3 - partially covered	4 - partially covered
Eurofleets	3 - I3 (integrated infrastructure initiative)	2 - partially covered	partially covered	3 - partially covered	1- not covered
Eurofleets2	3 - I3 (integrated infrastructure initiative)	2 - partially covered	partially covered	3 - partially covered	1- not covered

Items analyzed	Type of Item	Water cycle System characterization	Environmental change on water basins	Adaptive and sustainable management of river-delta-sea systems
FixO3	3 - I3 (integrated infrastructure initiative)	2 - partially covered	3 - partially covered	1- not covered
Marine GeoHazard	2 - Infrastructure	1- not covered	3 - partially covered	4 - partially covered
MariNet	2 - Infrastructure	2 - partially covered	1- not covered	1- not covered
MARS	2 - Infrastructure	2 - partially covered	3 - partially covered	4 - partially covered
RITMARE	2 - Infrastructure	2 - partially covered	3 - partially covered	4 - partially covered
SEADATANET	2 - Infrastructure	2 - partially covered	3 - partially covered	1- not covered
GROOM	3 - I3 (integrated infrastructure initiative)	2 - partially covered	3 - partially covered	1- not covered
EurAqua	2 - Infrastructure	2 - partially covered	3 - partially covered	4 - partially covered
JERICO	3 - I3 (integrated infrastructure initiative)	2 - partially covered	3 - partially covered	1- not covered
Copernicus EEOP	2 - Infrastructure	2 - partially covered	3 - partially covered	4 - partially covered
HydrabIV	3 - I3 (integrated infrastructure initiative)	3 - fully covered	3 - partially covered	1- not covered
MesoAqua	2 - Infrastructure	2 - partially covered	3 - partially covered	1- not covered
RSO	2 - Infrastructure	2 - partially covered	3 - partially covered	4 - partially covered

Items analyzed	Type of Item	Water cycle System characterization	Environmental change on water basins	Adaptive and sustainable management of river-delta-sea systems
LaguNET	2 - Infrastructure	2 - partially covered	3 - partially covered	4 - partially covered
AnaEE	1 - ESFRI	2 - partially covered	3 - partially covered	1- not covered
CIRCL E 2	2 - Infrastructure	2 - partially covered	4 - fully covered	4 - partially covered
EASTN MR	2 - Infrastructure	2 - partially covered	3 - partially covered	1- not covered
Eelixir	1 - ESFRI	4 -not applicable	3 - partially covered	6 -not applicable
ExpeER	3 - I3 (integrated infrastructure initiative)	4 -not applicable	5 -not applicable	4 - partially covered
ICOS	1 - ESFRI	1- not covered	3 - partially covered	1- not covered
Life III	2 - Infrastructure	1- not covered	3 - partially covered	1- not covered
Lifewatch	1 - ESFRI	2 - partially covered	3 - partially covered	1- not covered
LTER	2 - Infrastructure	2 - partially covered	3 - partially covered	4 - partially covered
SIOS	1 - ESFRI	2 - partially covered	3 - partially covered	4 - partially covered
EPOS	1 - ESFRI	1- not covered	1- not covered	4 - partially covered

1	System characterization
1.1	Origin & evolution of the Danube river- delta-Black Sea
1.1.1	Genesis of the river & basin;
1.1.2	geological structure;

1.1.3	Earth crust dynamics and river evolution;
1.1.4	interactions between the river and the sea (relation to sea-level changes and connections to other basins;
1.1.5	delta formation;
1.1.6	evolution of depocentres, etc.).
1.2	Geodynamic processes
1.2.1	Neo-tectonics;
1.2.2	uplift processes in orogenic zones and formation and evolution of river terraces;
1.2.3	subsidence and sediment compaction;
1.2.4	correlation with system evolution.
1.3	Hydrology, HYDRODYNAMICS and sedimentology
1.3.1	Water and sediment fluxes in the river – delta - coast – sea system;
1.3.2	the sediment cycle (source – transfer – sink);
1.3.3	bio- & geo-chemistry of water & sediment throughout the system;
1.3.4	hydrodynamic processes at the river/sea interface and in coastal wetlands.
1.4	ECOSYSTEM ASSESSMENT AND FUNCTION
1.4.1	Evaluation of the biotic and abiotic status of the river-delta-sea ecosystems;
1.4.2	System pollution, eutrophication, toxicity, biodiversity;
1.4.3	Evaluation of food-chains, population dynamics and ecosystem function;
1.4.4	green-house gas fluxes in wetlands, lakes & sea.
2	Environmental change
2.1	IN-SITU ECOSYSTEM MONITORING
2.1.1	Real-time and permanent environmental quality assessment in the river-delta-sea system;
2.1.2	application of new types of on-line sensors and equipment (including micro- and mesocosme techniques);
2.1.3	use of biomarkers;
2.1.4	Establishing long-term data series to study process changes.

2.2	EARTH OBSERVATION AND REMOTE SENSING
2.2.1	Characterizing land and water in the river – delta – sea systems,
2.2.2	monitoring morphological & hydrological changes,
2.2.3	studying and monitoring water currents and river plumes, eutrophic conditions, sediment dynamics and seafloor conditions.
2.3	Geo-hazards and risk assessment
2.3.1	Understanding extreme events, their natural & anthropogenic triggering mechanisms at different scales, such as floods, draughts, landslides, storms; earthquakes;
2.3.2	Slope instability on the continental margin;
2.3.3	geo-hazards originating from gas-hydrates.
2.4	MODELLING, SIMULATION AND HYPOTHESIS TESTING
2.4.1	Predictive tools to assess environmental response;
2.4.2	Climate and environmental change modeling including impacts on the river-delta-sea system;
2.4.3	effects of extreme events on the system;
2.4.4	impacts of sea-level rise.
2.5	Anthropogenic impact on ecosystem goods and services
2.5.1	Damages induced by anthropogenic activity on ecosystems;
2.5.2	evaluating the social dynamics of local communities & identify economic opportunities for sustainable development while minimizing biodiversity loss.
3	Adaptive and sustainable management
3.1	ADAPTIVE ECOSYSTEM MANAGEMENT
3.1.1	Provision of the scientific basis for sustainably managing of river-delta-sea systems using an appropriate range of methods and models.
3.2	NATURE CONSERVATION & RESTORATION
3.2.1	Improve the ecological status, habitat restoration, bioremediation, restoration of connectivity;
3.2.2	guidelines to conserve endangered species & habitats;
3.2.3	implementation of EU environmental legislation;

3.2.4	assessment of invasive species.
3.3	Natural resource assessment and Evaluation
3.3.1	Studies advancing the sustainable management of biotic and abiotic resources through knowledge-based development and use of a wide range of methods and models (e.g. valuing ecosystem services).
3.4	Evaluating development scenarios for sustainable use
3.4.1	Interdisciplinary and holistic approach to developing new strategies for sustainable management. Develop methods for and apply/test Decision Support Systems (DSS) and Multi-Criteria Decision Aids (MCDA).

Items analyzed	Type of Item	Status of the project	Water cycle System characterization	Environmental change on water basins	Adaptive and sustainable management of river-delta-sea systems
ACQU EAU	5 - Eureka	6 - Permanent programme	2 - partially covered	3 - partially covered	4 - partially covered
AnaEE	1 - ESFRI	2 - Preparatory phase	2 - partially covered	3 - partially covered	1- not covered
Black SeaScene	3 - I3 (integrated infrastructure initiative)	4 - Finalized	2 - partially covered	4 - fully covered	4 - partially covered
BS Strategy	4 - Initiative/policy	6 - Permanent programme	2 - partially covered	3 - partially covered	5 - fully covered
BSC	4 - Initiative/policy	6 - Permanent programme	2 - partially covered	4 - fully covered	5 - fully covered
CIRCLE 2	2 - Infrastructure	3 - Ongoing	2 - partially covered	4 - fully covered	4 - partially covered

Items analyzed	Type of Item	Status of the project	Water cycle System characterization	Environmental change on water basins	Adaptive and sustainable management of river-delta-sea systems
Copernicus EEOP	2 - Infrastructure	3 - Ongoing	2 - partially covered	3 - partially covered	4 - partially covered
DABLAS	4 - Initiative/policy	3 - Ongoing	2 - partially covered	3 - partially covered	4 - partially covered
Danubia	4 - Initiative/policy	6 - Permanent programme	2 - partially covered	3 - partially covered	4 - partially covered
Delta Alliance	4 - Initiative/policy	3 - Ongoing	2 - partially covered	4 - fully covered	4 - partially covered
DIANE CM	4 - Initiative/policy	4 - Finalized	2 - partially covered	3 - partially covered	4 - partially covered
Assemble	3 - I3 (integrated infrastructure initiative)	3 - Ongoing	2 - partially covered	3 - partially covered	4 - partially covered
EAST NMR	2 - Infrastructure	3 - Ongoing	2 - partially covered	3 - partially covered	1 - not covered
Ecoop	2 - Infrastructure	4 - Finalized	2 - partially covered	3 - partially covered	4 - partially covered
Eelixir	1 - ESFRI	2 - Preparatory phase	4 - not applicable	3 - partially covered	6 - not applicable
EMODNet	6 - Other	3 - Ongoing	2 - partially covered	3 - partially covered	4 - partially covered
EMBR C	1 - ESFRI	2 - Preparatory phase	2 - partially covered	3 - partially covered	4 - partially covered

Items analyzed	Type of Item	Status of the project	Water cycle System characterization	Environmental change on water basins	Adaptive and sustainable management of river-delta-sea systems
EMSO	1 - ESFRI	2 - Preparatory phase	2 - partially covered	3 - partially covered	4 - partially covered
ERVO	2 - Infrastructure	3 - Ongoing	2 - partially covered	3 - partially covered	4 - partially covered
EurAqua	2 - Infrastructure	3 - Ongoing	2 - partially covered	3 - partially covered	4 - partially covered
EURO Argo	1 - ESFRI	3 - Ongoing	2 - partially covered	3 - partially covered	4 - partially covered
Eurofleets	3 - I3 (integrated infrastructure initiative)	4 - Finalized	2 - partially covered	3 - partially covered	1- not covered
Eurofleets2	3 - I3 (integrated infrastructure initiative)	3 - Ongoing	2 - partially covered	3 - partially covered	1- not covered
ExpeER	3 - I3 (integrated infrastructure initiative)	3 - Ongoing	4 - not applicable	5 - not applicable	4 - partially covered
FixO3	3 - I3 (integrated infrastructure initiative)	3 - Ongoing	2 - partially covered	3 - partially covered	1- not covered
GEF	4 - Initiative/policy	6 - Permanent programme	2 - partially covered	3 - partially covered	4 - partially covered
GEO	4 - Initiative/policy	6 - Permanent programme	2 - partially covered	3 - partially covered	4 - partially covered

Items analyzed	Type of Item	Status of the project	Water cycle System characterization	Environmental change on water basins	Adaptive and sustainable management of river-delta-sea systems
GEOS S	4 - Initiative/policy	6 - Permanent programme	2 - partially covered	3 - partially covered	4 - partially covered
Globo Lakes	6 - Other	3 - Ongoing	2 - partially covered	3 - partially covered	4 - partially covered
GOOS	4 - Initiative/policy	6 - Permanent programme	2 - partially covered	3 - partially covered	4 - partially covered
HydralabIV	3 - I3 (integrated infrastructure initiative)	3 - Ongoing	3 - fully covered	3 - partially covered	1- not covered
Hydro Net	6 - Other	4 - Finalized	2 - partially covered	3 - partially covered	1- not covered
IAD	4 - Initiative/policy	6 - Permanent programme	2 - partially covered	3 - partially covered	4 - partially covered
ICOS	1 - ESFRI	3 - Ongoing	1- not covered	3 - partially covered	1- not covered
ICPDR	4 - Initiative/policy	6 - Permanent programme	2 - partially covered	3 - partially covered	4 - partially covered
IHE UNESCO	6 - Other	6 - Permanent programme	3 - fully covered	3 - partially covered	4 - partially covered

Items analyzed	Type of Item	Status of the project	Water cycle System characterization	Environmental change on water basins	Adaptive and sustainable management of river-delta-sea systems
IOC UNESCO	6 - Other	6 - Permanent programme	2 - partially covered	3 - partially covered	4 - partially covered
IUCN	6 - Other	6 - Permanent programme	4 - not applicable	3 - partially covered	4 - partially covered
JCOM MOPS	6 - Other	6 - Permanent programme	2 - partially covered	3 - partially covered	1 - not covered
JERICO	3 - I3 (integrated infrastructure initiative)	3 - Ongoing	2 - partially covered	3 - partially covered	1 - not covered
JPI Climate	4 - Initiative/policy	3 - Ongoing	4 - not applicable	3 - partially covered	4 - partially covered
JPI Oceans	4 - Initiative/policy	3 - Ongoing	2 - partially covered	3 - partially covered	4 - partially covered
JPI Water	4 - Initiative/policy	3 - Ongoing	2 - partially covered	3 - partially covered	4 - partially covered
LaguNET	2 - Infrastructure	3 - Ongoing	2 - partially covered	3 - partially covered	4 - partially covered
Life III	2 - Infrastructure	4 - Finalized	1 - not covered	3 - partially covered	1 - not covered
Lifewatch	1 - ESFRI	3 - Ongoing	2 - partially covered	3 - partially covered	1 - not covered

Items analyzed	Type of Item	Status of the project	Water cycle System characterization	Environmental change on water basins	Adaptive and sustainable management of river-delta-sea systems
LOICZ	4 - Initiative/policy	3 - Ongoing	2 - partially covered	3 - partially covered	4 - partially covered
LTER	2 - Infrastructure	3 - Ongoing	2 - partially covered	3 - partially covered	4 - partially covered
MarineGeoHazard	2 - Infrastructure	5 - Implemented	1- not covered	3 - partially covered	4 - partially covered
MariNet	2 - Infrastructure	3 - Ongoing	2 - partially covered	1- not covered	1- not covered
MARS	2 - Infrastructure	3 - Ongoing	2 - partially covered	3 - partially covered	4 - partially covered
MedWet	4 - Initiative/policy	6 - Permanent programme	2 - partially covered	3 - partially covered	6 -not applicable
Mesoaqu	2 - Infrastructure	4 - Finalized	2 - partially covered	3 - partially covered	1- not covered
RITMARE	2 - Infrastructure	3 - Ongoing	2 - partially covered	3 - partially covered	4 - partially covered
RSO	2 - Infrastructure	3 - Ongoing	2 - partially covered	3 - partially covered	4 - partially covered
SEADATANET	2 - Infrastructure	3 - Ongoing	2 - partially covered	3 - partially covered	1- not covered
SedNet	4 - Initiative/policy	3 - Ongoing	2 - partially covered	3 - partially covered	4 - partially covered
SIOS	1 - ESFRI	3 - Ongoing	2 - partially covered	3 - partially covered	4 - partially covered
UNEP	6 - Other	6 - Permanent	1- not covered	3 - partially covered	4 - partially covered

Items analyzed	Type of Item	Status of the project	Water cycle System characterization	Environmental change on water basins	Adaptive and sustainable management of river-delta-sea systems
		programme			
GROM	3 - I3 (integrated infrastructure initiative)	3 - Ongoing	2 - partially covered	3 - partially covered	1 - not covered
EMODnet	4 - Initiative/policy	3 - Ongoing	2 - partially covered	3 - partially covered	4 - partially covered
EPOS	1 - ESFRI	3 - Ongoing	1 - not covered	1 - not covered	4 - partially covered

Items analyzed	Type of Item	Status of the project	Water cycle coverage	Scientific agenda Water cycle characterization	Scientific agenda Environmental change on water basins	Scientific agenda Adaptive and sustainable management of river-delta-sea systems
Copernicus EOP	2 - Infrastructure	3 - Ongoing	6 - River-Delta-Sea	2 - partially covered	3 - partially covered	4 - partially covered
RSO	2 - Infrastructure	3 - Ongoing	6 - River-Delta-Sea	2 - partially covered	3 - partially covered	4 - partially covered

Items analyzed	Type of Item	Status of the project	Description
AnaEE	1 - ESFRI	2 - Preparatory phase	ecotones / experimental sites

Items analyzed	Type of Item	Status of the project	Description
Copernicus EEOP	2 - Infrastructure	3 - Ongoing	earth observation satellites and in situ sensors such as ground stations, airborne and sea-borne sensors
Danubia	4 - Initiative/policy	6 - Permanent programme	Deep multi-actors scientific models
DIANE CM	4 - Initiative/policy	4 - Finalized	Collaborative modelling (CMM).
Ecoop	2 - Infrastructure	4 - Finalized	Forecasting System, Information system – EuroMISS and EuroDESS
Eelixir	1 - ESFRI	2 - Preparatory phase	Providing access to information on plant genomes, insect pests and plant pathogens in order to enable crop researchers to develop healthier, more productive crops in the face of a rapidly growing population
EMBRC	1 - ESFRI	2 - Preparatory phase	Research Vessels & Ship-born platform, Scientific Diving and Associated Facilities, Ecosystem Access, Aquarium facilities, Molecular Platforms and Facilities, Imaging / microscopy, Analytical services
EMSO	1 - ESFRI	2 - Preparatory phase	Submarine observatories of seabottom and water column
ERVO	2 - Infrastructure	3 - Ongoing	exchangeable equipment owned by the vessels operators
EurAqua	2 - Infrastructure	3 - Ongoing	Network of mesocosm sites in aqueous environments
EUROArgo	1 - ESFRI	3 - Ongoing	EU contribution to global ARGO floats. unique attribute of Argo data is its easy availability via the World Wide

Items analyzed	Type of Item	Status of the project	Description
Eurofleets	3 - I3 (integrated infrastructure initiative)	4 - Finalized	pulling together resources and infrastructures in terms of research vessels
Eurofleets2	3 - I3 (integrated infrastructure initiative)	3 - Ongoing	pulling together resources and infrastructures in terms of research vessels
ExpeER	3 - I3 (integrated infrastructure initiative)	3 - Ongoing	brings together the major observational, experimental, analytical and modelling facilities in ecosystem science in Europe
FixO3	3 - I3 (integrated infrastructure initiative)	3 - Ongoing	marine and open ocean infrastructures as platforms for multidisciplinary, high quality science and technology research
GEO	4 - Initiative/policy	6 - Permanent programme	GEO is constructing GEOSS on the basis of a 10-Year Implementation
GEOSS	4 - Initiative/policy	6 - Permanent programme	all networks regarding remote and in situ Earth Observation
GloboLakes	6 - Other	3 - Ongoing	Remote sensing equipment and facilities for measurements in lakes
HydralabIV	3 - I3 (integrated infrastructure initiative)	3 - Ongoing	18 experimental installations (physical modelling in hydraulics)
HydroNet	6 - Other	4 - Finalized	A network of robotic sensors for water environment
ICOS	1 - ESFRI	3 - Ongoing	Operational information System on CO2

Items analyzed	Type of Item	Status of the project	Description
JERICO	3 - I3 (integrated infrastructure initiative)	3 - Ongoing	network of coastal observatories
LaguNET	2 - Infrastructure	3 - Ongoing	network of lagoon observatories and institutes
Lifewatch	1 - ESFRI	3 - Ongoing	Lifewatch IT research and innovation distributed e-RI, virtual laboratories and temporary collaboration networks
LTER	2 - Infrastructure	3 - Ongoing	network of LTER sites
MarineGeoHazard	2 - Infrastructure	5 - Implemented	EUXINUS network and GeoPontica network
MARS	2 - Infrastructure	3 - Ongoing	marine research institutes and stations
Mesoqua	2 - Infrastructure	4 - Finalized	Virtual Transnational Pelagic Mesocosm Center - a portal of information on mesocosm research worldwide
RSO	2 - Infrastructure	3 - Ongoing	network of observatories along the Rhone River – Delta system
SEADATANT	2 - Infrastructure	3 - Ongoing	Networking of marine professional data centres in an unique virtual data management system
SIOS	1 - ESFRI	3 - Ongoing	Svalbard has the highest available data bandwidth in the High Arctic. Is accessible all year round, has advanced community infrastructure and mild climate.
GROOM	3 - I3 (integrated infrastructure initiative)	3 - Ongoing	The gliders already owned by the partners

Items analyzed	Type of Item	Status of the project	Description
EMODnet	4 - Initiative/policy	3 - Ongoing	Sensors and marine research facilities of the partners.
EPOS	1 - ESFRI	3 - Ongoing	groups together seismological observatories, crustal dynamics, geomagnetic, volcanic observatories, geological cores and collections

Items analyzed	Type of Item	Status of the project	Category of infrastructure	Overall impact on level of quality: scientific, educational, technological and managerial	Major scientific equipment/facilities/resources;
BSC	4 - Initiative/policy	6 - Permanent programme	6 - User of infrastructure/data	3 - Low	4 - not applicable
GEO	4 - Initiative/policy	6 - Permanent programme	6 - User of infrastructure/data	1 - High	4 - not applicable
GOOS	4 - Initiative/policy	6 - Permanent programme	6 - User of infrastructure/data	1 - High	2 - partially complementary
IAD	4 - Initiative/policy	6 - Permanent programme	6 - User of infrastructure/data	2 - Medium	2 - partially complementary
ICPDR	4 - Initiative/policy	6 - Permanent programme	6 - User of infrastructure/data	2 - Medium	2 - partially complementary
JCOMMOPS	6 - Other	6 - Permanent programme	6 - User of infrastructure/data	2 - Medium	2 - partially complementary
MariNet	2 - Infrastructure	3 - Ongoing	6 - User of infrastructure/data	2 - Medium	3 - non complementary

Items analyzed	Type of Item	Status of the project	Category of infrastructure	Overall impact on level of scientific, educational, technological and managerial quality:	Major scientific equipment/facilities/resources;
EMO Dnet	4 - Initiative/policy	3 - Ongoing	6 - User of infrastructure/data	1 - High	2 - partially complementary

8.1.2. Anexa 2 – Fișele de date privind infrastructurile de cercetare, inițiativele și programele relevante din domeniul ciclului apei la nivel european și mondial

A. ESFRI Projects

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>
AnaEE (Infrastructure for Analysis and Experimentation on Ecosystems)
Category of infrastructure
ESFRI Project

Status of the project	Category of infrastructure
Preparatory Phase from November 2012 for 3.5 years.	Potential collaborator with DANUBIUS on the area of biodiversity assessment and state of the art infrastructure for analytical platforms devoted to evaluation of biological adaptations.
Location	
Distributed infrastructure in continental zone (France, Belgium, Italy, UK, Finland, Norway, Turkey, Czech Rep, Sweden)	
Proposed objectives	
<p>To set-up a distributed infrastructure of open-access platforms offering services to experiment, analyse and model complex ecological systems, in order to:</p> <ul style="list-style-type: none"> • Understand how ecological systems are responding to various pressures (anthropogenic, climate change); • Assess biological adaptations as results of different kinds of interactions among genetic and non-genetic factors, by biotic interactions among organisms, and by feedbacks between living organisms and their environment. • Study how biodiversity and ecosystems adapt to global changes and how agriculture and forest management can favor this adaptation. • Understand the mechanistic bases of adaptation and impacts on eco- and agro-system functioning. <p>AnaEE will provide services to the scientific communities across Europe by providing:</p> <ul style="list-style-type: none"> • a long-term well-designed experimental component, standardize approaches and other resources needed to enable additional and innovative sensors; • measurements; • experiments opportunities to be deployed by the community; • data access for research and education. <p>AnaEE will contribute to innovation www.anaee.com</p>	
Description of the current infrastructure	
Distributed infrastructure including analytical devices, experimental platforms for land management and biodiversity evaluation	
Human resources	
More than 1000	
Scientific agenda	
<p>AnaEE will set-up a distributed and coordinated network of state of the art in natura and in vitro experimental platforms equipped with the latest technology. They will be associated with analytical and modelling platforms and will be linked to networks of instrumented observation sites that will provide indispensable calibration and validation datasets.</p> <p>1. In natura Long term Experimental Platforms will be distributed across the main types of climate and land use (arable land, grassland, forest, wetlands). Main experimental treatments will refer to land management, climate and biodiversity changes and will be applied for a long term when needed.</p> <p>2. Highly-instrumented In Vitro Sites will allow us to have a better understanding of interacting processes by testing specific combinations of forcing variables and assessing retro-action of living organisms. Enclosed in environmentally controlled chambers, ecosystems can be synthesized de novo or sampled in plots of the Experimental Platforms for a detailed analysis of the impact of in natura long-term treatments.</p>	

AnaEE will combine the development of new sites (in vitro and in natura) and platforms (analytical and modelling) and the upgrade of existing sites. In particular, full advantage of time series of data in existing in natura sites will be made by adding new complementary facilities.

3. **Analytical Platforms** at the cutting edge of technological development to adapt to the new investigative capabilities and applied to samples of soil, water, organisms or air to help better understand and quantify the complex interactions between the different bio-geochemical cycles, ecological states, fluxes and compartments.

4. **Databases, models and a European Modelling Platform.** This Platform will consist of a toolbox of numerical models, sharing concepts between disciplines, which will evaluate and predict the effects of climate and land use changes on ecosystem processes.

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
ELIXIR - Building a sustainable European infrastructure for biological information, supporting life science research and its translation to medicine, agriculture, bioindustries and society.	
<i>Category of infrastructure</i>	
ESFRI project	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Ongoing-preparatory phase	DANUBIUS will develop a strategy to succeed in establishing a functional bi-univocal collaboration with

	Elixir on the data bases development and data processing.
Location	
Distributed infrastructure; the coordinating Hub –European Molecular Biology Laboratory’s European Bioinformatics Institute (EMBL-EBI) Wellcome Trust genome Campus, Cambridge, UK	
Proposed objectives	
Main aim: to construct and operate a sustainable infrastructure for biological information in Europe to support life science research and its translation to medicine and the environment, the bio-industries and society. Data integration in the context of expansion of new technologies such as next-generation DNA sequencing. The collection, curation, storage, archiving, integration and deployment of biomolecular data in an international coordination. www.elixir-europe.org	
Description of the current infrastructure	
ELIXIR is the European life sciences infrastructure for biological information, as part of the European Strategy on Research Infrastructures (ESFRI) process. On behalf of ELIXIR, EMBL-EBI coordinates Biomed Bridges which develop technical bridges between data and services in the biological, medical, translational and clinical domains.	
Human resources	
No available data	
Scientific agenda	
Linking biomedical and biological data resources to facilitate understanding of diseases of old age and to drive earlier diagnosis, improved disease management and preventive strategies. Providing access to information on plant genomes, insect pests and plant pathogens in order to enable crop researchers to develop healthier, more productive crops in the face of a rapidly growing population. Facilitating pre-competitive collaboration and attracting more companies to Europe to support pharma and biotech industries. Providing help to environmental scientists to understand the effects of climate change on species diversity and develop new methods to tackle pollution and waste.	

INFRASTRUCTURE Data file

Name of the infrastructure	
EMBRC - European Marine Biological Resource Centre	
Category of infrastructure	
ESFRI project	
Status of the project	Category of infrastructure
Preparatory phase (2011-2014)	Potential collaborator, providing complementary expertise for DANUBIUS on sea/oceans and cross-cutting issues as biomedicine and health.
Location	

Geographical location: along the Atlantic north-south, along the Channel, the North Sea and associated regional seas, Baltic Sea, Mediterranean Sea.

Proposed objectives

- Provide access to European coastal marine biota and their ecosystems;
- Provide an integrated supply of marine model species, for multidisciplinary research;
- Offer interdisciplinary training in marine biological sciences and marine genomics;
- Promote synergies among End-Users (academia and industry) across the life-sciences with the ERA;
- Contributing towards an interoperable global marine knowledge system;
- Establishing an open platform for data sharing;
- Implementing standardized procedures of data gathering, evaluation, storage and calibration to optimize interoperability among RIs;
- Providing up-to-date research infrastructures across Member States;

Description of the current infrastructure

Research Infrastructures (RI) provide academic researchers and SMEs with state-of-the-art research facilities, instrumentation, services and training at the European level. The RI **European Marine Biological Resource Centre (EMBRC)** will provide End-Users from Academia, SME's and Industry with access to marine biodiversity, its associated meta-data and extractable products, as well as state-of-the-art research infrastructure and training needed. The RI and services will specifically include biobanks and dedicated 'omics' platforms, structural and functional biology, microscopy and bioinformatics.

By providing all the elements needed to support the technological transfer of marine biological knowledge into the development of novel quality-products, -services, and jobs, EMBRC will contribute to the objectives of the Europe 2020 Strategy and the Innovation Union to increase European competitiveness and to build a new economy based on innovation.

- Research Vessels & Ship-born platform
- Scientific Diving and Associated Facilities
- Ecosystem Access
- Aquarium facilities
- Molecular Platforms and Facilities
- Imaging / microscopy
- Analytical services

www.embrc.eu

Human resources

> 1000

Scientific agenda

Marine biodiversity constitutes an under-used resource within the European Research Area (ERA) although marine organisms are becoming increasingly important for researchers outside the traditional fields of marine sciences as biological models and a source of innovative products and services with applications across society.

Biodiversity and Ecosystem Function

EMBRC currently exploits the dramatic increase in tools available for integrative investigations of marine systems at all levels of organisation from molecular to ecosystem. For example, genetic diversity and adaptation of populations can be studied at the level of individual genomes and metagenomic approaches allow the exploration of microbial diversity of hitherto unculturable organisms. Studies of chemical ecology enable molecular signalling mechanisms to be elucidated and their role in environmental adaptation determined.

Other research priorities include investigation of oceanic patterns of trophic exchange, foraging and diving behaviour, population diversity and dynamics **and** animal migration (e.g. **spatial ecology of plankton and predators**), as well as impact of invasive and toxic species **and the** role of viruses in ecosystem functioning. **Molecular analysis combined with classical taxonomy studies are being utilised to extract additional value from time-series of ecosystems. This theme also provides an ecosystem context for model organisms.**

Developmental Biology and Evolution

Marine organisms provide a rich resource of models for deeper understanding of fundamental biological processes and will continue to underpin major advances in evolutionary and developmental biology. In particular marine embryos and life stages allow studies of the evolution of gene function during development. Research in this area include tractable marine models **for fundamental research on the cellular, molecular, genetic and physiological basis of developmental processes and their evolution, for example, the use of echinoderm eggs to understand the early molecular events accompanying fertilisation.**

Marine models also allow the study of underlying mechanisms of development and evolution, for example the roles of non-coding DNA sequences, regulatory RNAs and epigenetic mechanisms, how they evolve, and their function in development and disease.

Other priorities currently investigated within this theme include genomic approaches to the evolution of bio-mineralisation in marine flora and fauna and the co-evolution of organisms and the biosphere.

Biogeochemistry and Global Change

The focus of the EMBRC within this theme is on organismal interaction with biogeochemical cycles in the sea and ocean atmosphere exchange.

Priorities include carbon and energy cycles, feedbacks among biologically uptaken metal cycles and carbon chemistry and coupling between different oceanic realms. Studies on diversity, adaptation and function of organisms and ecosystems in response to global change factors are underway for predicting future climate scenarios and developing mitigation strategies.

In this context the use of natural models in ocean processes can be valuable, for example, CO₂ vents to investigate natural acidification impacts on ecosystem biodiversity.

Marine Products and Resources

The marine environment presents vast and under utilised potential for development of natural products (Biotechnology). Sustainable use of this resource requires sophisticated knowledge of the interactions of marine species with human activity. EMBRC partners are, for example, studying the impact of oil and gas extraction platforms, tidal and wind power structures with animal migration and habitat utilisation. Genomic approaches and life cycles of organisms are being explored to improve aquaculture production, for example in the development of sustainable feeds and marker-assisted selection of superior strains for farming.

The mining of marine genomes is underway to develop new industrial products and processes (for example the identification of favourable microalgal strains for biofuels, secondary and refined products).

Research on marine pollution and ecotoxicology is also being carried out, for example understanding of detoxification mechanisms, for treatment of contaminated environments.

Biomedical Science

Fundamental studies on physiology and behaviour are currently underway on a number of research topics, including simple nervous systems, neural networks, developmental physiology and locomotion. With the demand for new treatments and diagnostic tools, as well as a deeper understanding of various medical conditions being required, studies on marine organisms will provide fundamental insight into biomedicine, particularly with respect to

infection, immunity and disease (e.g. sponges and symbiotic bacteria, polychaetes resistant to pathogenic bacteria and producing hydrolytic enzymes, extremophiles, algae and their symbionts, cyanophages). Marine models for studying DNA replication, repair and gene transfer and structure-orientated drug design are also of key importance in EMBRC research and are being developed further.

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
EMSO – European Multidisciplinary Seafloor and water-column Observatory	
It is a <i>geographically distributed infrastructure</i> composed of several deep-seafloor and water-column observatories, which will be deployed at key sites in European waters, spanning from the Arctic, through the Atlantic and Mediterranean, to the Black Sea. EMSO is a European network of fixed point, deep sea observatories with the basic scientific objective of real-time, long-term monitoring of environmental processes related to the interaction between the geosphere, biosphere, and hydrosphere.	
<i>Category of infrastructure</i>	
ESFRI Project	
<i>Status of the project</i>	<i>Category of infrastructure</i>

Preparatory phase (2008-2012) Current status – Preliminary presentation of EMSO-ERIC application (Oct.-Nov. 2013) Current phase: Phase 1	ESFRI project close to implementation – with complementary issues (need to develop protocols to develop joint nodes MARINE GEOHAZARD – node of EMSO and DANUBIUS). Joint nodes of DANUBIUS may be developed also with EMSO platforms in the Mediterranean etc. seas.
Location	
Arctic, Norwegin Margin, Nordic Sea, Porcupine Abyssal Plane, Azores Islands, Canary Islands – PLOCAN, Iberian Margin, Ligurian Sea, Western Ioanian Sea, Hellenic Arc, Marmara Sea, Black Sea	
Proposed objectives	
<ul style="list-style-type: none"> • Develop a global system of multidisciplinary and interdisciplinary sustained observatory networks • Integrate and enhance the existing infrastructures • Expansion of observatories in critical, representative locations in particular environments • Novel scientific achievements • Technological innovation • Data harmonisation and quality control so that data are in the public domain immediately after collection • Develop links with data users: modelling, operational and civilian communities, etc. • Outreach so that the public and funding bodies use and appreciate the value of observatories <p>More info on: http://www.emso-eu.org</p>	
Description of the current infrastructure	
<p>Fixed stationary platforms: Unmanned, multi-sensor platforms to make measurements from above the air-sea interface to below the seafloor, and with different configurations related to the communications:</p> <ul style="list-style-type: none"> • Stand-alone and delayed mode • Mooring and seafloor platforms with acoustic/cabled capabilities 	
Human resources	
100 – 1000	
Scientific agenda	
<p>The processes that occur in the oceans have a direct impact on human societies, therefore it is crucial to improve our understanding of how they operate and interact. To encompass the breadth of these major processes, sustained and integrated observations are required that appreciate the interconnectedness of atmospheric, surface ocean, biological pump, deep-sea, and solid-Earth dynamics and that can address:</p> <ul style="list-style-type: none"> • Natural and anthropogenic change • Interactions between ecosystem services, biodiversity, biogeochemistry, physics, and climate • Impacts of exploration and extraction of energy, minerals, and living resources • Geo-hazard early warning capability for earthquakes, tsunamis, gas-hydrate release, and slope instability and failure • Connecting scientific outcomes to stakeholders and policy makers <p>Long-term, continuous data sets from a variety of fields are necessary to build a comprehensive picture of the earth-ocean system. These include:</p> <p><i>Geosciences</i></p> <ul style="list-style-type: none"> • Gas-hydrate stability • Submarine landslides and fluid flow along the seabed • Seismic activity and geo-hazard early warning (earthquakes and tsunamis) <p>In order to produce robust forecasting, measurements need to be carried out continuously over sufficiently long periods of time to be able to differentiate between episodic events and trends or shorter period variations.</p> <p><i>Physical Oceanography</i></p> <ul style="list-style-type: none"> • The effect of global warming on the marine environment 	

Detailed knowledge about ocean transport, wind-driven and deep-ocean circulation is mandatory to assess the role of the oceans in the global climate system.

Biogeochemistry

- The acidification of the oceans that impact the ability of marine organisms to calcify (molluscs, corals)

At the other end of the spectrum, there is only so much carbon dioxide the oceans are able to absorb. Once this threshold is reached the declining uptake of anthropogenic carbon dioxide could increase the proportion that accumulates in the atmosphere and thereby accelerating the effect of global warming.

Marine Ecology

- Evaluate the sensitivity of marine ecosystems to anthropogenic change and its effect on primary production, climate regulation, carbon sequestration and storage, and living resources, including fisheries

So far, only a limited number of data sets are available allowing for the observation of climatically-driven changes in marine ecosystems by discerning between interannual and interdecadal variations and secular change (Rosenzweig et al., 2008; Glover et al. 2010).

Socio-economy

- Natural and anthropogenic change
- Interactions between ecosystem services, biodiversity, biogeochemistry, physics and climate
- Impacts of exploration and extraction of energy, minerals and living resources
- Geo-hazard early warning capability for earthquakes, tsunamis, gas hydrate release and slope instability and failure
- Connecting scientific outcomes to stakeholders and policy makers

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
EPOS – European Plate Observing System	
The European Plate Observing System (EPOS) is the integrated solid Earth Sciences research infrastructure approved by the European Strategy Forum on Research Infrastructures (ESFRI) and included in the ESFRI Roadmap in December 2008. EPOS is a long-term integration plan of national existing RIs.	
<i>Category of infrastructure</i>	
ESFRI project	
<i>Status of the project</i>	<i>Category of infrastructure</i>

Preparatory phase (2010-2014)	ESFRI project close to implementation – with complementary issues (need to develop protocols to develop joint nodes MARINE GEOHAZARD (GeoPontica) – node of EPOS and DANUBIUS).
Location	
Europe	
Proposed objectives	
<p>EPOS is aimed at a broad stakeholders community including European and Mediterranean countries. We have identified the following stakeholders categories:</p> <ul style="list-style-type: none"> • Geoscience data providers. • Scientific user community (including Academia). • National research organisations & funding agencies. • Data and services providers and users outside the research community (incl. industry). <p>Several thousands of researchers in Earth sciences will benefit from the services provided by EPOS, fostering major advances in the understanding of the processes occurring in the dynamic Earth.</p> <p>The European Plate Observing System (EPOS) goals are:</p> <ul style="list-style-type: none"> • to represents a scientific vision and approach in which innovative multidisciplinary research is made possible for a better understanding of the physical processes controlling earthquakes, volcanic eruptions, unrest episodes and tsunamis as well as those driving tectonics and Earth surface dynamics. • to establish a long-term plan to facilitate the integrated use of data, models and facilities from existing, and new distributed research infrastructures (RIs), for solid Earth science. The aim is to obtain an efficient and comprehensive multidisciplinary research platform for the Earth sciences in Europe. <p>The added value for Europe and the innovation resulting from EPOS's construction consists of:</p> <ul style="list-style-type: none"> • the design of multidisciplinary measurements tailored to particular investigations; • the strengthening of collaborations between dispersed research groups working in the same field incorporating and integrating efforts using different methodologies toward common goals; • joint open software and web applications, which will significantly influence the operational aspects of observatories; • the development of new technologies for particular infrastructures, such as experimental laboratories or in-situ observatories (deep drilling, borehole seismology, ocean bottom seismometers, geochemical data acquisition in faults and volcanoes); • the interconnections with other proposed or currently operating networks and infrastructures in the field of Earth Sciences (such as in Space and Ocean Geophysics). <p>The EPOS infrastructure will contribute to information, dissemination, education and training. It will provide universities and young scientists with unrestricted on-line access to an enormous wealth of observational data, laboratory experiments, computational software and facilities in solid Earth sciences. The EPOS infrastructure will also facilitate the development of advanced educational material, i.e. e-learning, as its e-infrastructure will be based on global and open standards.</p> <p>More info on: http://www.epos-eu.org/</p>	
Description of the current infrastructure	

<p>The RIs that EPOS will coordinate include at least, but not only:</p> <ul style="list-style-type: none"> • Regionally-distributed geophysical observing systems (seismological and geodetic networks) • Local observatories (including geomagnetic, permanent in-situ and volcano observatories) • Experimental & analogue laboratories in Europe • Integrated satellite data and geological information <p>EPOS is promoting open access to geophysical and geological data as well as modelling/processing tools, enabling a step change in multidisciplinary scientific research for Earth Sciences.</p>
<i>Human resources</i>
>1000
<i>Scientific agenda</i>
<p>The goal of EPOS is to promote and make possible innovative approaches for a better understanding of the physical processes controlling earthquakes, volcanic eruptions, unrest episodes and tsunamis as well as those driving tectonics and Earth surface dynamics. Integration of the existing national and trans-national RIs will increase access and use of the multidisciplinary data recorded by the solid Earth monitoring networks, acquired in laboratory experiments and/or produced by computational simulations. Establishment of EPOS will foster worldwide interoperability in Earth Sciences and provide services to a broad community of users.</p>

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
Euro-Argo	
Main objective: ensure a long term European contribution to Argo.	
Global ocean monitoring using profiling autonomous floats. Started January 2008 as a project, Euro-Argo aims at developing a European "infrastructure" for Argo to the level where the European partners have the capacity to procure and deploy about 800 floats per year , to monitor these floats and ensure all the data can be processed and delivered to users (both in real-time and delayed-mode).	
<i>Category of infrastructure</i>	
ESFRI Project	
<i>Status of the project</i>	<i>Category of infrastructure</i>

Euro-Argo ERIC –Phase 1 (Summer 2012- January 2014) (ramping up period)	ESFRI operational project – DANUBIUS needs a strategy to develop the contribution towards EURO ARGO for mutual benefit in: <ul style="list-style-type: none"> - study of water masses exchange and mixing at river-sea interaction zone - study of the NW part of the Black Sea
Location	
Black Sea, Mediterranean, Nordic seas, Arctic, Atlantic, Pacific, Indian Ocean	
Proposed objectives	
<p>The new Euro-Argo Research Infrastructure called Euro-Argo-ERIC will allow active coordination and strengthening of the European contribution to the international Argo programme. Its aims are:</p> <ol style="list-style-type: none"> 1. to provide, deploy and operate an array of around 800 floats contributing to the global array (a European contribution of ¼ of the global array) 2. to provide enhanced coverage in the European regional seas 3. to provide quality controlled data and access to the data sets and data products to the research (climate and oceanography) and operational oceanography (e.g. GMES Marine Core Service) communities. <p>More info on: http://www.euro-argo.eu/Activities</p>	
Description of the current infrastructure	
In situ observing system composed on autonomous floats.	
Human resources	
100 – 1000	
Scientific agenda	
<p>1. Climate change and global warming</p> <p>The oceans cover 70% of the earth and though their surface can be seen from space, learning about conditions below the surface on a global scale has only been possible in the past decade thanks to Argo. Ocean measurements are essential if we are to understand earth’s climate, to make predictions of how it will change under natural variability and due to human influences and to address such practical problems as sea level rise and regional changes in rainfall and temperature.</p> <p>The oceans have a fundamental influence on our climate and weather, both of which are affected by changes in the currents and heat content of the ocean. Argo is a unique system to monitor heat and salt transport and storage, ocean circulation and global overturning changes and to understand the ability of the ocean to absorb excess CO2 from the atmosphere. Over the past 50 years, the oceans have absorbed more than 80% of the Earth warming due to the anthropogenic increase of greenhouse gas concentration. Euro-Argo will develop further a leading role of Europe in global ocean observations and in ocean and climate research.</p> <p>The on going climate change have great environmental and socio-economic consequences :</p> <ul style="list-style-type: none"> • The temperature rising and the growing acidification of the oceans due to the anthropogenic increase of greenhouse gas concentration modify the geographical spreading out of marine species : the local economy may be influenced by those migrations. • The global warming causes also extreme events inducing damages increasingly costly for governments, and forced displacement of populations with important social consequences. • Coastal urbanized areas concerned by a sea-level rise will be also a key issue for our modern society. <p>2. Operational Oceanography and the GMES Marine Core Service</p> <p>Euro-Argo has developed a legal framework within which nationally funded contributions can co-exist with contributions to the global project from the European Global Monitoring for Environment and Security (GMES). Argo is the single most important in-situ observing system required for the GMES Marine Core Service (MCS). Argo and satellite data are assimilated into MCS models used to deliver regular and systematic reference information on the state of the ocean for the global ocean and the main European seas. Particularly, marine transport, marine</p>	

industry, marine safety at sea (search and rescue) and fisheries need real-time data to build marine products (shipping, fishery, tourism) and forecasts about marine environment and weather.

3. Educational applications for general public : reaching beyond scientists

A unique attribute of Argo data is its easy availability via the World Wide. This has been linked with the powerful Google Earth GIS tool to allow the general public to look at Argo data and, without having to go to sea, to learn something about how the oceans work and why they are important for the earth's climate. This outreach is important because it is ultimately the general public as taxpayers who pay for Argo and it is they who will eventually benefit through improved weather and climate forecasts and through warnings of disasters.

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
ICOS - Integrated Carbon Observation System	
ICOS provides the long-term observations required to understand the present state and predict future behavior of climate, the global carbon cycle and greenhouse gases emissions.	
<i>Category of infrastructure</i>	
ESFRI Project	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Ended the Preparatory Phase (2008-2013) and submitted for ERIC. Classified as CATEGORY	Integration DANUBIUS – ICOS needed, discussions started. ICOS misses carbon observatories in coastal wetlands / deltas – while Danube Delta is an adequate

1 ESFRI RI's at the latest evaluation (October 2013)	site to place an ICOS towers. Then – ICOS mission is important for the development of DANUBIUS
Location	
Europe with future expansion in Africa and Syberia	
Proposed objectives	
<ul style="list-style-type: none"> • to provide the long-term observations required to understand the present state and predict future behavior of the global carbon cycle and greenhouse gas emissions • to monitor and assess the effectiveness of carbon sequestration and/or greenhouse gases emission reduction activities on global atmospheric composition levels, including attribution of sources and sinks by region and sector • enable Europe to become a global player for in situ observations of greenhouse gases, data processing and user-friendly access to data products for validation of remote sensing products, scientific assessments, modeling and data assimilation. <p>More info: http://www.icos-infrastructure.eu/</p>	
Description of the current infrastructure	
ICOS tracks carbon fluxes in Europe and adjacent regions by monitoring the ecosystems, the atmosphere and the oceans through integrated networks (athmospheric network, ecosystem network, marine network).	
Human resources	
>1000	
Scientific agenda	
<ul style="list-style-type: none"> • Maintain a coordinated, integrated, long-term high-quality network of atmospheric, ecosystem and oceanic observations, • Improve access to existing data and further develop future atmospheric, ecosystem and marine data for research and political decision-making, • Create state-of-the-art facilities for the European research community, • Contribute to the European share to a global greenhouse gas observation network under GEO, IGCO and UNFCCC. 	
<p>The observations collected by ICOS will enable researchers to gain full understanding of the exchange of greenhouse gases over the European continent, and of its driving forces, using:</p>	
<ul style="list-style-type: none"> • Atmospheric greenhouse gas concentrations of CO₂, CH₄, CO and radiocarbon-CO₂ to quantify the fossil fuel component, • Ecosystem fluxes of CO₂, CH₄, H₂O, and heat together with ecosystem variables needed to understand processes, • In parallel, a new strategy is developed for ocean flux observations to be integrated in the infrastructure by 2012. 	
<p>The ICOS measurements will be combined using advanced carbon cycle models into an operational information system, to allow daily assessments of sources and sinks at scales down to about 10 km over European countries. This system will establish a world class standard for understanding the exchange processes between the atmosphere, the terrestrial surface and the ocean. The routine flux diagnostics will be generated both by research institutes members of ICOS, and by other institutes that will benefit from free access to the infrastructure data. Regular assessment and synthesis of the different flux products, and interaction with policy will be organized by ICOS.</p>	
<p>The list of variables covered in ICOS is exactly that of GEOSS (Global Earth Observation System of Systems) recommended to ‘support the development of observational capabilities for Essential Climate Variables such as CO₂, CH₄ and other greenhouse gases’ according to the 10-years GEOSS implementation Plan. ICOS will also contribute to the WMO Global Atmosphere Watch program, to the Global Terrestrial Observing System (GTOS) and to the international Integrated Global Observing Strategy for Atmospheric Chemistry Observations (IGACO) and for Global Carbon Observations (IGCO) under the GEOSS umbrella.</p>	

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
Lifewatch – E Science European Infrastructure for Biodiversity and Ecosystem research	
<i>Category of infrastructure</i>	
ESFRI Project	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Ongoing project construction phase (2012-2016)	Potential collaborator for DANUBIUS within mutual interest area of biodiversity and ecosystem status assessment.
<i>Location</i>	

Distributed e-infrastructure, central server in Italy; includes Spain, Romania, Hungary, Belgium, The Netherlands, Greece, Sweden.

Proposed objectives

- Develop a framework for research centers across Europe to interconnect access data and share resources (with standards, procedures, user groups and networks so existing systems can interlink and be more effective).
- A platform for researchers or other users to create and manage Virtual Laboratories and Temporary Collaboration Networks – ad hoc, multi-center projects, pulling expertise from around Europe and the globe to work efficiently and quickly.
- A set of powerful new online tools for scientists to model data, perform computer simulations, manage research, investigate grant possibilities, or publish their work.
- A standardized portal for biodiversity information open to all – from researchers, to policy-makers to citizens – but with special log-in rules so each type of user gets access to the kind of data needed.
- A community-driven infrastructure, with its capabilities determined by each group of users – each ‘owning’ their piece of the system – to maximize effectiveness.
- A gateway for European researchers to the world of biodiversity and ecosystem science – and for international researchers to connect with Europe.

Description of the current infrastructure

LifeWatch has the main goal to serve and strengthen the scientific research on biodiversity **by building on the web** a flexible and powerful **laboratory environment**.

LifeWatch starts with the usual tools of **information and communications technology**: lots of **computers, software, networks**. It uses them to interlink a wide variety of **research stations, databases, monitoring equipment and scientists** across Europe. On top of that network, it installs a range of **new services and tools** to help the researchers communicate, share data, analyze results, create models, manage projects and organize training. It is not a research project in itself; it is a **high-end service infrastructure** that enables researchers to collaborate – to work efficiently in ‘**Virtual Labs**’, sharing expertise and information regardless of their location.

The LifeWatch ‘**Virtual Labs**’ are open to users by applying for their frontier science experiments or by proposing for the development of such experiments in order to produce new knowledge required for management and policy issues.

The LifeWatch research infrastructure is built upon **advanced ICT science and technology** and the **Lab facilities** comprise three key components: data, tools for standardization, integration and management of data and services to run experiments and deliver results (**ICT core, LifeWatch IT Research and Innovation Centre, Service Centre**). LifeWatch is a component of the European research space on biodiversity and ecosystems, interconnecting to other key components such as physical research infrastructures, EU research centers and agencies, international initiatives and panels, networks of knowledge and excellence, EU projects, through **bi-directional fluxes of information, knowledge and services**.

Human resources

100-1000

Scientific agenda

Research agendas can be flexible, tackling the leading scientific questions from one year to another.

General scientific themes:

- **Biodiversity at different scales.** LifeWatch can provide key services, such as computing power and ‘dummy’ datasets, to benchmark existing and new models, advanced computing and other technologies that open new possibilities to study biodiversity.

- **Biodiversity in space and time.** LifeWatch can provide efficient services for ecological niche modeling, past and projected. It can also stimulate new and faster methods to study the relations between different species as they evolved and diverged over time – their phylogeny and track species movements.
- **Observing biodiversity and ecosystems.** LifeWatch can enhance the development of new sensor technologies, technologies for automated data capture and long-term databases for ecological archives. These new technologies can help monitor the health of ecosystems, whether in the ocean or in forests and discover new species, enhance and implement standards so that existing observatories can be interoperable.
- **Man as actor and factor in biodiversity and ecosystems.** LifeWatch can speed research into the functioning and maintenance of ecosystem services by providing better decision-support systems. It will address vital policy questions on the relation between humans and ecosystems, such as biodiversity in cities, urban sprawl, and human health. LifeWatch will support the linkage of databases on ecosystems and biodiversity to our statistical warehouses for health, economics and other ‘societal grid’ data.
- **E-Science.** LifeWatch will speed the development of e-science as a methodology in research, by using ICT tools to look for relations and patterns, to make conjectures and correlations, to perform ‘what-if’ scenarios with powerful, data-intensive models of how the world works. LifeWatch will encourage the development of new analytical tools and methods, necessary for biodiversity and ecosystem research but also relevant to other disciplines entirely.

Particular research studies:

- **Exploring the Arctic biome.** The Finnish proposal for the construction of LifeWatch is centered on **long-term ecological research sites in marine, aquatic**, and forested sites. Its aim is to link these sites to socio-economic research, earth observation data, and the species information of an international network, the Global Biodiversity Information Facility.
- **Marine wetlands – and human society.** Dutch and Romanian LifeWatch proposals include the creation of **Virtual Laboratories**, integrating all available data – on bird movements, marine life, environmental monitoring, and human habitation – to understand and model these complex systems (in the **wetland areas**: Wadden Sea along the Dutch, German and Danish coasts, and the **Danube Delta in Romania**). New sensor networks and technologies are also vital. This research can support the implementation of important policy frameworks, such as the EU Marine Strategy Directive.
- **Plains and meadows.** The Hungarian proposal focuses on how changes in land-use affect biodiversity and ecosystem services. It aims to develop services for habitat mapping and habitat defragmentation. It will develop systems for long-term ecological research sites that link to GEO BON, an international effort to coordinate and advance biodiversity research.
- **Marine environments.** The Italian proposal for LifeWatch encompasses research on the interrelations among ecology, species, climate change, food webs, and human health. It will provide services to automate the digitization of biological collections, and e-tools to analyze data (such as phylogenetic inference, gene annotation, meta-genomic annotation). The model of the Adriatic could develop into a Mediterranean LifeWatch Centre that would also involve Spain and Greece. A Flemish contribution to LifeWatch will develop a central taxonomic backbone that links the names of species to their functional characteristics and environmental parameters. The starting point will be the marine environment, but such services are envisioned for all species in every ecosystem.
- **Mountains and forests.** The Romanian proposal for LifeWatch includes forecasting the effect of climate change on the Carpathian forests. Long-term observations and measurements of forests are combined with socio-economic data to enhance the management of the

ecosystems in the region. This could develop into a model system for research in mountainous areas throughout Europe.

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
SIOS – Svalbard Integrated Earth Observing System	
<i>Category of infrastructure</i>	
ESFRI Project	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Ongoing- Preparatory Phase	SIOS is a potential collaborator for DANUBIUS, in terms of protocols of data collection and integration in a standardized manner.
<i>Location</i>	

Distributed infrastructure in Arctic zones, with centre at Svalbard, Norway

Proposed objectives

It is the goal of this proposal to establish an Arctic Earth Observing System in and around Svalbard that integrates the studies of geophysical, chemical and biological processes from all research and monitoring platforms. This will be done through:

- (1) Organize all infrastructure and all research and monitoring activities into four observation platforms being land-based, sea-based, glacier/ice based and space/air-based.
- (2) Assess the present infrastructure and activities to identify gaps and weaknesses in the system. Invest in additional infrastructure and activities to close these gaps.
- (3) Establish a Knowledge Centre in Longyearbyen for data assessment, storage and delivery, education and outreach, cooperative efforts, and input to Earth System modeling.
- (4) Take actions to coordinate the SIAEOS initiative with complementary ESFRI efforts as well as other Earth Observation Systems and related modelling efforts

Description of the current infrastructure

Svalbard has been a platform for international Arctic research since the beginning of the 20th century. E.g., G.M.B. Dobson performed first total ozone measurements in Longyearbyen in the late 1920s. Poland established a permanent Arctic research station in Hornsund during the International Geophysical Year, and many meteorological, ionospheric and other geophysical measurements have been continued since. During the last 20 years, many countries under the Svalbard Treaty have established Arctic research stations, mostly in Ny-Ålesund.

- Lagrangian Platforms (moving)
- Eulerian Platforms (fixed)
- Weather stations
- Glaciological stations
- Atmospheric concentration measurements - zeppelin observatory
- Radars and radio receivers

The research infrastructure in Svalbard is extensive: Research organizations from 20 countries are present on a regular basis, operating a wide variety of advanced facilities, ranging from large scale radars to numerous field stations and a variety of research vessels having the highest available data bandwidth in the High Arctic.

Human resources

>1000

Scientific agenda

SIOS Core Activities –based on the observation that most changes occur at the interfaces between different spheres (e.g. ocean-atmosphere, ocean-biology, atmosphere-biology). SIOS will prioritize measurements of variables whose interactions are believed to be significant in Svalbard. In particular measurements that are assumed to be able to elucidate important processes acting on annual to decadal time-scales will be prioritized. This core observational program of SIOS will provide the research community with systematic observations that are guaranteed to be available over time. The SIOS Research Infrastructure Optimization Report presents the first suggested observation priorities which will be the basis for the future SIOS research infrastructure development strategy. To establish the formal framework needed to operate a geographically distributed and thematically structured multi-national research infrastructure across Svalbard and provide a research node to contribute effectively to future circum-Arctic monitoring.

SIOS Knowledge Center (KC) – will use the observations and knowledge to continuously develop the core program.

The core observational program of SIOS will be stable over time, yet dynamic as new methods and questions from society appear. An important capacity building activity at the SIOS-KC will be to stimulate

the development of new observational techniques for environmental monitoring that are: clean, energy efficient and robust in the Arctic environment.

The SIOS-KC will provide an intellectual environment where sampling strategies and observational practices are developed with an Earth system science perspective, and will thus become a unique international meeting place for developing the science of long term environmental monitoring in Polar Regions. The center will continuously inform users and society about the accrued knowledge within its field of expertise.

The SIOS open access data policy and an ambitious meta-database service will be managed and maintained under the SIOS-KC.

SIOS will be promoted and developed as an important component in global Earth System observing efforts and in international efforts to establish a Sustained Arctic Observing Network (SAON);

SIOS will be integrated with international long-term remote sensing strategies, such as GMES and GEOSS.

B. I3 (Integrated Infrastructure Initiative)

INFRASTRUCTURE Data File

<i>Name of the infrastructure</i>	
ASSEMBLE- Association of European Marine Biological Laboratories	
<i>Category of infrastructure</i>	
I3 (Integrated Infrastructure Initiative)	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Ongoing project	Potential collaborator, nod, etc.
<i>Location</i>	
Network of Integrated infrastructures/marine research stations	
<i>Proposed objectives</i>	
Main ASSEMBLE objective to improve the quality of provision of marine organisms with an emphasis on models for marine genomics. This includes multi-cellular organisms, unicellular eukaryotic organisms and cell lines as well as genetic and molecular resources.	

To fulfill the main objective it is aimed to establish common marine genomic models based on the following criteria: biological (e.g., evolutionary), ecological or economic significance; amenability for culture; impact on the community, within the consortium and beyond; and availability of biological tools, such as amenability to sexual or asexual propagation
<i>Description of the current infrastructure</i>
Distributed infrastructure, I3 type, integrating laboratories, technological platforms supporting marine biology, developmental ecology; microbiology, gene cloning, Genomic, Proteomic, X-ray crystallography, bioinformatics, microscopy; research vessels; a wide variety of marine organisms collections (either on-site or by shipment).Analytical, structural analysis and surface analysis (including morphology) devices
<i>Human resources</i>
No available data
<i>Scientific agenda</i>
<p>Biogeochemistry and Earth Science, Ecology, Microbial and Molecular Biology and Physics Sea Ice and Technology</p> <p>Developing techniques for containment during on-site holding, breeding and culture for selected model organisms;</p> <p>Optimising of the protocols for inter-laboratory distribution of organisms;</p> <p>Developing protocols for <i>ex situ</i> holding, breeding and culture of a panel of multicellular marine model organisms;</p> <p>Developing methods for establishing genetically defined resources;</p> <p>To extend the availability of mutant resources and develop protocols for genotyping and phenotyping in four selected marine model systems; and improving the access to molecular resources such as genomic and cDNA libraries, microarrays and genetic markers</p> <p>Developing cryopreservation protocols to maintain live strains as well as cell lines of selected tissues and organisms in genetic and physiological inertia.</p> <p>Establish methodologies for cell isolation, dissociation, propagation and storage of cells and cell lines in fish, Amphioxus, Ciona, echinoderms and mollusks</p>

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
Upgrade Black Sea SCENE (and previous FP6 Black Sea SCENE1)	
The UP-GRADE BS-SCENE project is an FP7 EU funded project running from 2009-2011 that is building and extending the existing research infrastructure (developed under FP6 project BlackSeaScene1) with an additional 19 marine environmental institutes/organizations from the 6 BS countries. Implementing FP6 RI SeaDataNet project standards regarding common communication standards and adapted technologies will ensure the data centers interoperability. Main output will be on-line access to in-situ and remote sensing data, meta-data and products.	
<i>Category of infrastructure</i>	
FP 7 project, network of RI's	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Ended in 2011	FP7 I3 network of facilities around the Black Sea. It has a great potential in developing nodes around the Black

	Sea (third unit of the Danube – Black Sea Macrosystem). Major e-research infrastructure (database in the Black Sea region).
Location	
Europe	
Proposed objectives	
<ul style="list-style-type: none"> • To extend the existing research infrastructure with an additional 19 marine environmental institutes/organizations from the 6 Black Sea countries. • To implement the results of the Joint Research Activities of the FP6 RI SeaDataNet project (common communication standards and adapted technologies to ensure the datacenters interoperability). • To network the existing and new Black Sea datacenters, active in data collection, and provide integrated databases of standardized quality on-line. • To realize and improve on-line access to in-situ and remote sensing data, meta-data and products. • To adopt standardized methodologies for data quality checking to ensure the quality, compatibility and coherence of the data issuing from so many sources. <p>More info on: http://www.blackseascene.net/</p>	
Description of the current infrastructure	
<p>Database with the following:</p> <ul style="list-style-type: none"> • Data products – map • Mnemiopsis leidyi Database • Black Sea Zooplankton Checklist • Black Sea Phytoplankton Checklist • Marine Protected Areas • Socio-economic data • Black Sea scientists <p>The Common Data Index (CDI) was initiated in the Sea-Search project. As part of SeaDataNet it is being further developed and extended in data coverage to all SeaDataNet data centres and it is now also used in the Black Sea satellite project (Upgrade) BlackSeaScene. Its primary objective is to give users a highly detailed insight in the availability and geographical spread of marine data across the different data centres and institutes across Europe. The CDI provides an index (metadatabase) to individual data sets. Furthermore it provides direct online data access or direct online requests for data access or file downloads.</p> <p>Currently, the Black Sea CDI V2 metadatabase contains more than 104.000 individual data entries from 11 Data Holding Centres from the 6 countries around the Black Sea, covering a broad scope and range of data, held by these organisations (originators may be other institutes!). In the coming months additional data centres from the BlackSeaScene network will further populate the CDI metadatabase and other institutes in their countries will be encouraged to participate.</p>	
Human resources	
>1000	
Scientific agenda	
<ul style="list-style-type: none"> <input type="checkbox"/> marine meteorology; <input type="checkbox"/> physical, chemical and biological oceanography; <input type="checkbox"/> sedimentology; <input type="checkbox"/> marine biology and fisheries; <input type="checkbox"/> environmental quality; <input type="checkbox"/> coastal and estuarine studies; <input type="checkbox"/> marine geology and geophysics. 	

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
EuroFleets Aiming at bringing together the European research fleets to enhance their coordination and promote the cost effective use of their facilities.	
<i>Category of infrastructure</i>	
FP 7 project, network of RI's	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Ended in September 2013	FP7 I3 project continued by FP7 EUROFLEETS 2 – description in Eurofleets 2. Great potential for interlinking the R/V's of DANUBIUS – are RI's in EUROFLEETS 1 and 2.
<i>Location</i>	
Europe	
<i>Proposed objectives</i>	

<ul style="list-style-type: none"> • Structure and durably integrate, on European scale, through an e-platform the way that the research vessels are operated and their interoperability capacities, • Use more cost-efficiently the existing European Ocean/Global and Regional fleets, • Facilitate a wider sharing of knowledge and technologies across fields and between academia and industry, • Promote greener and sustainable research vessel operations and responsibility, • Provide all European researchers with a full access to high performing research fleets to conduct marine research, • Foster the coordinated and joint development of European fleets in terms of capacity and performances. <p>More info on: http://www.eurofleets.eu/np4/home.html.</p>
Description of the current infrastructure
<p>RV of the countries involved in the project:</p> <ul style="list-style-type: none"> • Ocean and Global RV's: Celtic Explorer – Ireland, OGS Explora – Italy, L'Atalante – France, Marion Dufresne – France, Polarstern – Germany • Regional RV's: Aegaeo – Grece, Akademik – Bulgaria, Belgica – Belgium, Bilim 2 – Turkey, Celtic Voyager – Ireland, Dom Carlos – Portugal, Garcia del Cid – Spain, Heincke – Germany, Mare Nigrum – Romania, Oceania – Poland, Ramon Margalef - Spain, Salme – Estonia, Urania – Italy
Human resources
(>1000)
Scientific agenda
<p>The EUROFLEETS consortium considers that only by pulling resources and infrastructures together, a strong innovation impact could be achieved in terms of:</p> <ol style="list-style-type: none"> 1. Identifying and quantifying actual and potential marine resources, 2. Maintaining high resolution and sustainable observing systems, 3. Providing better knowledge and understanding of ecosystem functioning and processes, 4. Providing new and efficient tools and technologies for resource exploration and development, 5. Prediction tools.

INFRASTRUCTURE Data file

Name of the infrastructure	
EuroFleets 2 – New operational steps towards an alliance of European research fleets	
Category of infrastructure	
FP 7 project, network of RI's	
Status of the project	Category of infrastructure
Started in March 2013	I3 network „the alliance of research vessels in Europe”. Mare Nigrum is part of EUROFLEETS 2 and also will be a node in DANUBIUS.
Location	
Europe	
Proposed objectives	
<ul style="list-style-type: none"> • Promoting a larger integration of European Global/Ocean and Regional RVs as these two types should be addressed separately for most of the strategic and programming issues. In fact in EUROFLEETS2 a higher participation of RVs is expected: 8 Ocean/Global with 4 new ones; • 14 regional RVs with 6 new ones and 6 mobile equipments normally not made accessible on their usual national support vessel; 	

<ul style="list-style-type: none"> • Integrating a common polar vision in the strategic vision of the European marine research fleets; • Promoting exchanges of movable equipment on board European RVs and in doing so fostering high operational interoperability within Europe; • Further integrating the European RVs by coordinating multi-vessels experiments (super-integration) for larger and ambitious marine research missions; • Initiating operational experimental tests demonstrating the higher interoperability of European fleets; • Enhancing the impact of research infrastructures on innovation by fostering the involvement of industry with specific activities, both as a user (e.g. development and testing of new equipment or deep-sea exploration for new energy or mineral resources) and as a supplier of such facilities. <p>More info on: http://www.eurofleets.eu/np4/home.html.</p>
Description of the current infrastructure
<p>RV of the countries involved in the project:</p> <ul style="list-style-type: none"> • Ocean and Global RV's: Celtic Explorer – Ireland, OGS Explora – Italy, L'Atalante – France, Marion Dufresne – France, Polarstern – Germany • Regional RV's: Aegaeo – Greece, Akademik – Bulgaria, Belgica – Belgium, Bilim 2 – Turkey, Celtic Voyager – Ireland, Dom Carlos – Portugal, Garcia del Cid – Spain, Heincke – Germany, Mare Nigrum – Romania, Oceania – Poland, Ramon Margalef - Spain, Salme – Estonia, Urania – Italy
Human resources
(>1000)
Scientific agenda
<p>The EUROFLEETS consortium considers that only by pulling resources and infrastructures together, a strong innovation impact could be achieved in terms of:</p> <ol style="list-style-type: none"> 6. Identifying and quantifying actual and potential marine resources, 7. Maintaining high resolution and sustainable observing systems, 8. Providing better knowledge and understanding of ecosystem functioning and processes, 9. Providing new and efficient tools and technologies for resource exploration and development, 10. Prediction tools.

INFRASTRUCTURE Data file

Name of the infrastructure	
ExpeER – Experimentation in Ecosystem Research	
Category of infrastructure	
I3- integrated infrastructure initiative	
Status of the project	Category of infrastructure
Ongoing	ExpeER based on state of the art research infrastructure is potential collaborator for DANUBIUS in the field of ecosystem researches.
Location	
Distributed Infrastructure for Experimentation in Ecosystem Research; coordinator Institute National de la recherche Agronomique, Paris, France	
Proposed objectives	
ExpeER aims to bring together, for the first time, the major observational, experimental, analytical and modelling facilities in ecosystem science in Europe.	
Subsidiary objectives:	
<ul style="list-style-type: none"> • Analysis of current resources and roadmap for the ExpeER integrated infrastructure • Standardization of core variables and protocols 	

<ul style="list-style-type: none"> Establishing links with related infrastructures on the network level, including integration in broad scale site networks (observational power, representativeness), explore options for permanent funding of the EXPEER distributed ecosystem research infrastructures.
Description of the current infrastructure
<p>Network of analytical platforms, observatories and research facilities, functioning as I3.</p> <p>Includes: highly instrumented research platforms designed for ecosystem research under confined, controlled environment and replicated conditions which allow for manipulation and measurements of complex ecological processes (ecotrons); highly instrumented research sites designed for long-term monitoring of ecological structures and processes; analytical platforms - laboratories equipped with a range of instruments for the measurements of a large variety of parameters</p>
Human resources
No data available
Scientific agenda
<ul style="list-style-type: none"> Developing new methods to overcome current limitations in understanding ecosystem processes Developing improved environmental control techniques and new experimental approaches Developing ecosystem models and provision of a model toolkit Developing methods for up-scaling and biogeochemical and ecological processes data interpretations.

INFRASTRUCTURE Data file

Name of the infrastructure	
<p>FixO3 - Fixed Point Open Ocean Observatories Network (FixO3) seeks to integrate European open ocean fixed point observatories and to improve access to these key installations for the broader community. These will provide multidisciplinary observations in all parts of the oceans from the air-sea interface to the deep seafloor.</p>	
Category of infrastructure	
FP 7 Project, network of RI's	
Status of the project	Category of infrastructure
2013 - 2017	FP7 I3 project (network of submarine observatories) - opportunity to link the "deeper" part of DANUBIUS to FixO3 (and EMSO).
Location	
Mediterranean; Arctic; Atlantic.	
Proposed objectives	
<p>It is proposed that all of the sustained open ocean multidisciplinary observatories which are operated by EU institutions are bought together as one coordinated network. The observatories address a wide range of disciplines (biology, biogeochemistry, chemistry, physics and geology) and environments from the surface to the sea floor and at some locations all environments and disciplines are addressed. The oceanic environment is affected by a variety of physical forcing functions (sunshine, wind, dust supply, etc) which</p>	

have massive geographical variability. The FixO3 network covers this range in a way which has never before been possible: Sea Surface temperature (SST) and dust supply (dust) and relative to major geographical variations in Chlorophyll determined from satellite remote sensing (Chl) and the exchange in CO across the air sea interface (CO). All of the observatories exist or are about to be deployed and the intention is that although this integrating proposal will not be used to provide capital enhancement, the process of integration will provide substantial leverage for funding applications to other bodies. This was the experience with EuroSITES and is expected to be repeated in FixO3.

More info: <http://fixo3.com/>

Description of the current infrastructure

Open ocean observatory infrastructure: Beyond the current state of the art. Each of the sustained time series ocean observatories offers state of the art infrastructures as platforms for multidisciplinary, high quality science and technology research. The networking, joint research and transnational access proposed will greatly broaden access to these outstanding European infrastructures that have so far been restricted largely to National access and a few scientific collaborations. Selecting a wide range of regions, FixO3 will offer the user unprecedented access to the open ocean in areas that are otherwise inaccessible and yet highly sensitive to climate change. Seafloor monitoring, generally based on specific technologies adapted to the extreme hyperbaric conditions and the difficult access, is subject to continuous innovation and discoveries and is generally operated by highly specialised teams with little time or resource to invite external users. FixO3 includes several of these infrastructures with unique deep seafloor installations of outstanding track record, most of them being part of the ESONET consortium and the EMSO infrastructure.

The proposed infrastructure:

1. Satellite remote sensing
2. Gliders
3. Floats
4. Ships of opportunity
5. Research cruises
6. Eulerian Observatories

Human resources

(>1000)

Scientific agenda

- Biology**
- Biogeochemistry**
- Chemistry**
- Physics**
- Geology**
- Climate change**
- Oceanic environment in general, from the sea floor to the open ocean**

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
GROOM – Gliders for Research, Ocean Observation and Management <i>A Design Study on a Glider European Research Infrastructure for the benefit of marine research and operational oceanography</i>	
<i>Category of infrastructure</i>	
FP7 project (Network of RI's – I3)	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Starting Oct. 2011 to Sept. 2014	GROOM is a key project for building the required observatory network that would allow the Marine Strategy Framework Directive to be implemented.
<i>Location</i>	
Europe and going global (integration in GOOS).	
<i>Proposed objectives</i>	
The objective of the GROOM project is to design a new European Research Infrastructure that uses underwater gliders for collecting oceanographic data. This new infrastructure shall be beneficial for a large number of marine activities and societal applications, which can be related to climate change, marine ecosystems, resources, or security and which rely on academic oceanographic research and/or operational oceanography systems.	

GROOM will define the scientific, technological, and legal framework of this European glider capacity.

GROOM will develop in line with other European and international initiatives supporting marine in-situ observations, like in particular [Euro-Argo](#), [JERICO](#), and [GOOS](#).

The objective for this design study for a European glider RI are to demonstrate that:

- a distributed architecture of “gliderports” around the European seas and overseas (see figure on the right), working in close coordination, is the required and cost effective way to operate fleets of gliders in the combination with existing observing systems,
- this infrastructure is suitable to deploy, maintain and operate individual as well as fleets of gliders continuously for operational monitoring and research.
- such infrastructure can provide a world-class service to the research and environment monitoring communities.

More info on: <http://www.groom-fp7.eu/doku.php>

Description of the current infrastructure

The gliders already owned by the partners.

Human resources

Parteners:

1. Université Pierre-et-Marie-Curie (UPMC, coordinator, FR),
2. University of Cyprus (UCY, CY),
3. Leibniz- Institut Für Meereswissenschaften an der Universitaet Kiel (IFM-GEOMAR, DE),
4. Helmholtz-Zentrum Geesthacht (HZG, DE),
5. the Alfred Wegener Institute for Polar and Marine Research (AWI, DE),
6. Universität Trier (UT, DE),
7. the Finnish Meteorological Institute (FMI, FI),
8. Centre National de la Recherche Scientifique (CNRS, FR),
9. Institut Français de Recherche pour l’Exploitation de la Mer (IFREMER, FR),
10. Hellenic Centre for Marine Research (HCMR, GR),
11. NATO Undersea Research Center (NURC, IT),
12. Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (OGS, IT),
13. University of Bergen (UIB, NO),
14. Nansen Environmental and Remote Sensing Center (NERSC, NO),
15. Agencia Estatal Consejo Superior de Investigaciones Cientificas (CSIC, ES),
16. Plataforma Oceanica de Canarias (PLOCAN, ES),
17. Scottish Association for Marine Science, Oban, United Kingdom (SAMS, UK),
18. University of East Anglia (UEA, UK)
19. Natural Environment Research Council – National Oceanography Centre (NERC-NOC, UK).

Scientific agenda

Taking into account the existing frames and vision statement about ocean observation, the GROOM project work program will focus on:

- The integration of gliders into the existing global and regional/coastal ocean observing systems, including a consistent EC-wide contribution for GMES,
- The Law of the Sea and maritime traffic issues that such platforms raises,
- The assessment of strategic location for a full network perspective and coordination with existing observation activities,
- Research priorities to deliver new sensor capabilities for gliders in particular for biology,
- The assessment of existing legal frameworks and existing RI entities for joint funding and management of the proposed RI,
- Integration of the proposed RI in an international network of similar capacities, with the aim of an European leadership,
- Adaptation and strengthening of existing data management e-infrastructure framework to gather and make available consistent and quality controlled datasets,
- Exploiting the open access to glider data as an educational “window” on the oceans and their role in climate, resources, etc.

and, as an overall contribution, the GROOM project will propose a roadmap for a ten year implementation plan.
 Research focus: Infrastructure Design Study

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
Hydralab IV Aim: structuring the access to unique and costly hydraulic and ice engineering research infrastructures in the European Research Area.	
<i>Category of infrastructure</i>	
FP7, Network of RI's	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Operational (2010 – 2014)	FP7 I3 network of hydraulic and eco-hydraulic facilities. Potential to develop a node – but more dedicated to DREAM. Major importance for development of the RO-DREAM node in the danube Delta – to be also part of DANUBIUS.
<i>Location</i>	
Europe and European reasearch areas	
<i>Proposed objectives</i>	
Further objectives of HYDRALAB IV are to improve access to experimental data, by providing researchers with a database on results of experiments, and bring young researchers and first time users from across Europe to the cutting edge of experimental research. More info on: http://www.hydralab.eu	

<i>Description of the current infrastructure</i>
<p>A web-based database containing details of unique instrumentation that HYDRALAB (or other EU) institutes have developed. It also includes instruments that are rare and, for the sake of completeness, includes unique and rare instruments that the owners are not prepared to lend to other institutions on this list.</p> <p>Inventory of facilities within europe:</p> <ul style="list-style-type: none"> • Basins (both for marine research with waves and/or (tidal) currents and research on inland water issues) • Multi directional wave basins • Flumes (both for marine research and for research on inland water issues) • Towing tanks for ship dynamics research • Cavitation tunnels • Rotation basins for research on coriolis dominated issues • Facilities for ice research • Other hydraulic facilities <p>A total of 11 HYDRALAB partners are offering Access to 18 experimental installations, grouped in the categories mentioned above.</p>
<i>Human resources</i>
>1000
<i>Scientific agenda</i>
<p>Research in their infrastructures deals with complex questions regarding the interaction of water with environmental elements, sediment, structures and ice and goes beyond just hydraulic research: hence they have adopted the theme ,More than water', with the following elements:</p> <ul style="list-style-type: none"> • Water and environmental elements (focusing on ecology and biology) • Water and sediment • Water and structures • Water and ice

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
JERICO – Towards a joint EU research infrastructure network for coastal observatories	
The main challenge for the research community is to increase the coherence and the sustainability of the dispersed infrastructures (marine observatories) by addressing their future within a shared pan-European framework (Pan European approach for a European coastal marine observatory network, integrating infrastructure and technologies such as moorings, drifters, ferrybox and gliders).	
<i>Category of infrastructure</i>	
FP 7 project, network of RI's (I3 = Integrated Infrastructure Initiative)	
<i>Status of the project</i>	<i>Category of infrastructure</i>
In progress	Major RI project on coastal area – an observatory at river-sea interaction zone (part of DANUBIUS) may be of major interest for JERICO – while one or some of the coastal observatories have the potential to be developed into DANUBIUS nodes. Major community of users for the project.
<i>Location</i>	
Europe	
<i>Proposed objectives</i>	

Networking activities will lead to the definitions of best practices for design, implementation, maintenance and distribution of data of coastal observing systems, as well as the definition of a quality standard. Harmonisation and strengthening coastal observation systems within EuroGOOS regions will be sought. Unique twin Trans National Access experiments will be carried out in order to reveal the potential of datasets used in synergy. Central coastal infrastructure in Europe will be opened for international research. This will among other benefits GMES and European contribution to climate change research. New joint research will be conducted in order to identify new and strategic technologies to be implemented in the next generation European coastal observatories. Focus is given on emerging technologies and the biochemical compartment.

JERICO intends to contribute to the international and global effort on climate change research (GEOSS), to provide coastal data inputs for operational ocean observing and forecasting, and also to answer to some of the needs of the environmental research and societal communities.

More info on: <http://www.jerico-fp7.eu/>

Description of the current infrastructure

Ferryboxes (Norway, Germany)
 Fixed Platforms (Italy, Germany)
 Gliders (France, Germany, Spain, U.K.)
 Support Facilities (calibration and validation laboratories) (Italy, Greece)
 JERICO Data Tool

Human resources

>1000

Scientific agenda

As part of its drive towards an alignment of practices, JERICO will encourage coastal observatories to cover a shared list of priority parameters, which in addition to the standard temperature and salinity will include acidity (pH), turbidity, chlorophyll, dissolved oxygen (O₂) and partial pressure of carbon dioxide (pCO₂). These parameters tie in with environmental monitoring needs as well as with the Water Framework Directive and the Marine Strategy Framework Directive. Further effort will focus on nutrients, contaminants, and the identification of plankton species.

The project will also provide a platform for the identification and dissemination of best practice, the definition of quality standards, optimisation of the use of existing infrastructures and promotion of interoperability. This comprehensive approach is geared to the delivery of a consistent, cost-effective observational set-up, a strategic infrastructure based on an end-to-end concept of coastal monitoring that covers all steps leading from data acquisition to data dissemination.

In addition to these harmonisation efforts, the project will assess the scope for technological upgrades and innovation, notably in view of a wider adoption of automatic measurement systems. Manual water sampling followed by laboratory analysis has remained the norm in coastal monitoring since the 1970s. For many parameters, this time-consuming process has now been rendered obsolete by the advent of autonomous measurement systems, which have already been adopted by many European institutions. JERICO will also explore the potential of emerging technologies, including biochemical applications, to refine the technical set-up of observatories. The partners are notably planning to develop innovative sensors and systems to enhance interoperability, as well as new software optimising the exploitation of mobile systems.

C. Other regional and European projects

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
CIRCLE 2– Climate Impact Research & Response Coordination for a Large Europe	
CIRCLE-2 is a European Network of 34 institutions from 23 countries committed to fund research and share knowledge on climate adaptation and the promotion of long-term cooperation among national and regional climate change programs.	
<i>Category of infrastructure</i>	
ERA-Net Project start in 2010	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Ending in 2014	Network of institutions dealing with climate change and vulnerability – major potential of collaboration with DANUBIUS.
<i>Location</i>	
Global	
<i>Proposed objectives</i>	

<ul style="list-style-type: none"> • Establish a research funding network oriented towards Climate Change Impacts, Vulnerability and Adaptation (CCIVA) policy-relevant questions. • Facilitate cooperation among Europe's national and regional CCIVA research programmes and their funders/managers. • Promote a common strategic agenda on relevant CCIVA research areas and coordinate it with European framework programmes, policies and objectives. • Design and Fund joint initiatives and joint calls for transnational CCIVA research proposals on identified knowledge gaps or needs. • Share knowledge and support European countries in their efforts to adopt appropriate climate Adaptation strategies, action plans and measures. • Optimise national and European investments on CCIVA research by increasing the effectiveness of its funding and maximising the policy-relevance of its outcomes.
Description of the current infrastructure
More info on: http://www.circle-era.eu/np4/home.html
Human resources
NA
Scientific agenda
<ul style="list-style-type: none"> • Scientific sound knowledge about climate change impacts and vulnerability but also on available and novel adaptation options for decision-making. • Scientific research needed to enable policy developers to evaluate their various options and to help align national and sub-national climate change response initiatives with the overall European framework and international agreements and developments. • Good understanding of adaptation measures is necessary for the development of multi-level adaptation regimes and their ongoing improvement.

INFRASTRUCTURE Data file

Name of the infrastructure	
DIANE CM - Decentralised Integrated Analysis and Enhancement of Awareness through Collaborative Modelling and Management of Flood Risk	
The approach used in the DIANE--CM project aims at filling some of the gaps and developing the missing links by focusing on the improvement of risk awareness and increasing public participation. The main concept employed the DIANE-CM project is collaborative modelling (CMM).	
Category of infrastructure	
ERA-Net CRUE Funding Initiative	
Status of the project	Category of infrastructure
Ended in 2009 (as ERA NET project), continued till 2012	Not an RI, but an ERA NET dedicated to flood protection. Good results to build on and potential partners.
Location	
UK and Germany	
Proposed objectives	
<ul style="list-style-type: none"> • Improvement of flood models and near real time flood forecast in urban areas prone to fluvial and pluvial flooding. This is complemented by improved prediction and visual representation of the 	

results in a way that can be understood by the general public and taken-up by professionals and local champions

- Introduction of innovative methods of risk quantification and communication aiming to clarify how data from hazard and vulnerability analyses result in risk quantification and how the visually improved maps can be used to initiate a public dialogue for more informed and shared decision making.
- Increase of local community participation in flood risk management through collaborative modelling and decision making as well as increased public involvement in flood risk management.
- Testing the approaches and tools developed or customised in the project in two selected case studies (in Germany and the UK) and determining how participation in the establishment of flood risk management plans can be encouraged and improved as a feature of “good governance”.
- Identification of lessons learned regarding risk communication in local communities. Determining how these lessons can be applied to improve the effectiveness of communication with the general public, across a range of flood risk management activities, including mapping, planning, and event management.
- Identification of requirements and potential barriers for successful collaborative modelling in the project and in the post-project uptake and dissemination.
- Dissemination of the results amongst the participants in the case studies and other potential audiences by means of an e-learning platform and by making the results available for broader implementation in both event management and long term planning.

More info on: http://www.crue-eranet.net/partner_area/documents/DIANE-CM_frp.pdf.

Description of the current infrastructure

Thanks to the work of the DIANE-CM project, improved data and information and maps for assessing flood hazards are available for the communities in the UK and German case study areas. In Redbridge, a data measurement network for real-time forecasting and validated 1D-1D model and (Automatic Overland Flow Delineation (AOFD) tool has been established. For the all steer river, a 1-DD river model has been developed for the downstream section (as far as its confluence with Elbe river), which was connected to a similar existing model for the upstream section of the river.

Human resources

100-1000

Scientific agenda

Against the background of the DIANNE-M project results we can formulate following recommendations for decision makers:

- Make the information, the decision-making process and your decisions transparent and comprehensible.
- Consider local knowledge from stakeholders and citizens in your decision-making process in order to increase the data and information basis for current flood risk and broaden the pool of potential measures for flood risk reduction.
- Establish long term / permanent structures for participation and social learning processes in flood risk management.
- Besides face-to-face communication and exchange, use tools for transparent and informative flood risk information and interactive web-based tools for communication, cooperation and negotiation.
- Support in the form of models and platforms for illustration and visualization is helpful for enhancing flood risk awareness and capacity building for flood risk management.
- Identify and train local champions as competent and permanent contact persons and moderators in flood risk management processes in order to build up sustainable communication structures and trust among the involved persons.
- Establish a common data base for flood related data and information; this should be accessible for all administrative bodies.

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
<i>EAST-NMR- Enhancing Access and Services to East European users Towards an efficient and coordinated Pan-European pool of NMR capacities to enable global collaborative research & boost technological advancements.</i>	
<i>Category of infrastructure</i>	
Network –pool of excellence;	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Ongoing project	DANUBIUS needs to integrate state of the art research infrastructures, EASTNMR being in this respect a node, highly valuable from the point of view of existing infrastructures.
<i>Location</i>	
Pan-European distributed RI	
<i>Proposed objectives</i>	
<ul style="list-style-type: none">• To Provide transnational access to NMR instrumentation based in Eastern Europe and to solid-state NMR facilities, an emerging technology at the international level• To educate and train researchers, especially from Eastern Europe, in NMR's potential and use	

<ul style="list-style-type: none"> • To advance in sample preparation technologies especially of difficult to tackle membrane proteins through joint research activities developing procedures for the production of membrane protein samples for NMR spectroscopy. • Exchange of best practice; transfer of the optimum protocols for structure determination of molecular complexes and increasingly large molecules
Description of the current infrastructure
State of the art devices on the field of MAS NMR able to provide services in development of protocols devoted to phenotype and chemotype determination.
Human resources
No data available
Scientific agenda
Developing procedures for the production of membrane protein samples for NMR spectroscopy. Establishment of robust technologies that provide novel long-range structure restraints including paramagnetic tagging and novel alignment media for molecular complexes structure determination. Providing advanced methods in NMR spectroscopy for determining the 3D structure of biomolecules and complexes of these molecules in solid and solution states.

INFRASTRUCTURE Data file

Name of the infrastructure	
ECOOP – European COastal sea Operational observing and Forecasting system The goal of ECOOP is to build up a sustainable pan-European capacity in providing timely, quality assured marine service (including data, information products, knowledge and scientific advices) in European coastal-shelf seas.	
Category of infrastructure	
Network of Infrastructures and Users	
Status of the project	Category of infrastructure
Ended in 2009. Continuation of MERSEA	FP6 project of network of coastal observatories. Precursor of FP7 JERICO.
Location	
Baltic Sea, North Sea, Iberia, Biscay, Ireland region, Mediterranean Sea, Black Sea.	
Proposed objectives	
The overall goal of ECOOP is to: Consolidate, integrate and further develop existing European coastal and regional seas operational observing and forecasting systems into an integrated pan- European system targeted at detecting environmental and climate changes, predicting their evolution, producing timely and	

quality assured forecasts, providing marine information services (including data, information products, knowledge and scientific advices) and facilitate decision support needs.

In summary:

- Integrate and harmonise existing EU-wide ocean observing systems.
- Evaluate existing ocean forecasting systems.
- Improve ocean model forecasting skills by developing and implementing, e.g., data-assimilation systems.
- Integrate and update existing ocean forecast systems into a pan-European system.
- Develop an integrated marine service in support of marine environmental management, search and rescue applications etc., in European coastal areas (EuroDeSS).
- Quantify monthly to decade variability of the European shelf sea climate.
- Develop capacity in non-EU countries to observe and model the coastal ocean following ECOOP standards.

More info on: <http://www.ecoop.eu/>

Description of the current infrastructure

Tide gauges, remote sensing, sensors for temperature and salinity measurements, CTD data collected in cruises of opportunity.

Human resources

Over 70 institutions from Belgium, Bulgaria, China, Croatia, Cyprus, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Ireland, Israel, Italy, Malta, Morocco, Netherlands, Norway, Poland, Portugal, Romania, Russia, Tunisia, Turkey, Ukraine, U.K.

Scientific agenda

- **Produce timely & quality assured forecasts**
- **Detect environmental & climate changes, & predict their evolution**
- **Provide marine information services**
- **Facilitate decision support needs (search & rescue, oil spill, HAB ...)**

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
EMODnet – European Marine Observation and Data Network In response to the EU Green Paper on Future Maritime Policy, the European Commission initiated the European Marine Observation and Data Network (EMODNET). The overall objective to create pilot studies that assemble fragmented and inaccessible marine data into interoperable, contiguous and publicly available datasets for whole maritime basins.	
<i>Category of infrastructure</i>	
Network of Infrastructure and Users	
<i>Status of the project</i>	<i>Category of infrastructure</i>
In progress (2010-2014)	EMODnet is a project of the European Commission that gathers marine data into interoperable and publicly available datasets. DANUBIUS can become a data provider for EMODnet for the Black Sea.
<i>Location</i>	

Europe

Proposed objectives

EMODNET is essential for the EU to improve the quantity, quality and accessibility of marine observation and information for evidence-based ocean governance and to open up new economic opportunities in the marine and maritime sectors of Europe, for the ultimate benefit of the European citizen and the global community.

The European Marine Observation and Data Network, Marine Board - EuroGOOS perspective
EMODNET will be an end-to-end, integrated and inter-operable network of systems of European marine observations and data communications, management and delivery systems, supported by a comprehensive user-oriented toolkit to enable implementation of the Marine Policy for Europe.

Giving and harmonizing access to marine data from different sources will:

- Help industry, public authorities and researchers find the data and make more effective use of them to develop new products and services.
- Improve our understanding of how the seas behave.

Information systems have an increasing role in the society and a strong impact on science, technology and business.

- Access to data can generate new science;
- Retention of unique observational data which is impossible to re-create;
- Retention of expensively generated data which is cheaper to maintain than to re-generate;
- Data are necessary to assess compliance with legal requirements;
- Data are necessary to validate published research results and for use in teaching.

More info on: <http://www.emodnet-physics.eu/> ,
http://www.vliz.be/sites/vliz.be/files/public/icons/mb_eurogoos_emodnet_vision_final.pdf

Description of the current infrastructure

Sensors and marine research facilities of the partners.

Human resources

Contributors (for the data portal):

- AWZ - Administratie Waterwegen en Zeewezen - Belgium
<http://www.wenz.be/nl/>
- BSH - Bundesamt für Seeschifffahrt und Hydrographie - Germany
<http://www.bsh.de>
- CEFAS - Centre for Environment, Fisheries & Aquaculture Science - UK
<http://www.cefasc.defra.gov.uk/>
- CETMEF - Centre d'etudes techniques maritimes et fluviales - France
<http://www.cetmef.developpement-durable.gouv.fr/>
- DaMSA - Danish Maritime Safety Administration - Denmark
<http://frv.dk/en/Pages/default.aspx>
- Deltares - Nederland
<http://www.deltares.nl/en>
- DMI - Deutsches marine institute - Germany
<http://www.deutsches-maritimes-institut.de/>
- EPA - Environmental Protection Agency, Department of Marine Research - Lithuania
<http://gamta.lt/cms/index?lang=en>
- Euskalmet- Basque Government - Spain
<http://www.euskalmet.euskadi.net/s07-9032/es/>
- FMI - Finnish Meteorological Institute - Finland
<http://en.ilmatieteenlaitos.fi/>
- HCMR - Hellenic Centre for Marine Research - Greece
<http://www.hcmr.gr/en/>

- IEO - Instituto Espanol de Oceanografia - Spain
<http://www.ieo.es/inicial.htm>
- Ifremer - Institute Francais de Recherche pour l'Exploitation de la Mer - France
http://wwz.ifremer.fr/institut_eng
- Instituto Hidrografico - Portugal
<http://www.hidrografico.pt/>
- IOBAS - Institute of Oceanology- Bulgarian Academy of Science- Bulgaria
http://www.io-bas.bg/index_en.html
- ISPRA - Istituto Superiore per la Protezione e la Ricerca Ambientale - Italy
<http://www.isprambiente.gov.it/it>
- KNMI - Koninklijk Nederlands Meteorologisch Instituut - Netherlands
<http://www.knmi.nl/>
- LEGMA - Latvian Environment, Geology and Meteorology Agency - Latvia
<http://www.meteo.lv/en/>
- Marine Institute - Ireland
<http://www.marine.ie>
- Met Eirann - Ireland
<http://www.met.ie/>
- Meteo France - France
<http://france.meteofrance.com/france/accueil>
- MetNo - Norwegian Meteorological Institute - Norway
<http://met.no/English/>
- MSI - Marine Systems Institute - Estonia
<http://www.msi.ttu.ee/>
- MUMM - Management Unit of the North Sea Mathematical Models - Belgium
<http://www.mumm.ac.be/EN/>
- NHS - Norwegian Hydrographic Service – Norway
<http://vannstand.no/index.php/nb/english>
- NIB - Morska Bioloska Postaja Piran - Marine Biology Station Piran
<http://www.mbss.org>
- NMA - Norwegian Mapping Authority - Norway
<http://www.statkart.no/>
- NOC - National Oceanography Centre - Southampton - UK
<http://www.noc.soton.ac.uk>
- NWAHEM - North-West Regional Administration for Hydrometeorology and Environmental Monitoring - Russia
<http://adm.meteo.nw.ru/NWUGM/uprEng.php>
- OGS - Istituto Nazionale di Oceanografia e di Geofisica Sperimentale - Italy
<http://www.ogs.trieste.it/>
- Puertos del Estado - Spain
<http://www.puertos.es/>
- RIKZ - Rijkswaterstaat - Netherlands
<http://www.rijkswaterstaat.nl/en/>
- SHOM - Service Hydrographique et Oceanographique de la marine - France
<http://www.shom.fr>
- SMHI - Swedish Meteorological and Hydrographic Institute - Sweden
<http://www.smhi.se/en>
- UKMO - Met Office - UK
<http://www.metoffice.gov.uk/>
- UKM - United Kingdom Recent Marine Data
http://www.ndbc.noaa.gov/maps/United_Kingdom.shtml

<ul style="list-style-type: none"> Xunta Galicia - Spain http://www.meteogalicia.es/web/index.action (<1000)
<i>Scientific agenda</i>
<ul style="list-style-type: none"> Biology Chemistry Physical Parameters Geology Hydrography Sea-bed habitats

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
ERVO – EU Research Vessels Operators, Marine Research Infrastructure InfoBase	
<i>Category of infrastructure</i>	
Network of Infrastructures and Users	
<i>Status of the project</i>	<i>Category of infrastructure</i>
In progress	Flexible forum which meets annually to share experiences of common interest, to explore opportunities for co-operation between R.V. managers and to define the scope for such cooperation. Link with DANUBIUS through the Romania research vessel Mare Nigrum.
<i>Location</i>	
Europe's Marine Research areas: from the Arctic to the Mediterranean and Atlantic	
<i>Proposed objectives (for ERVO in general)</i>	
<ul style="list-style-type: none"> to share experience of common interest 	

<ul style="list-style-type: none"> • to explore opportunities for co-operation between R.V. managers • to define the scope for such cooperation <p>More info on: http://www.rvinfobase.eurocean.org/</p>
Description of the current infrastructure
<p>The database comprises two main parts:</p> <ul style="list-style-type: none"> • One containing information about every research vessel operated in EU (operator, area of operation, technical characteristics, and contact details) that are in use, under construction and out of service. • One containing information about all European large exchangeable equipment owned by the operators
Human resources
Members from: Belgium, Finland, France, Germany, Iceland, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, United Kingdom, each with 1 to 12 permanent members.
Scientific agenda
The same with the proposed agenda of each member – Marine Research in general.

INFRASTRUCTURE Data file

Name of the infrastructure	
EurAqua- European Network of Freshwater Research Organisations	
Category of infrastructure	
Network of Infrastructure and Users	
Status of the project	Category of infrastructure
<i>Project phase</i> Ongoing project	The research network EurAqua with respect to DANUBIUS is a node , being one of the few structure able to contribute to development of freshwater science since EurAqua is the leading European network for facilitating improved and coordinated water research
Location	
Distributed infrastructure including river-delta observatories systems from EU plus Norway and Switzerland	
Proposed objectives	

The key objective of EurAqua is to contribute substantially to the development of European freshwater science and technology and its dissemination on a European scale, thus having a significant input on the development of the scientific and economic basis of European water management.

Another objective of the network is introduce commonality where appropriate, so that methods and analyses can be readily transferred between sites, or applied to the network as a whole, or a sub-set of observatories. An important objective of EurAqua is to initiate and develop multiparty research projects.

www.euraqua.org

Description of the current infrastructure

EurAqua and PEER have jointly established a network of hydrological observatories with the aim of supporting both hydrological research and water policy development. A key driver is to address issues of environmental change at the European scale, for example how flood risk and water scarcity will be impacted by climate change. Observatories are based on existing infrastructures, long-term monitoring schemes, and data management services, which PEER and EurAqua members provide or support. In all cases the observatories have already provided facilities, data or information to enable a wide range of research activity, and are therefore well known to the local network partner. Observatories are relevant to the scale of water resources (i.e. 100s to 1000s of km²) but may also contain small (reach or plot) scale research sites.

Human resources

More than 1000

Scientific agenda

EurAqua scientific agenda attempt to meet and to comply with the policy makers requirements.

aims to achieve his objective by carrying out the following four types of activities:

1. **"Science Collaboration"** - EurAqua takes action to further strengthen the collaboration and integration of research resources and to facilitate efficient transfer of knowledge between scientific institutions and between researchers.
2. **"Science Policy Collaboration"** - EurAqua takes action to collaborate and exchange research results with end-users, thus aiming to bridge the science-policy and the innovation gaps.
3. **"Research needs identification and validation"** - EurAqua actively and continuously works on identifying and validating research needs required to implement today's policy and future emerging challenges.
4. **"Efficiency and strength of EurAqua"** - EurAqua actively pursues information flow between its partners as to increase efficiency. EurAqua also liaises with other networks to collaborate whenever possible, further enhancing efficiency and effectiveness. EurAqua is the leading European network for facilitating improved and coordinated water research, in support of knowledge-based water management and policy.

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
HYDRONET - Floating Sensorised Networked Robots For Water Monitoring	
The HydroNet Project aims at designing, developing and testing a new technological platform to execute in-situ, real-time monitoring of water bodies based on a network of sensorised, autonomous, marine robots (buoys and small boats), embedded in an Ambient Intelligence infrastructure implementing also the remote Control Station software.	
<i>Category of infrastructure</i>	
ERA-Net Project - FP7-ENV-2007	
<i>Status of the project</i>	<i>Category of infrastructure</i>
2008-2012	FP7 – STREP, development of network of robotic sensors – important to identify members that can become users and/or develop nodes.
<i>Location</i>	
Europe	
<i>Proposed objectives</i>	
The main objective of the HydroNet project has been to design, develop and test an open HW and SW platform composed by a network of autonomous, miniaturised, sensorised, radio interconnected, floating and fixed robots embedded into an Ambient Intelligence (AmI) SW controller suite aimed at assessing in real time the healthiness of water bodies and at supplying information on spatial and temporal water quality.	

The core of the platform is represented by sensors devices (bio, optical and chemo) hosted inside the floating robots and the fixed buoys able to communicate with a remote (land) control station.

Parameters monitored in HydroNet are physical/water quality parameters along the water column:

- Temperature, Dissolved Oxygen,
- Salinity, pH
- ORP, Turbidity
- Nitrate

And chemical parameters:

- Cadmium
- Chrome
- Polycyclic Aromatic Hydrocarbon
- Oil slicks

More info on: <http://iwrm-net.europeanwatercommunity.eu/outputs/detail/43>.

Description of the current infrastructure

HydroBot is an autonomous catamaran for environmental monitoring - Chemo- optical- and bio-sensors used for the monitoring of physical parameters and pollutants (chromate, cadmium, mercury, oil) installed on the HydroBot This output responds to several monitoring needs, where conventional sampling strategy (frequency and stations density) are insufficient.

Human resources

>100

Scientific agenda

The sensorised robots network:

- monitors a designed area by autonomously and automatically executing a planned daily campaign communicating the in-situ measured water parameters to the control station in realtime. Anomalies in the measurements are reported by the high level user interface;
- finds the source of a pollutant emission by cooperatively working together with the land control station;
- maps continuously, in space and time, a designed area sending the acquired data to the AmI database; in this configuration the robots move in prefixed trajectories.

INFRASTRUCTURE Data file

Name of the infrastructure	
JCOMMOPS – JCOMM in situ observing platform support centre	
Category of infrastructure	
Network of Infrastructures and Users	
Status of the project	Category of infrastructure
In Progress	Potential collaboration / network of users / development of a node on the NW Black Sea within DANUBIUS to be integrated with the global initiative.
Location	
Global	
Proposed objectives	
<p>The JCOMM In-situ Observing Platform Support Centre is a component of the international coordination mechanism, which aims on behalf of JCOMM to:</p> <ul style="list-style-type: none"> – assist as appropriate in the implementation of the GOOS – develop synergies between observing systems – assist in the planning, implementation and operations of the observing systems – monitor and evaluate the performance of the networks – encourage cooperation between communities and member states – encourage data sharing – assist in data distribution on the Internet and GTS 	

<ul style="list-style-type: none"> – relay user feedback on data quality to platform operators – encourage harmonization of data and instrumentation related practices – provide technical assistance and user support worldwide – act as a clearing house and focal point on all program aspects <p>More info on: http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS</p>
Description of the current infrastructure
<ul style="list-style-type: none"> – Drifting and moored buoys in the high seas and tropical moorings (DBCP) – XBTs, TSGs, atmospheric soundings from ships, meteorological observations from ships (SOT) – Profiling floats (Argo) – Deep ocean time-series reference stations (OceanSITES)
Human resources
<ul style="list-style-type: none"> • JCOMMOPS comprises two Technical Coordinators, a ½ time IT person, plus occasionally students on work experience. • Office & Information System hosted by CLS, Toulouse
Scientific agenda
<p>JCOMMOPS provides coordination at the international level for oceanographic and marine observations from drifting buoys, moored buoys in the high seas, ships of opportunity and sub-surface profiling floats. JCOMMOPS operates under the auspices of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM).</p>

INFRASTRUCTURE Data file

Name of the infrastructure	
LaguNET - Italian Network for Lagoon Research	
LaguNet is a scientific observational network studying the fluxes of nutrients and other contaminants from lagoon catchments to the near coastal environment.	
Category of infrastructure	
Others types of Projects/Possible Nodes	
Status of the project	Category of infrastructure
Permanent programme, operational since 2012	Network of institutes with dedicated research facilities and personnel. Some parts of LaguNET may become Nodes. LaguNET has the potential of major community of users for DANUBIUS.
Location	
Italy+ Mediterranean	
Proposed objectives	
<ul style="list-style-type: none"> • To provide a forum for discussion and cooperation between researchers who are studying biogeochemical processes in lagoons, wetlands and salt- marshes at sites along the Italian coast. • Evaluate available information and present understanding of the biogeochemistry of carbon, nitrogen and phosphorous in transitional and coastal waters under the influence of catchment basins. • Discuss the feasibility of the application of the LOICZ Biogeochemical Model to such areas. 	

- Promote an agreed common approach to studies of biogeochemical processes in these transitional ecosystems that can provide support to management or policy applications.
- Consider the feasibility of developing one or more projects either in Italy or in Europe (with Mediterranean EU partners as well as eventually from Eastern Europe and North Africa).

Description of the current infrastructure

More info on: <http://www.lagunet.it/>

Human resources

>1000

Scientific agenda

Typology of Mediterranean Lagoons:

- definition of a set of structural abiotic features as major environmental niche axes for transitional Mediterranean waters, as a result of the views of the expert groups;
- identification of a set of Mediterranean lagoons for which data on these structural features are available;
- collection of data on structural features and identification of the available data set on the quality elements considered in the WFD;
- collection of the available data for the quality element descriptors of selected biological quality elements;
- LaguNet meeting to discuss the statistical tools which can be used to investigate environmental niche dimensions explaining the variability of quality element descriptors;
- Organisation of working groups for the analysis of the collected data-base.

Regional/national networks:

- To provide a forum for discussion and co-operation between research groups who are studying biogeochemical and ecology processes in lagoons, wetlands and salt marshes in the southern European area.
- To evaluate available information and present understanding of biogeochemistry of carbon, nitrogen and phosphorous flows in transitional and coastal waters under the influence of catchment basins.
- Promote an agreed common approach to studies of biogeochemical and ecological processes that can provide support to management and policy applications (e.g. EU Water Framework Directive etc.)
- Discuss the feasibility of providing scientific products to IGBP programmes and other regional and global monitoring/observation systems.
- Consider the feasibility of one or more projects in collaboration with similar networks in southern Europe such as LaguNet (Italy), PNEC (France), and DITTY (EU project).

Vegetation of the Italian Transitional Zones: preparing a common report, booklet or publication on the present knowledge of the flora and vegetation status of the Italian transitional zones (marine macroalgae and phanerogams) particularly referring to the lagoons which are typical of the Italian coastal zone.

The application of the **LOICZ Biogeochemical Model** to the LaguNet sites was one of the first objectives indicated in the Workshop of Venice . Presently LaguNet comprises 22 ecosystems where the LOICZ-BM has been applied for well-defined time period. In total 94 flux estimations have been undertaken considering a wide range of systems and different time periods.

Investigation of the **macrobenthos** communities - sedimentary organic matter content relationships in transitional waters soft sediments along the Italian coast to develop benthic indicators of environmental quality.

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
LIFE III: Integrated Multi-Objective System for optimal management of urban drainage	
<i>Category of infrastructure</i>	
Infrastructure	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Finalized	Potential collaborator
<i>Location</i>	
Genoa, Italy	
<i>Proposed objectives</i>	
<p>By the mean of collected data using real time multi-sensors (rain gauges, flowmeters, turbidity monitors, low cost meteorological radar), modelling activities (rain field forecasts and network modelling) and upgrades to infrastructure (sluice gates, pumping stations, volume rehabilitation, new SCADA system) there were developed strategies for:</p> <ol style="list-style-type: none"> 1. Optimization of effluent treatment capacity 2. Reduction in environmental impact of discharged water 3. Control of critical flow rates 	
<i>Description of the current infrastructure</i>	
Single sited infrastructure, including multi-sensors, field equipment (turbidity meter and spectrophotometer) , etc.	
<i>Human resources</i>	
<100	
<i>Scientific agenda</i>	

Wastewater control is a crucial issue, particularly in large urban areas. Addressed issues were:

- The optimum management of the drainage system as a whole, including the limiting of risks of failure in sewage networks under both ordinary and critical conditions, and the reduction of environmental pollution.
- The impact of drainage water effluents on bodies of water into which they flow is a key environmental problem. It is detrimental for the health of the ecosystem and, especially in highly urban areas, is strictly related to water management.

A correct management of drainage systems, particularly in highly populated areas, is a very important problem which has to be solved by operators by using a rational and effective approach taking into account two main aspects:

- Reduction in environmental pollution
- Reduction of flood risks in urban areas

The project ensures *wastewater control and disposal* in the presence of ordinary and critical rainfall events. During *ordinary operation* supervision and control of effluent conveyed to the treatment plant and modelling of effluent discharge is made, thus dramatically reducing environmental impact. In the presence of *intense events* hydraulic control of the disposal network is ensured, minimizing inefficiency phenomena in critical sections through the utilization of retention tanks.

The project development has determined the application of an innovative strategy ensuring optimal management of particularly intense rainfalls events in urban areas.

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
LTER Europe - European Long-Term Ecosystem Research Network	
Long-Term Ecosystem Research (LTER) is an essential component of worldwide efforts to better understand ecosystems. This comprises their structure, functions, and response to environmental, societal and economic drivers as well as the development of management options.	
<i>Category of infrastructure</i>	
Others types of Projects/Possible Nodes -	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Permanent / European contribution to the Global LTER Programme	Lower Danube and Danube Delta – potential to develop LTER sites
<i>Location</i>	
Global	
<i>Proposed objectives</i>	
The long-term objective of LTER-Europe is: <ul style="list-style-type: none"> • to track and understand the effects of global, regional and local changes on socio-ecological systems and their feedbacks to environment and society • to provide recommendations and support for solving current and future environmental problems. The main objectives are: <ul style="list-style-type: none"> • to identify drivers of ecosystem change across European environmental and economic gradients • to explore relations between these drivers, responses and developmental challenges under the framework of a common research agenda, and referring to harmonised parameters and methods 	

<ul style="list-style-type: none"> • to develop criteria for LTER Sites and LTSER Platforms to support cutting edge science with a unique in-situ infrastructure • to improve co-operation and synergy between different actors, interest groups, networks <p>More info on: http://www.lter-europe.net/</p>
Description of the current infrastructure
Physical infrastructure comprising in situ research sites, technical infrastructure, laboratories, monitoring networks, collections, museums, visitor centres, databases etc.
Human resources
>1100
Scientific agenda
<p>To support fundamental research on ecosystem processes, the selection of sites favoured natural or semi-natural ecosystems with core study topics being primary production, population ecology, biogeochemical cycles, organic matter dynamics, disturbances and biodiversity.</p> <ul style="list-style-type: none"> • National networks and the European contribution to the global International Long Term Ecological Research (ILTER) with over half of the ILTER members belonging to LTER-Europe • Research infrastructures (LTER sites and LTSER platforms forming national networks) • Institutions involved in ecological research across the continent and aiming at a virtual European ecological research institute • Researchers in natural sciences, sociology and economy • Scientific site co-ordinators and research platform managers • Long-term data • Research projects • Support for communication and lobbying.

INFRASTRUCTURE Data file

Name of the infrastructure	
MarineGeoHazard – Set-up and implementation of key core components of a regional early-warning system for marine geohazards of risk to the Romanian-Bulgarian Black Sea coastal area	
The project aims for the establishment of a joint regional early-warning system and of a common decision tool, which can support in an efficient manner the emergency managers and decision makers in their activity related to protection of the local communities, environment and assets within the cross-border area, from consequences of natural marine geohazards.	
<ol style="list-style-type: none"> 1. EUXINUS network – the Black Sea regional early warning system to marine-geohazard-marine observatories 2. GeoPontica network – the first on-line geodynamic surveillance network in the entire Black Sea region 	
Category of infrastructure	
Regional Infrastructures	
Status of the project	Category of infrastructure
MarineGeoHazard finished in June 2013. The regional networks are in place and deliver data 24/7	Node to/or part of DANUBIUS
Location	
Black sea	
Proposed objectives	
<ul style="list-style-type: none"> ▪ Define and implement a unified and integrated approach to assessment of marine geohazards of risk for the Romanian-Bulgarian Black Sea cross-border area. 	

<ul style="list-style-type: none"> ▪ Install a real-time, fully automatic detection system comprising of deep Black Sea complex measurement stations (gauges), of on-shore marine seismicity monitoring and digitalized GPS stations. ▪ Implement a common decision-support tool (DST) by provision of unique forecast and assessment software package and development of a joint database of scenarios, to facilitate and support management and mitigation of marine geohazards. ▪ Create the regional technical capability to perform marine seismic measurements. ▪ Prepare joint, updatable databank by integrating the existing national data, the real-time data from deep-sea gauges and the on-line data from sea-level gauges, remote sensing and national seismographic networks and by performing coordinated marine geohazard investigations to fill-in the lacking data. ▪ Cluster and enhance the regional expertise by training the staff and establishment of data exchange platform between national institutions
<p><i>Description of the current infrastructure</i></p> <ul style="list-style-type: none"> • GeoPontica cross-border network, comprising 18 GNSS permanent stations which will monitor 24/7 plate motion and meteorological parameters. • Coastal network of seismic monitoring with 3 systems (Sulina, Constanta and Mangalia, Romania) that will be integrated in the national network for seismic survey and strong motion seismometers - 5 of 5 systems installed, tested and ready to work in Bulgaria • EUXINUS cross-border network – 5 marine buoys equipped with sensors that monitor 24/7 the hydro-meteorological conditions, the physic-chemical parameters of the water column, local seismicity. • 5 extensometers in Bulgaria monitoring active faults. • Coastal gauges. • Ocean bottom seismometers – 5 • 2D shallow seismic acquisition
<p><i>Human resources</i></p> <p>(<20)</p> <p>2 command centres in Romania (GeoEcoMar Constanta) and Bulgaria for operating and maintaining the 2 regional networks.</p>
<p><i>Scientific agenda</i></p> <p>Euxinus - An integrated multi-parameter system that:</p> <ul style="list-style-type: none"> ➤ provide data for tsunamis generation and propagation in the Black Sea ➤ provide long time series of physical and bio-chemical data, regarding the properties of the water masses and local meteo parameters (Humidity, Wind speed, Precipitation, Water current amplitude, Water current direction, Conductivity, Temperature, Pressure, Oxygen concentration, Turbidity, Chlorophyll) <p>Network of mechanical extensometers to monitor relative micro-displacements between both walls of on-shore active faults (Bulgarian area)</p> <p>Mechanical extensometer designed for installation on narrow crack (crack gauging) to monitor relative micro-displacements between both walls of the crack.</p> <ul style="list-style-type: none"> ➤ Displacements in all three directions (X, Y, Z) ➤ Displacement vector in two perpendicular planes: horizontal and vertical ➤ Angular deviation (rotation) ➤ Sensitivity of the instrument is 0.05-0.0125 mm in all three space co-ordinates and 3.2 x 10⁻⁴ in angular deviations ➤ The measurement works on the principle of Moire optical effect of two optical grids <p>Coastal network of seismic monitoring</p> <ul style="list-style-type: none"> ➤ Water level sensors ➤ Radar tide gauge sensor ➤ Pressure sensors ➤ Tide gauge data logger with internal storage capability

- **Communication system**
 - **Seismometers and accelerometers**
 - Network of strong motion seismometers – **Bulgarian area**
 - **Provide information about the strong seismic motions generated by local sources; integration with the marine stations can provide the seismic trigger level of warnings about the population and infrastructure**
 - **Model FBA ES-T is a triaxial package types of earthquake recording applications**
 - **The unit consists of three EpiSensor force balance accelerometer modules mounted orthogonally in one small convenient package**
- “GeoPontica” Network - **18 on-line GNSS (Global Navigation Satellite System) stations dedicated to the geodynamic surveillance of the coastal area: 13 locations in Romania and 5 in Bulgaria.**

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
MARINET - Marine Renewable Infrastructure Network	
<i>Category of infrastructure</i>	
Infrastructure	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Ongoing	MariNet is playing with respect to DANUBIUS as potential user of distributed infrastructure.
<i>Location</i>	
MARINET initiative is a distributed structure, coordinated by Beaufort Research at University College Cork (UCC) in Ireland, part of the Irish Maritime and Energy Resource Cluster (IMERC). There are 29 original partners with a total of 47 locations for their facilities.	
<i>Proposed objectives</i>	
The primary objective of MARINET is the networking of a number of world class research facilities to provide a coherent portfolio of infrastructures which can support the research and development of this emerging industry at all stages of development. Main objective: to accelerate the development of marine renewable energy technologies - wave, tidal & offshore-wind	
<i>Description of the current infrastructure</i>	
MARINET is a network of research centres and organisations that are working together to accelerate the development of marine renewable energy technologies - wave, tidal & offshore-wind. MARINET offers	

periods of free-of-charge access to world-class R&D facilities & expertise and conducts joint activities in parallel to standardise testing, improve testing capabilities and enhance training & networking. A cornerstone of the MARINET initiative is the offer of EC-funded transnational access for those who wish to conduct marine renewables testing at specialised facilities/infrastructures. The suite of facilities that makes up the MARINET network represents the highest quality of facilities in the marine renewable energy sector. The quality of the infrastructure not only depends upon the physical facilities but also includes the capability and experience of the staff.

Human resources

The network has a range of backgrounds in its 29 partners. All of the staff at the infrastructures have extensive experience in the field of offshore renewable energy.

> 1000

It is evident from the size of the network, with 45 infrastructures, that the capability offered to support research in this area is extensive.

Scientific agenda

Key research activities will address specific problematic areas related to systems for wave energy, tidal energy, offshore-wind energy, environmental monitoring and cross-cutting issues:

Wave Energy – New methods related to remote underwater motion measurement, non-intrusive wave field measurement, real time estimation of incident waves.

Tidal Energy – Improvements in the determination of the current velocity field in the rotor catchment area including dynamic effects from turbulence and waves, the resulting dynamic forces in the rotor blades by improving the use of existing (as well as designing new) instrumentation.

Offshore-Wind Energy – develop high resolution offshore wind methodologies and investigate foundation stability issues including developing a pile-sleeve displacement measuring system.

Environmental Monitoring – developing standardised methods and techniques for environmental monitoring in the field.

Cross-Cutting: Electrical – electrical engineering aspects related to dynamic testing of electrical components and systems and new analysis tools for the effects on electrical grid.

Cross-Cutting: Station Keeping – developing technical and economic moorings solutions including wave tank research on low frequency response and field test buoy research on moorings.

These activities involve the development of new instrumentation and methods for operation of the facilities. They also encompass the unique research related to quantitative measurement methods for assessing the environmental impacts to be implemented at the sea-based Research Infrastructures.

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
MARS – The European Network of Marine Institutes and Stations	
<i>Category of infrastructure</i>	
Infrastructure	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Ongoing	Potential collaborator for DANUBIUS based on easy access provided to marine ecosystems and capabilities on research in the sea/ocean field.
<i>Location</i>	
MARS is a network of Europe's marine research institutes and stations. Atlantic Ocean, the North, Irish, Baltic and Adriatic Seas, and the Black and Mediterranean Seas.	
<i>Proposed objectives</i>	
Overarching level of science strategy and policy in marine sciences . In more detail the roles of the MARS network encompass:	
<ul style="list-style-type: none"> • Create awareness of marine stations as an important part of Europe's scientific patrimony • Contact, and lobby, with the managers of European research (e.g. EC, UNESCO, ESF) • Identify relevant science priorities and strategic themes in science policy, and stimulate international interdisciplinary marine science programmes • Create a critical mass and focus for European and Global marine activities • Promote collaboration in spin-off projects • Communicate the products with stakeholders • Support the organisation of symposia, workshops, capacity building and training 	
<i>Description of the current infrastructure</i>	

The MARS is a distributed infrastructure, a network of marine research stations and research vessels (boats, OOS, submersibles etc.) providing easy access to (sample, monitor, observe) marine ecosystems and marine (model) organisms, with a large geographic coverage all over the coastline provided by the many members in 25 European countries; facilities to study organisms in their natural habitat
Human resources
> 100
Scientific agenda
An important element in European marine research to increase the knowledge base is formed by the marine stations. With a long history that in many cases dates back from the 19th century, these stations are very well suited places for research, study and education of the marine realm along the European seashore. In the last decades we have witnessed an exponential growth in marine research and subsequently a tremendous increase in marine expertise, knowledge and data. This has resulted in an inevitable specialisation and maybe even a fragmentation of the marine community. Moreover, nowadays the pressure on, and competition for, resources is increasing, whereby the position of marine stations is more and more at stake, and survival of stations may even be an issue. To overcome this fragmentation and threatening pressure on resources, an adequate marine research strategy with a far broader scope and vision than adopted so far is required. This calls for a strong large scale pan European network of marine research institutes and stations, that is able to deal with, and to direct, the cooperation between marine stations towards the major issues in marine sciences. The MARS network is a foundation created by, and open to, Europe's marine research institutes and stations. For almost two decades MARS provides the platform for such cooperation between directors and heads of marine research stations and institutes. They have been able to develop a successful strategy and policy in marine sciences leading to funding of several major programmes and projects, and facilitated many important new breakthroughs.

INFRASTRUCTURE Data file

Name of the infrastructure	
Meso aqua - a network of leading MESOCOSM facilities to advance the studies of future AQUATIC ecosystems from the Arctic to the Mediterranean. MESOAQUA project is working to create a virtual transnational pelagic mesocosm centre linking mesocosm labs from the Arctic to the Mediterranean.	
Category of infrastructure	
FP 7 project, network of RI's	
Status of the project	Category of infrastructure
Meso aqua ended in December 2012	FP7 I3 (network of laboratories/facilities) – the network is of major importance to DANUBIUS and efforts to develop MESO cosm sites in the Lower Danube & Danube Delta & coastal zone. Potential partners & users, some of the labs have the potential of becoming nodes of DANUBIUS
Location	
Europe, from the Arctic to the Mediterranean	
Proposed objectives	
MESOAQUA offered a number of activities including Networking, Transnational Access to mesocosm facilities and Joint Research from 2009 to 2012. MESOAQUA also serves as a Virtual Transnational Pelagic Mesocosm Center - a portal of information on mesocosm research worldwide. In these four years MESOAQUA offered to European and non-European researchers 3896 person-days of Transnational Access (TA) to its mesocosm facilities. 167 users have conducted 74 projects, where they were leading or contributing to a total of 23 different cooperative international mesocosm experiments.	

More info on: http://mesoaqua.eu/
Description of the current infrastructure
To tackle this serious shortcoming, MESOAQUA will establish a network of mesocosm facilities that will serve to strengthen experimental ecology as a key part of European marine science.
Human resources
>1000
Scientific agenda
Freshwater and marine MESOCosm ecology

INFRASTRUCTURE Data file

Name of the program	
RITMARE – Italian Research for the Sea, National Research Program financed by the Italian Ministry of university and Research	
The aim of RITMARE is to implement what is suggested in the Blue Paper (“ <i>enhance Europe's capacity to face the challenges of globalisation and competitiveness, climate change, degradation of the marine environment, maritime safety and security, and energy security and sustainability.</i> ” It stated further that such a policy “ <i>must be based on excellence in marine research, technology and innovation</i> ”) in terms of research and innovation, by means of a <i>national programme of scientific and technological marine research.</i>	
Category of infrastructure	
Regional Infrastructures	
Status of the project	Category of infrastructure
In progress (started 2012, ends in 2016)	Potential to become Node in DANUBIUS on Lagoons and Po River-Po Delta - Adriatic Sea
Location	
Italy marine research areas	
Proposed objectives	
<p>Ritmare is divided into seven sub-projects:</p> <ol style="list-style-type: none"> 1. Maritime Technologies for the development and construction of a Demonstration Vessel 2. Technologies for Sustainable Fishing 3. Planning of the Maritime Space in Coastal Waters 4. Planning of the Deep Marine Environment and the Open Sea 5. Observation System for the Marine Mediterranean Environment 6. Research, Training and Dissemination Structures 	

7. Interoperable Infrastructure for the Observation Network and Marine Data.

More specifically, RITMARE has been structured around the following three objectives:

- to support integrated policies for the safeguard of the environment (*the health of the sea*);
- to enable sustainable use of resources (*the sea as a system of production*);
- to implement a strategy of prevention and mitigation of natural impacts (*the sea as a risk factor*).

In this framework, RITMARE represents a significant opportunity for the Italian marine scientific community to:

1. Increase synergies between those Research Bodies and University Consortia that are involved in marine research, facilitating the emergence of excellence and promoting cooperation;
2. Strengthen cooperation between the world of research and Italian Industry in two complementary directions: inducing the research community to respond to the needs of industry and encouraging the latter to contribute to a relaunch of the technologies available to marine researchers. This will enable the creation of a new generation of researchers, specifically by means of industry-research joint doctorates;
3. Enhance Italian participation in European projects and initiatives, increasing the number of Italian scientists appointed as project coordinators and promoting participation in joint programmes (e.g. JPIs) where the resources made available by the participants are matched by contributions from the EU.

The objective over the five years is to set up a system for maritime research that is more internally cohesive, better coordinated with the international scientific community and more in tune with Italy's economic and industrial players.

More info on: <http://www.ritmare.it/en/>

Description of the current infrastructure

Italy's research vessels and equipment. ????

Human resources

Coordinated by the Italian National Research Council and involves an integrated effort of most of the scientific community working on marine and maritime issues (OGS, INGV, CONISMA, ENEA), as well as some major industrial groups.

Scientific agenda

1. Maritime Technologies for the development and construction of a Demonstration Vessel
2. Technologies for Sustainable Fishing
3. Planning of the Maritime Space in Coastal Waters
4. Planning of the Deep Marine Environment and the Open Sea
5. Observation System for the Marine Mediterranean Environment
6. Research, Training and Dissemination Structures
7. Interoperable Infrastructure for the Observation Network and Marine Data.
8. Observation System for transitional waters (lagoons and Po Delta).

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
RSO - Rhone Sediment Observatory	
The Rhone Sediment Observatory (RSO) was established in 2009 by the different research teams situated along the length of the river in response to management questions that emerged as part of the “Plan Rhone” framework	
<i>Category of infrastructure</i>	
Others types of Projects/Possible Nodes	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Started in 2009 – first project for 3 years, continued to sustain itself to the current time	Network of institutions involved in the study of sediments at basin scale in the Rhone River – Delta. Major potential to develop both a node and community of users.
<i>Location</i>	
Rhone River – Delta – Sea System	
<i>Proposed objectives</i>	
The RSO has the double objective of improving the scientific understanding of the Rhone River, its sediment flux and fluvial landforms, and informing river managers as they put in place environmental policies. The main research objectives of the RSO are the following :	
<ul style="list-style-type: none"> • Understand the evolution of the channel in order to better make the link between sediment dynamics and flood risk and to promote a new way of thinking about protection of life and property. • Manage the sediment deficit and its impacts, notably on the delta and the Mediterranean coast. • Understand the transfer of sediment and contaminants associated with these sediments to the Mediterranean Sea and to identify the role of different tributaries to the ensemble of the fluvial corridor. 	

- Identify the link between sedimentary forms and aquatic and fluvial habitats in order to protect and restore them.
- Analyse the impact of various practices (dredging, flushing, deforestation) on sediment storage fluvial features.
- Produce, centralize, structure, and archive data on Rhone River sediments in order to optimize understanding and diffusion to managers, decision makers, and citizens.

More info on: <http://www.graie.org/osr/spip.php?rubrique39>

Description of the current infrastructure

Project to develop a network of observatories along the Rhone River – Delta system.

Human resources

>100

Scientific agenda

RSO has set as its general scientific objective to understand the spatial and temporal variability of the Rhone River sediment dynamics using a comparative and multi-scale approach in order to better understand the influence of different factors and to characterize the evolutionary trajectory of the system. In order to meet this ambitious goal, several research axes have been defined with the following objectives :

- Quantify the transfer of suspended and bedload sediment at different time-scales.
- Quantify the flux of organic and mineral contaminants associated with the sediments.
- Study the relationship between fluvial dynamics and morphodynamic processes in the delta and littoral zone, and calibrate morphodynamic models for predicting coastal evolution.
- Establish a sediment budget that integrates longitudinal discontinuities and the role of management.
- Characterize sediment storage (reservoirs and alluvial margins) and establish a classification of sediment filling. Understand the repartition of stored hydrophobic pollutants and remobilization phenomenon.
- Model flow and evaluate the hydrologic and hydraulic consequences of recent sediment history on the river corridor.
- analyse the effects of climate change on the fluvial-sedimentary dynamics and on the fluvial-coastal interface.

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
SEADATANET – Pan-European Infrastructure for Ocean & Marine Data Management	
<i>Category of infrastructure</i>	
Pan European e-infrastructure	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Ongoing project	Potential collaborator and even node for developed DANUBIUS e-component.
<i>Location</i>	
Distributed e-infrastructure. SeaDataNet brings together a unique group of major institutes and marine data centres from countries bordering the North-East Atlantic, and its adjacent seas: the Mediterranean, the Black Sea, the Baltic, the North Sea and the Arctic	
<i>Proposed objectives</i>	
<p>Managing the large and diverse data sets collected by the oceanographic fleets and the automatic observation systems; providing standards and tools</p> <p>Networking and enhancing the existing infrastructures, national oceanographic data centres of 35 countries, active in data collection.</p> <p>Networking of professional data centres, in a unique virtual data management system in order to provide integrated data sets of standardized quality on-line.</p> <p>Providing up-to-date and high quality access to ocean and marine metadata, data and data products by : setting, adopting and promoting common data management standards; realizing technical and semantic interoperability with other relevant data management systems and initiatives on behalf of science, environmental management, policy making, and economy</p>	
<i>Description of the current infrastructure</i>	
SEADATANET brings together institutes and marine data centres from countries bordering the North-East Atlantic, and its adjacent seas: the Mediterranean, the Black Sea, the Baltic, the North Sea and the Arctic. National Oceanographic Data Centres, Designated National Agencies for international data exchange and Satellite Data Centres represent the backbone of the marine data and information infrastructure.	
<i>Human resources</i>	

No available data
<i>Scientific agenda</i>
Development of software tools, services and interoperability solutions: standards and tools Development of value added products necessary to SeaDataNet users; development and regular updating of standard data products for maritime regions: the Arctic waters, the North Sea, the North Atlantic Ocean, the Baltic Sea, the Mediterranean Sea and the Black Sea Training, Education and capacity building for transfer of practices and tools and for overall data management capacity building at IOC-IODE's training centre.

D. European Programmes/Initiatives

INFRASTRUCTURE Data file

<i>Name of the initiative</i>	
ACQUEAU– Global Ocean Observing System	
ACQUEAU is one of the 7 clusters of the EUREKA network. It is a market and industry driven initiative, joined by more than 20 countries and 100 companies across Europe and beyond. The goal is to promote transnational collaboration for developing innovative projects in water technologies.	
<i>Category of infrastructure</i>	
EUREKA Programs/Project	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Permanent programme	Major importance for cooperation with DANUBIUS – as it is an innovative cluster and joint actions must be planned.
<i>Location</i>	
Europe	
<i>Proposed objectives</i>	
ACQUEAU focus on 9 main technological areas: water resources, water treatment, water distribution, customer requirements, agriculture, industry, urban drainage and wastewater collection, wastewater treatment, biosolids. The overall objective of tackling challenges are: <ul style="list-style-type: none"> • Reducing the water footprint • Improving water resources management and accessibility • Managing with aging or insufficient infrastructures • Coping current social, financial and global issues facing the water sector. More info on: http://www.acqueau.eu/about-acqueau/	
<i>Description of the current infrastructure</i>	
It has the capacity to respond and it will be dependent on the development of faster and more reliable analytical tools and on-line quality monitoring sensors, improvements in IWRM and DSS, the capacity to process a large amount of data coming from different sources and finally modelling for both forecasting and control purposes.	

<i>Human resources</i>
NA
<i>Scientific agenda</i>
ACQUEAU is an intermediary between project participants and funding agencies, the mission is to deliver the EUREKA Σ label, which facilitates access to national funding for participants. The label is granted after an extensive technical evaluation process called Open Call. The internationally recognized Σ EUREKA label adds value to R&D project by certifying its innovative potential in terms of market success, financial viability and high returns on investment. Project participants thus gain a crucial competitive edge in their dealings with financial, technical and commercial partners.

INFRASTRUCTURE Data file

<i>Name of the initiative</i>	
Sea Basin Strategy: Black Sea	
The Black Sea Synergy launched by the EU is an initiative for regional cooperation with and between the countries surrounding the Black Sea. It was designed as a flexible framework to ensure greater coherence and policy guidance while also inviting a more integrated approach.	
<i>Category of infrastructure</i>	
Main Initiatives and Projects in the Black Sea Area	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Elaborated since 2007, strengthened by the EU MSFD	It is a major strategy reflected by an EC programme. DANUBIUS should be developed in conformity with the objectives and goals of this Synergy.
<i>Location</i>	
Black Sea basin, Europe	
<i>Proposed objectives</i>	
Marine and maritime-related EU-funded projects can be found across various policy areas and are financed by various EU funds. Especially the Instrument for Pre-accession Assistance (IPA) and the European Neighbourhood and Partnership Instrument (ENPI) provide financial support for actions in this region. The latter finances the Black Sea Basin Joint Operational Programme 2007-13 , which aims to contribute to a stronger and sustainable economic and social development of the region.	
The programme's three specific objectives are:	
<ul style="list-style-type: none"> • Promoting economic and social development in the border areas • Working together to address common challenges • Promoting local, people-to-people cooperation 	
More info available: http://eeas.europa.eu/blacksea/index_en.htm	
<i>Description of the current infrastructure</i>	
NA	
<i>Human resources</i>	
NA	
<i>Scientific agenda</i>	

COMMISSION Data file

<i>Name of the commission</i>	
The Commission on the Protection of the Black Sea Against Pollution The Commission on the Protection of the Black Sea Against Pollution (the Black Sea Commission or BSC) via its Permanent Secretariat is the intergovernmental body established in implementation of the Convention on the Protection of the Black Sea Against Pollution (Bucharest Convention), its Protocols and the Strategic Action Plan for the Environmental Protection and Rehabilitation of the Black Sea (latest version adopted in 2009).	
<i>Category of infrastructure</i>	
Major Initiatives and Projects in the Danube and Black Sea Area	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Came into force in 1994	DANUBIUS should become data and policy provider for the BSC. As BSC acknowledges the Danube as main pollutant source for the Black Sea, DANUBIUS should take into account the requirements of the BS Commission and try to offer viable solutions to fulfil these goals.
<i>Location</i>	
Black Sea Area – Europe + Asia	
<i>Proposed objectives</i>	
<p>The main functions of the Black Commission's functions are defined in Article 18 of the Convention as:</p> <ol style="list-style-type: none"> 1. <i>Promote the implementation of this Convention and inform the Contracting Parties of its work.</i> 2. <i>Make recommendations on measures necessary for achieving the aims of this Convention.</i> 3. <i>Consider questions relating to the implementation of this Convention and recommend such amendments to the Convention and to the Protocols as may be required, including amendments to Annexes of this Convention and the Protocols.</i> 4. <i>Elaborate criteria pertaining to the prevention, reduction and control of pollution of the marine environment of the Black Sea and to the elimination of the effects of pollution, as well as recommendations on measures to this effect.</i> 5. <i>Promote the adoption by the Contracting Parties of additional measures needed to protect the marine environment of the Black Sea, and to that end receive, process and disseminate to the</i> 	

Contracting Parties relevant scientific, technical and statistical information and promote scientific and technical research.

6. Cooperate with competent international organizations, especially with a view to developing appropriate programmes or obtaining assistance in order to achieve the purposes of this Convention.

7. Consider any questions raised by the Contracting Parties.

8. Perform other functions as foreseen in other provisions of this Convention or assigned unanimously to the Commission by the Contracting Parties.

More info on: <http://www.blacksea-commission.org/>

Description of the current infrastructure

Has major decision making role in developing and implementing the Black Sea Strategic Action Plans and measures to be implemented by the Riparian countries in order to have a healthier environment in the Black Sea. Has 6 members, the ministers of the environment of the 6 Black Sea riparian countries. The BSC receives the environmental quality data on the Black Sea waters, as well as of tributary rivers, also the coastal settlements.

Human resources

Members of the Commission on the Protection of the Black Sea Against Pollution

Currently the Commission is:

- **Chairman - Mr. Ercan Tiras, Ministry of Environment and Urbanization, Turkey**
- **Commissioner - Ms Ivelina Vasileva, Ministry of Environment and Water, Bulgaria**
- **Commissioner - Ms. Nino Tkhilava, Ministry of Environment Protection and Natural Resources of Georgia, Georgia**
- **Commissioner - Mr. Ionut-Ciprian Iuga, Ministry of Environment and Forests, Romania**
- **Commissioner - Ms. Natalia Tretyakova, Ministry of Natural Resources, Department for International Cooperation, Russian Federation**
- **Commissioner - Mr. Ercan Tiras, Ministry of Environment and Urbanization, Turkey**
- **Commissioner - Mr. Oleksandr Bon, Ministry of Environmental Protection of Ukraine, Ukraine**

Black Sea Directory:

1 Chairman

6 members, the ministers of the environment of the 6 Black Sea riparian countries: Bulgaria, Georgia, Romania, Russian Federation, Turkey, Ukraine.

Advisory Groups on:

CBD - Conservation of Biodiversity	Boris Alexandrov , Ukraine
FOMLR - Fisheries and Marine Living Resources	Simion Nicolaev , Romania
ICZM - Integrated Coastal Zone Management	Ekaterina Antonidze , Russian Federation
ESAS - Environmental and Safety Aspects of Shipping	Adrian Alexe , Romania
LBS - Land Based Sources	Tulay Kirimhan Salman , Turkey
PMA - Pollution Monitoring and Assessment	Radu Mihnea , Romania
IDE - Information and Data Exchange	To be elected

Scientific agenda

Mission

Acting on the mandate of the Black Sea countries (Bulgaria, Georgia, Romania, Russian Federation, Turkey and Ukraine) which on the 21-04-1992, signed and shortly thereafter ratified the [Convention on the Protection of the Black Sea Against Pollution](#), the Commission on the Protection of the Black Sea Against Pollution (the Black Sea Commission) implements the provisions of the Convention and the [Black Sea Strategic Action Plan](#).

Main Challenges

- Combating Pollution from land-based sources and maritime transport,
- Achieving sustainable management of marine living resources,
- Pursuing sustainable human development.

Main Policy Measures

- Pollution reduction from rivers, priority pollution sources, vessels; regulatory and legal tools
- Conservation of biological diversity, expansion of protected territories, promotion of responsible fisheries
- Introduction of ICZM, promotion of EIA environmental audit, ecologically sound technologies, public involvement in environmental decision making, green tourism and sustainable livelihood

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
<p>CEEOP – Copernicus, former GMES (Global Monitoring for Environment and Security), is the European Programme for the establishment of a European capacity for Earth Observation.</p> <p>The Copernicus programme is coordinated and managed by the European Commission. The development of the observation infrastructure is performed under the aegis of the European Space Agency for the space component and of the European Environment Agency and the Member States for the in situ component. Copernicus consists of a complex set of systems which collect data from multiple sources: earth observation satellites and in situ sensors such as ground stations, airborne and sea-borne sensors. It processes these data and provides users with reliable and up-to-date information through a set of services related to environmental and security issues.</p>	
<i>Category of infrastructure</i>	
EC Programme	
<i>Status of the project</i>	<i>Category of infrastructure</i>
EC Permanent programme, operational since 1998, initially known as GMES, operational also in the forthcoming years	DANUBIUS must be developed in harmony with COPERNICUS – to become data provider as well as collaborator / part of the EU environmental monitoring data collection system.
<i>Location</i>	
Europe (funding) + global scale	
<i>Proposed objectives</i>	
<ul style="list-style-type: none"> • Land Monitoring • Marine Monitoring • Atmosphere Monitoring • Emergency Management • Security • Climate Change <p>More info on: http://www.copernicus.eu/</p>	
<i>Description of the current infrastructure</i>	
<ul style="list-style-type: none"> • several Earth observation satellites • a multitude of sensors on the ground, at sea or in the air 	
<i>Human resources</i>	
>1000	
<i>Scientific agenda</i>	
<p>The services have reached different degrees of maturity. Some are already operational (land monitoring and emergency management) while others are still in a pre-operational mode (atmosphere monitoring and marine monitoring) or in a development phase (climate change monitoring and services for security applications).</p> <p>Through the different thematic areas it addresses (land, marine, atmosphere, climate change, emergency management and security), Copernicus supports applications in a wide variety of domains. These include:</p> <ul style="list-style-type: none"> • urban area management • sustainable development and nature protection • regional and local planning • agriculture, forestry and fisheries • health • emergency management • infrastructure, transport and mobility • tourism 	

INFRASTRUCTURE Data file

<i>Name of the initiative</i>	
DABLAS – The Danube Black Sea Task Force was set up in 2001 with the aim to provide a platform for cooperation to ensure the protection of water and water-related ecosystems in the Danube and the Black Sea.	
<i>Category of infrastructure</i>	
Major Initiatives and Projects in the Danube Area	
<i>Status of the project</i>	<i>Category of infrastructure</i>
In Progress (but no news since 2011)	First EU initiative towards the coordination of R&D activities in the field of water quality in the Danube – Black Sea Macrosystem. DANUBIUS should be developed in close collaboration with DABLAS – but no news has come from DABLAS since 2011.
<i>Location</i>	
Danube River Basin and Black Sea Region	
<i>Proposed objectives</i>	
<p>Its overall goal is to develop financing mechanisms for the implementation of investment projects for pollution reduction and the rehabilitation of ecosystems in the wider Black Sea region.</p> <p>The DABLAS Task Force sought to bring cohesion to the process of financing of technical assistance and investments, by:</p> <ul style="list-style-type: none"> • identifying priority objectives common to the region as a whole, • encouraging a more strategic focus to the use of available financing, and • ensuring co-ordinated action between all financial instruments operating in the region. <p>The aim was to further strengthen and disseminate the experience available in the beneficiary countries in the identification, preparation and financing of infrastructure investment projects in urban wastewater treatment.</p> <p>More info on: http://www.icpdr.org/main/activities-projects/dablas.</p>	
<i>Description of the current infrastructure</i>	
<p>The ICPDR-DABLAS database was revised in 2005 to include municipal, industrial, agro-industrial, wetland restoration, and agricultural & land use projects. A total of 354 investment projects were assessed in 11 countries in the Danube River Basin (BA, BG, RS, CZ, HR, HU, MD, RO, SI, SK, UA), and an additional 41 projects were identified in Austria (21) and Germany (20). Municipal sector projects (191) account for more than 50% of the total number of investment projects. There are 77 industrial and 32 agro-industrial projects; combined, these two point-source sectors represent 30% of the total. Wetlands and Land Use sector have 40 and 14 projects, respectively. The database was developed as an interactive tool to be used for evaluating remaining needs for investments and policy measures on a regional, national, and sector basis. The ICPDR DABLAS database is linked with the ICPDR Emission inventories database.</p>	
<i>Human resources</i>	
The DABLAS Task Force comprises representatives of the countries in the region, the ICPDR Secretariat, the Black Sea Commission, International Financing Institutions (IFIs), the EC, interested EU Member States, other bilateral donors and other regional/international institutions. Also the civil society is involved in the various tasks carried out by the DABLAS Task Force.	
<i>Scientific agenda</i>	
Consulting in the field of Integrated River Basin and the implementation of the Water Framework Directive in the Danube – Black Sea macrosystem.	

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
Danubia – Integrated simulation model for the climate change impact on activities related to the Upper Danube	
<i>Category of infrastructure</i>	
Major Initiatives and Projects in the Danube Area	
<i>Status of the project</i>	<i>Category of infrastructure</i>
<i>Part of GLOWA Project (Impact of Global Change on the Upper Danube)</i>	Complex model – adding physical issues to socio-economic ones. May be of interest when developing e-infrastructures aspects of DANUBIUS – as complex model design.
<i>Location</i>	
Danube River Basin	
<i>Proposed objectives</i>	
<p>The aim of GLOWA-Danube is to investigate with different scenarios the impact of change in climate, population and land use on the water resources of the Upper Danube and to develop and evaluate regional adaptation strategies. For this purpose the decision support system DANUBIA was successfully set up within the first and second project stage (2001-2006).</p> <p>More info on: http://www.glowa-danube.de/eng/projekt/projekt.php</p>	
<i>Description of the current infrastructure</i>	
<p>DANUBIA is a coupled simulation model. It includes for the first time model components for natural science as well as socio-economic processes and their interactions. With the intension of being predictive DANUBIA uses results of regional climate models for predictions on Climate Change. Physical and physiological components describe natural processes (hydrology, hydro-geology, plant physiology, yield, and glaciology). For the simulation in the included sectors (farming, economy, water supply companies, private households and tourism) DANUBIA uses deep multi-actors models which represent the decisions of the involved actors based on the structure of societies, their framework as well as their interests. All components of DANUBIA run parallel on an inexpensive LINUX-cluster.</p> <p>DANUBIA was carefully and successfully validated with comprehensive data sets of the years 1970-2005 and is now available in the third stage of the project for common use for project researchers and stakeholder.</p> <p>DANUBIA will be made available as "Open Source" at the end of the third project stage in 2010 and will particularly serve decision makers from policy, economy, and administration as tool for a foresighted planning of water resources against the background of Global Change.</p>	
<i>Human resources</i>	
1 coordinator and and 1 partener for each of the points in the scientific agenda	
<i>Scientific agenda</i>	
<ul style="list-style-type: none"> • Hydrology / Remote Sensing • Stakeholder participation • Meteorology • Informatics • Groundwater / Water Supply • Ecosystems / Plant Ecology • Glaciology • Environmental Psychology • Environmental Economics • Tourism Research • Human Capacity Building • Agricultural Economics • Regional Climate Modelling • Water Resources Management 	

INFRASTRUCTURE Data file

<i>Name of the initiative/association</i>	
IAD – International Association for Danube Research	
<i>Category of infrastructure</i>	
Major Initiatives and Projects in the Danube Area	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Operational since 1957	Major network of potential users for DANUBIUS
<i>Location</i>	
Danube River Basin	
<i>Proposed objectives</i>	
<p>The International Association for Danube Research (IAD) was founded in 1956 and is the longest existing international scientific network in the Danube Region. IAD is an Association according to Austrian law with the goal of promoting and coordinating activities in the fields of limnology, water management, water protection and sustainable development in the Danube River basin (current structure and contact). More info on: http://www.iad.gs/</p>	
<i>Description of the current infrastructure</i>	

<i>Human resources</i>	
<p>1 President 1 Vice-president 1 Secretary</p> <p>One representative from each of the following countries: Germany, Switzerland, Austria, Czech Republic, Slovakia, Hungary, Croatia, Serbia, Romania, Bulgaria, Moldavia, Ukraine</p> <p>Several expert groups on: Chemistry/Physics, Biotic Processes, Hygienics/Microbiology, Phytoplankton/Phytobentos, Macrophytes, Floodplain Ecology, Zooplankton/Zoobenthos, Fishery/Fish Biology, Saprobiology, Ecotoxicology, Fore-Delta/Delta, Sustainable Development.</p>	
<i>Scientific agenda</i>	
<ul style="list-style-type: none"> • Limnology • Water management • Water protection • Sustainable development in the Danube River basin <p>Research topics:</p> <ul style="list-style-type: none"> • Development of ecological river concepts and models • Eco-morphological mapping of the River Danube and its tributaries to identify areas needing restoration • Preservation or promotion of biodiversity by ecological improvements of the habitats of threatened and rare species • Studies of fish-ecology to ensure sustainable fishery practices • Interactions between river system, floodplains, and wetland areas • Development and standardization of additional chemical parameters for water quality monitoring • Quality management in data acquisition for improved comparability and evaluation of research • Mapping of the biological quality of waters according to the saprobic system • Long-term studies on the development of invertebrate stocks of Danube ecosystems • Microbiological and hygienic assessment of the river • Investigation and mathematical modelling of biological transformations of material and interactions between river structures, water quality, and biocoenoses • Definition of quality targets for local uses of river water on the Middle and Lower Danube • Nutrient content and trophic state of the River Danube with special reference to the delta and the adjacent part of the Black Sea • Inventory of aquatic vegetation in the delta, in the main channel, and in the floodplain waters of the River Danube 	

- Concentrations and ecotoxicity of contaminants in sediments and suspended solids
- Application of ecological short-term and long-term tests for monitoring contaminant concentrations and investigation of lethal and chronic impacts on organisms (bio-accumulation)
- Implementation of automatic bioassay systems for the protection of biocoenoses and early recognition of pollution spills

INFRASTRUCTURE Data file

<i>Name of the initiative/commission</i>	
ICPDR – International Commission for the Protection of the Danube River works to ensure the sustainable and equitable use of waters and freshwater resources in the Danube River Basin.	
<i>Category of infrastructure</i>	
Major Initiatives and Projects in the Danube Area – association of Governments of the Danube countries (ministries of the Environment).	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Operational for over 2 decades	DANUBIUS may become a major data and solution provider towards ICPDR, while ICPDR would be one of the major users of DANUBIUS facilities.
<i>Location</i>	
The Danube River Basin	
<i>Proposed objectives</i>	
<ol style="list-style-type: none"> 1. Ensure sustainable water management 2. Ensure conservation, improvement and rational use of surface waters and ground water 3. Control pollution and reduce inputs of nutrients and hazardous substances 4. Control floods and ice hazards <p>More info on: http://www.icpdr.org/main/</p>	
<i>Description of the current infrastructure</i>	
Research infrastructure of the institutions from the signatory countries. ICPDR Databases (water quality, joint surveys)	
<i>Human resources</i>	
<p>1 secretariat in Vienna</p> <p>Participants: Austria, Bulgaria, Croatia, the Czech Republic, Germany, Hungary, Moldova, Romania, Slovakia, Slovenia and Ukraine – and the European Community.</p> <p>There are several experts groups:</p> <ul style="list-style-type: none"> • Expert group on river basin management • Expert group on pressures and measures • Expert group on monitoring and assessment • Expert group on Flood Protection • Information Management and Geographical Information System Expert Group • Accident Prevention and Control Expert Group • Public Participation Expert Group • Strategic Expert Group 	
<i>Scientific agenda</i>	
<ul style="list-style-type: none"> • Safeguarding the Danube's Water resources for future generation • Naturally balanced waters free from excess nutrients • No more risk from toxic chemicals • Healthy and sustainable river systems • Damage-free flood 	

INFRASTRUCTURE Data file

<i>Name of the initiative</i>	
JPI Climate	
<i>Category of infrastructure</i>	
JPI – Joined Programming Initiative	
<i>Status of the project</i>	<i>Category of infrastructure</i>
In progress	Joint programming initiative of funding agencies in Europe that aims also at proposing excellent pan-EU infrastructures to be jointly developed as best practice exercises.
<i>Location</i>	
Europe	
<i>Proposed objectives</i>	
<p>The main objective of this JPI Climate programme is bringing together existing and developing new excellent scientific knowledge that is needed to assist practitioners to adequately transform society towards climate resilience and consequently providing integrated climate knowledge and decision support services for societal innovation.</p> <ul style="list-style-type: none"> • aims to respond to the knowledge needs of policy and the European society at large to address climate change. • provides a platform to align national research priorities according to a jointly agreed Strategic Research Agenda (SRA) with the aim of complementing and supporting initiatives at the European level (ERANET's, FP8, Climate KIC, ESFRI Projects). • facilitates the coordination, collaboration and exploitation of synergies in climate change research, learning and innovation while working against fragmentation and duplication of efforts. • connecting different disciplinary approaches in natural and social sciences leading to interdisciplinary research efforts of higher quality and relevance. • connecting top researchers and research groups from different European countries, leading to high quality and efficient research efforts, long term collaborations and a stronger global position. • connecting scientific insights with the demands of policy makers, decision makers and other stakeholders from local to international levels, leading to more effective policies. <p>More info on: http://www.jpi-climate.eu</p>	
<i>Description of the current infrastructure</i>	
No available data	
<i>Human resources</i>	
(>100)	
<i>Scientific agenda</i>	
<ul style="list-style-type: none"> • Moving towards Reliable Decadal Climate Predictions • Researching Climate Service Development and Deployment • Sustainable Transformations of Society in the Face of Climate Change • Improving Tools for Decision-Making under Climate Change 	

INFRASTRUCTURE Data file

<i>Name of the initiative</i>	
<p>JPI Oceans The Joint Programming Initiative Healthy and Productive Seas and Oceans (JPI Oceans) is a coordinating and integrating platform, open to all EU Member States and Associated Countries. Aim: To increase the value of relevant national and EU R&D and infrastructure investments through a combined effort of jointly planning, implementing and evaluating national research programmes.</p>	
<i>Category of infrastructure</i>	
JPI – Joined Programming Initiative	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Pilot actions	Joint programming initiative of funding agencies in Europe that aims also at proposing excellent pan-EU infrastructures to be jointly developed as best practice exercises. DANUBIUS (together with DREAM) has obtained the approval from the management board of JPI WATER to be main RI to be developed during the FP7 WatEUR project, in coordination with JPI OCEANS.
<i>Location</i>	
Europe	
<i>Proposed objectives</i>	
<p>While bringing together the interested Member States and Associated Countries JPI Oceans aims to add value by:</p> <ul style="list-style-type: none"> • avoiding fragmentation and unnecessary duplication • planning common and flexible initiatives • facilitating cooperation and foresight • establishing efficient mechanisms for interaction and knowledge transfer between the scientific community, industry & services, and policy makers at high level in order to solve the grand challenges more effectively. <p>In its role as a coordination platform, JPI Oceans will focus on making better and more efficient use of national research budgets, which represent 85% of the marine-maritime funding within Europe. One of JPI's goals is to develop joint research programs in which countries can be involved on a voluntary basis (variable geometry). Participating countries will also decide what contribution to make: this may include institutional, project-related or new funding.</p> <p>10 objectives:</p> <ol style="list-style-type: none"> 1. Foster enabling cross-cutting marine technologies across the maritime sectors 2. Foster the marine bio economy in relation to new products, services and jobs 3. Create the best enabling environment to maximise the development of marine renewable energy 4. Develop the necessary knowledge and technologies to conquer the new deep-sea frontier 5. Understand and mitigate impact of climate change and pressure from human activities on the marine environment, to reach GES (Good Environmental Status) of our seas by 2020 6. Improve understanding of marine ecosystems and their processes, in particular delivery of ecosystem services and the impacts of human activities 7. Understand climate change impact on coastal areas and design marine and maritime structures and activities, to optimise mitigation and significantly reduce costly damages 8. Develop and sustain infrastructure to support an integrated data and information base enabling industrial development and supporting maritime governance 9. Develop a research to policy mechanism, in particular to support of the MSFD and MSP and Management 10. Foster the inter-disciplinary human capacities that are necessary to the JPI goals <p>More info on: http://www.jpi-oceans.eu/prognett-jpi-oceans/About_us/1253960389448</p>	
<i>Description of the current infrastructure</i>	
<ul style="list-style-type: none"> • Research vessels and their underwater vehicles • In situ data acquisition systems 	

- | |
|---|
| <ul style="list-style-type: none">• Satellites• Marine data centres• Marine land-based facilities and in situ testing sites for ocean engineering• Experimental facilities |
|---|

<i>Human resources</i>

100-1000

<i>Scientific agenda</i>

- | |
|--|
| <ul style="list-style-type: none">• Marine Environment• Marine related Technologies• Climate Change• Human impact on marine environment |
|--|

INFRASTRUCTURE Data file

<i>Name of the initiative</i>	
JPI Water Aims at tackling the ambitious challenge of achieving sustainable water systems for a sustainable economy in Europe and abroad through a multidisciplinary approach which encompasses economy, ecology, society, technology.	
<i>Category of infrastructure</i>	
JPI – Joined Programming Initiative	
<i>Status of the project</i>	<i>Category of infrastructure</i>
WatEur – Tackling European Water Challenges (Jan. 2013-Dec. 2015).	Joint programming initiative of funding agencies in Europe that aims also at proposing excellent pan-EU infrastructures to be jointly developed as best practice exercises. DANUBIUS (together with DREAM) has obtained the approval from the management board of JPI WATER to be main RI to be developed during the FP7 WatEUR project, in coordination with JPI OCEANS.
<i>Location</i>	
Europe	
<i>Proposed objectives</i>	
<p>Member States and Associated Countries will move into the direction of defining and implementing a common research agenda with multi-annual commonly decided activities and funding mechanisms. Research on water must be increased with the objective to serve the needs of people involved in management and decision-making as well as providing information and results to wider audiences.</p> <ul style="list-style-type: none"> • Prevention of negative effects of the bio-based economy on the water system. • Searching sustainable balance in the ecosystem. • Joint research to improve knowledge on new contaminants like viruses and hormones, and their impact on water quality and societal well-being. • Dealing with a growing scarcity of fresh water that will emphasize the need of closing the water cycle. • Involving water end users for effective RDI results uptake. • Attaining critical mass of research programmes. Involve at least two thirds of the public National water RDI investment in Europe. • Reaching effective, sustainable coordination of European water RDI. • Harmonising National water RDI agendas in Partner Countries. • Harmonising National water RDI activities in Partner Countries. Develop a catalogue of jointly programmed activities whose global budget amounts to at least 20 % of the total water RDI budget of partner Programmes. • Supporting European leadership in science and technology. <p>More info on: http://www.waterjpi.eu</p>	
<i>Description of the current infrastructure</i>	
<i>Human resources</i>	
(>100)	
<i>Scientific agenda</i>	
<p>In line with the JPI objectives, research questions can be divided in the four categories:</p> <ul style="list-style-type: none"> • Maintaining Ecosystem Sustainability • Developing safe water systems for the citizens • Promoting competitiveness in the water industry • Implementing a water wise bio based economy • Closing the water cycle gap 	

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
LOICZ – Land Ocean Interactions in the Coastal Zone	
<i>Category of infrastructure</i>	
Initiative/policy	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Ongoing project	LOICZ is potential collaborator for DANUBIUS, integrating mutual interest and experiments in the field of ecosystems adaptability to global changes.
<i>Location</i>	
Distributed initiative; is targeting: Arctic Coasts; Islands at Risk; River-Mouth Systems, including Deltas and Estuaries; Urbanization in Coastal Zones	
<i>Proposed objectives</i>	
<p>LOICZ is working to support sustainability and adaptation to global change in the coastal zone.</p> <p>LOICZ aims to provide science that contributes towards understanding the Earth system in order to inform, educate and contribute to the sustainability of the world’s coastal zone. Therefore LOICZ seeks to inform the scientific community, policymakers, managers and stakeholders on the relevance of global environmental change in the coastal zone.</p> <p>LOICZ’s objectives: include developing and testing integrated multidisciplinary (natural+economic+social) methods to analyze the environmental and social interactions and feedbacks governing coastal system status and changes.</p>	
<i>Description of the current infrastructure</i>	
<p>LOICZ has implemented a distributed organizational structure by establishing Regional Nodes. Today, regional project offices in Singapore (Southeast Asia Regional Node), Sri Lanka (South Asia Regional Node), and China (East Asia Regional Node) promote and coordinate regional and local contributions to the global research, thus facilitating links and exchanges between international, national and local science and policy.</p>	
<i>Human resources</i>	
No data available	
<i>Scientific agenda</i>	
<p>Designing, promoting and supporting targeted LOICZ research activities (largely in form of the core (Hotspots) and cross cutting activities) to support sustainability and adaptation to global change in the coastal zone</p> <ul style="list-style-type: none"> • Scientific Themes I. Vulnerability of Coastal Systems and Hazards to Society: <ul style="list-style-type: none"> ✓ Effects of non-linearities and uncertainties on the vulnerability of coastal societies and ecosystems to global change hazards ✓ Communities stakes in the coastal zone including resources, goods and services ✓ External and internal factors of human and coastal vulnerability. II. Implications of Global Change for Coastal Ecosystems and Sustainable Development <ul style="list-style-type: none"> ✓ Characterizing the nature and location of coastal environmental and social system boundaries, and their tapestry of interactions ✓ Assessing system sensitivity and robustness to reveal critical thresholds for changes to biogeochemical and/or hydrological cycles that cause permanent state changes ✓ Quantifying human impacts on coastal areas using natural science methods and ecological-economic indicators ✓ Identifying options to design and manage system robustness, through a scenario approach that considers critical thresholds and sustainability 	

- ✓ Evaluating the effects of changing inputs on ecosystem health and coastal zone goods and services, including the links between biological functioning, geochemistry and human drivers.
- III. Human Influences on the River Basin Coastal Zone Interactions**
- ✓ Disentangling the cause-effect relationships of those impacts and human activities which are strictly coast or river basin-oriented (regional), from those which result from wider external pressures on the river-coast system;
 - ✓ Modeling coupled human-ecosystems in river basins using the Driver-Pressure-State-Impact-Response (DPSIR) approach and assessment framework in order to identify links between major anthropogenic and natural pressures in catchments that affect coastal ecosystems
 - ✓ Developing scenarios that predict future coastal change due to land use, climate change and management options
 - ✓ Evaluating societal and institutional dimensions and changes in order to establish basin-coastline linkages.
- IV. Biogeochemical Cycles in Coastal and Shelf**
- ✓ Quantifying material transport within and across the continental shelf, transformation of materials within the water column and sediments, storage of materials in the coastal zone and air-sea exchange
 - ✓ Assessing regional differences and understanding why some shelf waters are more resilient or resistant to change than others
 - ✓ Defining the terrestrial boundary condition for nutrient fluxes by better integration of river basin information, including sediment dynamics and organic inputs
 - ✓ Developing regional budgets and flux estimates for shelf and coastal waters in order to understand and predict the impacts of global and basin-scale changes in ocean climate and biogeochemical cycles.
- V. Towards Coastal system Sustainability by Managing Land-Ocean Interaction**
- ✓ Considering how temporal and spatial scales, including the institutional dimensions, affect scientific and management perspectives of coastal change
 - ✓ Classifying and comparing different settings of drivers/pressures in coastal system state interactions and existing responses using typologies
 - ✓ Linking natural, economic and human dimension sciences into ‘futures’ scenarios
 - ✓ Developing management response options and participation derived from ‘futures’ scenarios, developed and assessed in collaboration with relevant policy, management and investment communities.
- Cross-cutting activities:
 - ✓ Ecological economics
 - ✓ Modeling and assessments
 - ✓ Capacity Building
 - ✓ Coastal Governance
 - ✓ Social-ecological systems
 - Others
 - Designing and implementing targeted or open scientific workshops and congresses to work on a specific question or a subset of those along the LOICZ scientific priorities
 - Clustering and synthesizing existing or proposed scientific research activities on local, national regional and global scale primarily through the network of affiliated projects
 - Encouraging and promoting as well as supporting, scientific synthesis
 - Disseminating, and communicating scientific results and knowledge products
 - Capacity building and training
 - Congresses and workshops

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
Mediterranean Wetlands Observatory (MWO)	
<i>Category of infrastructure</i>	
Major Initiative in Europe	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Permanent program	MedWet is a potential collaborator for DANUBIUS based on mutual contribution to knowledge development in wetlands.
<i>Location</i>	
Mediterranean Region	
<i>Proposed objectives</i>	
<p>MedWet aims to provide effective long-term assessment of the status and trends in these valuable Mediterranean ecosystems, in order to raise awareness amongst decision-makers and the public at large as to why they are worth protecting</p> <ol style="list-style-type: none"> 1. Provide timely and quality information on Mediterranean wetlands status and trends. 2. Track threats to Mediterranean wetlands and identify actions to promote their protection, wise use and restoration. 3. Assess the role of Mediterranean wetlands in the Mediterranean context of sustainable development. <p>These three objectives are inter-related. The first objective encompasses the knowledge of the status and trends of Mediterranean wetlands. This objective provides information on a status that is a consequence of internal and external drivers and pressures on wetlands. The second objective is to analyse the causes of the changing status and trends of wetlands.</p> <p>The third objective is to assess how Mediterranean wetlands are considered and treated within the context of sustainable development, at the policy, strategic and scientific levels.</p>	
<i>Description of the current infrastructure</i>	
<p>The Mediterranean Wetlands Observatory is a major regional organisation for sharing knowledge and helping key decision-makers.</p> <p>The Mediterranean Wetlands Observatory is a major regional tool for the long-term assessment of the conservation status and trends of these ecosystems. It uses both current knowledge and other data to be found or produced. It targets a wide range of potential users and could help disseminate widely the experience and lessons learned by the different partners. It should also help harmonize the information on wetlands at the Mediterranean scale.</p>	
<i>Human resources</i>	
> 1000	
<i>Scientific agenda</i>	
<p>MedWet's mission is to ensure and support the effective conservation of wetlands and the wise use of their resources, values and services, through local, national, regional and international collaborations. Promoting and facilitating the implementation of activities that contributes to the conservation of Mediterranean wetlands, within the framework of the Ramsar Convention. MedWet has four main objectives:</p> <ol style="list-style-type: none"> a. to promote and participate in the implementation of the Ramsar Convention's objectives and initiatives in the Mediterranean region; b. to develop and reinforce the capacity of people involved in sustainable management, especially in Ramsar-designated wetland sites; c. to act as a catalyst for the exchange of knowledge and expertise between key conservation actors in order to reinforce Mediterranean wetland management; d. to collaborate with other international initiatives in the region and globally; <p>The MWO includes the restitution of the monitoring/evaluation results and of the informative products that will be developed, analyzed, or transmitted by the Observatory.</p> <p>MWO is able to</p> <ul style="list-style-type: none"> - provide data to assess Living Planet Index (LPI) indicator (an international composite indicator that measures the result of invasive species and the effects of climate change on vertebrate populations); Community Temperature Index (CTI)-belongs to a new generation of indicators, which intimately 	

evaluates if change in biodiversity is directly linked to climate change; and the Community Specialisation Index (CSI)- evaluates if change in biodiversity is directly linked to land-use change using birds, the best studied component of biodiversity, as models.

-provide data on river flow, river discharges and dams – at least the major ones – such as number, capacity

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-provide data on water quality according to EEA;

- provide data on wetlands loss

INITIATIVE Data file

<i>Name of the initiative / network</i>	
SedNet – European Sediment Network	
Aim: incorporating sediment issues and knowledge into European strategies to support the achievement of a good environmental status and to develop new tools for sediment management.	
<i>Category of infrastructure</i>	
Network of Infrastructure and Users	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Permanent network, operational since 2002	Network of users – who add their laboratories and others
<i>Location</i>	
Europe + global	
<i>Proposed objectives</i>	
<ul style="list-style-type: none"> • Contribute to the further development of holistic understanding of sediments and their management • Be a multidisciplinary platform for communication and education about sediment management and the needs for further actions (either in policy making, management or research) • Be the main contact/information point for the European Commission on sediment related questions in relation to sediment related European policies. <p>Sediment is an essential, integral and dynamic part of our river basins, estuaries and seas. Where human activities interfere with sediment quantity or quality, sediment management may become necessary. Effective and sustainable sediment management requires a holistic approach taking into account:</p> <ul style="list-style-type: none"> • System understanding; • Integrated management of soil, water and sediment; • Transboundary cooperation; • Upstream-downstream interrelationships; and • Stakeholder involvement. <p>More info on: http://www.sednet.org/</p>	
<i>Description of the current infrastructure</i>	
???? – labs of participants, information not available	
<i>Human resources</i>	
(>100)	
<i>Scientific agenda</i>	
Sediment quality and quantity issues – and their impact on ecosystem functioning – ranging from freshwater, at local to river basin scale, to estuarine and marine sediments.	

E. Global Initiatives/Programmes

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
Delta Alliance – A Global network for the Resilience of Deltas	
<i>Category of infrastructure</i>	
Network of Infrastructures, users and beneficiaries (beneficiaries)	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Global initiative of stakeholders involved in the integrated management of deltas worldwide (mainly Asia and Europe).	Not Infrastructure, but great potential for users / networking. Major role in promoting the global role of DANUBIUS. Brings in ideas to be developed with the use of the RI's. Important – to develop the Danube Delta Wing.
<i>Location</i>	
Europe, Asia, Africa, America Delta Alliance has ten network wings where activities are focused: California Bay (USA), Ciliwung and Mahakam (Indonesia), Mekong (Vietnam), Rhine-Meuse (the Netherlands), Nile (Egypt), Pantanal (Brazil), Ganges-Brahmaputra (Bangladesh), Mississippi (USA), Yangtze (China) and Parana (Argentina). Additional network wings will soon be included in Delta Alliance to further benefit from the wealth of information available in these deltas.	
<i>Proposed objectives</i>	
Mission of improving the resilience of the world's deltas.	
<ol style="list-style-type: none"> 1. envisioning and defining resilience for deltas 2. measuring and monitoring resilience 3. reporting and creating pressure for improved resilience 4. providing inspiration for improved resilience 5. providing assistance for improved resilience 	
More info on: http://www.delta-alliance.org/	
<i>Description of the current infrastructure</i>	
Not an infrastructure, but “wings” (groups of stakeholders – from research institutes, universities, local / regional administrations, NGO`s, SME`s, etc.).	
<i>Human resources</i>	
>1000	
<i>Scientific agenda</i>	
<ul style="list-style-type: none"> • Integrated Management of Deltas • Spatial planning of deltas • Demographic trends • Climate change • Subsidence • Economic developments • Technical developments 	

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
GEF – The Global Environment Facility	
<i>Category of infrastructure</i>	
Initiative/Independently operating financial organization	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Permanent program	Considering the basis of GEF it might act as potential funder for DANUBIUS by specific funding instruments
<i>Location</i>	
World-wide distributed program.	
<i>Proposed objectives</i>	
<ul style="list-style-type: none"> - Improve Sustainability of Protected Area Systems - Mainstream Biodiversity Conservation and Sustainable Use into Production Landscapes, Seascapes and Sectors - Build Capacity for the Implementation of the Cartagena Protocol on Biosafety (CPB) - Build Capacity on Access to Genetic Resources and Benefit Sharing - Integrate CBD Obligations into National Planning Processes through Enabling Activities. 	
<i>Description of the current infrastructure</i>	
<p>The Global Environment Facility (GEF) is a permanent program, involving 183 countries in partnership with international institutions, civil society organizations (CSOs), and the private sector to address global environmental issues while supporting national sustainable development initiatives. An independently operating financial organization, the GEF provides grants for projects related to biodiversity, climate change, international waters, land degradation, the ozone layer, and persistent organic pollutants.</p> <p>Since 1991, GEF has achieved a strong track record with developing countries and countries with economies in transition, providing \$11.5 billion in grants and leveraging \$57 billion in co-financing for over 3,215 projects in over 165 countries. Through its Small Grants Programme (SGP), the GEF has also made more than 16,030 small grants directly to civil society and community based organizations, totaling \$653.2 million.</p>	
<i>Human resources</i>	
No available data	
<i>Scientific agenda</i>	
<p>The GEF work focuses on the following main areas:</p> <ul style="list-style-type: none"> Biodiversity Climate Change (Mitigation and Adaptation) Chemicals International Waters Land Degradation Sustainable Forest Management / REDD + Ozone Layer Depletion 	

INFRASTRUCTURE Data file

<i>Name of the program</i>	
GEO – Global Earth Observation	
Global Monitoring Programme, it is a voluntary partnership of governments and international organizations. It provides a framework within which these partners can develop new projects and coordinate their strategies and investments. In present, GEO’s Members include 89 Governments and the European Commission. In addition, 67 intergovernmental, international, and regional organizations with a mandate in Earth observation or related issues have been recognized as Participating Organizations.	
<i>Category of infrastructure</i>	
UN Project	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Permanent programme, operational since 2003	Global Monitoring Programme. DANUBIUS may become data & information provider to GEO.
<i>Location</i>	
Global	
<i>Proposed objectives</i>	
<ul style="list-style-type: none"> • Reducing loss of life and property from natural and human-induced disasters; • Understanding environmental factors affecting human health and well-being, • Improving the management of energy resources, • Understanding, assessing, predicting, mitigating, and adapting to climate variability and change, • Improving water resource management through better understanding of the water cycle, • Improving weather information, forecasting and warning, • Improving the management and protection of terrestrial, coastal and marine ecosystems, • Supporting sustainable agriculture and combating desertification, and • Understanding, monitoring and conserving biodiversity. <p>More info on: http://www.earthobservations.org/geoss_wa_tar.shtml.</p>	
<i>Description of the current infrastructure</i>	
<ul style="list-style-type: none"> • Mainly use of a multitude of remote sensing / satellite data, combined with in-situ observatories, covering all parts of land & seas. 	
<i>Human resources</i>	
>100	
<i>Scientific agenda</i>	
<p>GEO was launched in response to calls for action by the 2002 World Summit on Sustainable Development and by the G8 (Group of Eight) leading industrialized countries. These high-level meetings recognized that international collaboration is essential for exploiting the growing potential of Earth observations to support decision making in an increasingly complex and environmentally stressed world.</p> <p>GEO is constructing GEOSS on the basis of a 10-Year Implementation Plan for the period 2005 to 2015. The Plan defines a vision statement for GEOSS, its purpose and scope, expected benefits, and the nine “Societal Benefit Areas” of disasters, health, energy, climate, water, weather, ecosystems, agriculture and biodiversity.</p>	

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
GEOSS – Global Earth Observation System of Systems	
GEOSS is constructed by GEO on the basis of a 10-Year Implementation Plan for the period 2005 to 2015. It will be a global and flexible network of content providers allowing decision makers to access an extraordinary range of information at their desk. GEOSS will proactively link together existing and planned observing systems around the world and support the development of new systems where gaps currently exist.	
<i>Category of infrastructure</i>	
UN Project	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Present stage ending in 2015, continuous.	Global initiative (network of remote sensing and field observation infrastructures) – Global Earth Observation System of Systems. DANUBIUS must report its activities to GEOSS – either as data provider as well as user.
<i>Location</i>	
Global	
<i>Proposed objectives</i>	
<p>The purpose of GEOSS is to achieve comprehensive, coordinated and sustained observations of the Earth system, in order to improve monitoring of the state of the Earth, increase understanding of Earth processes, and enhance prediction of the behaviour of the Earth system. GEOSS will meet the need for timely, quality long-term global information as a basis for sound decision making, and will enhance delivery of benefits to society in the following initial areas:</p> <ul style="list-style-type: none"> • Reducing loss of life and property from natural and human-induced disasters; • Understanding environmental factors affecting human health and well-being; • Improving management of energy resources; • Understanding, assessing, predicting, mitigating, and adapting to climate variability and change; • Improving water resource management through better understanding of the water cycle; • Improving weather information, forecasting, and warning; • Improving the management and protection of terrestrial, coastal, and marine ecosystems; • Supporting sustainable agriculture and combating desertification; • Understanding, monitoring, and conserving biodiversity. 	
<i>Description of the current infrastructure</i>	
<p>The GEOSS Common Infrastructure allows the user of Earth observations to access, search and use the data, information, tools and services available through the Global Earth Observation System of Systems. The infrastructure consists of four main elements:</p> <ul style="list-style-type: none"> • The GEO Portal provides the direct web interface through which the user accesses GEOSS and searches for information and services. • The GEOSS Clearinghouse is the engine that drives the entire system. It connects directly to the various GEOSS components and services, collects and searches their information and distributes data and services via the Portal to the user. • The GEOSS Components and Services Registry is similar to a library catalogue. All of the governments and organizations that contribute components and services to GEOSS provide essential details about the name, contents, and management of their contribution. This assists the Clearinghouse, and ultimately the user, to identify the GEOSS resources that may be of interest. • The GEOSS Standards and Interoperability Registry enable contributors to GEOSS to configure their systems so that they can share information with other systems. This Registry is vital to the ability of GEOSS to function as a true system of systems and to provide integrated and cross-cutting information and services. Contributors can also share ideas and proposals informally via the associated Standards and Interoperability Forum. 	
<i>Human resources</i>	

>100

Scientific agenda

- Achieve sustained operation, continuity and interoperability of existing and new systems that provide essential environmental observations and information, including the GEOSS Common Infrastructure (GCI) that facilitates access to, and use of, these observations and information.
- Enhance the coordination of efforts to strengthen individual, institutional and infrastructure capacities, particularly in developing countries, to produce and use Earth observations and derived information products.
- Ensure full interaction and engagement of relevant science and technology communities such that GEOSS advances through integration of innovations in Earth observation science and technology, enabling the research community to fully benefit from GEOSS accomplishments.
- Ensure critical user information needs for decision making are recognized and met through Earth observations.
- Enable the global coordination of observing and information systems to support all phases of the risk management cycle associated with hazards (mitigation and preparedness, early warning, response, and recovery).
- Substantially expand the availability, use, and application of environmental information for public health decision-making in areas of health that include allergens, toxins, infectious diseases, food-borne diseases, and chronic diseases, particularly with regard to the impact of climate and ecosystem changes.
- Close critical gaps in energy-related Earth observations and increase their use in all energy sectors in support of energy operations, as well as energy policy planning and implementation, to enable affordable energy with minimized environmental impact while moving towards a low-carbon footprint.
- Achieve effective and sustained operation of the global climate observing system and reliable delivery of climate information of a quality needed for predicting, mitigating and adapting to climate variability and change, including for better understanding of the global carbon cycle.
- Produce comprehensive sets of data and information products to support decision-making for efficient management of the world's water resources, based on coordinated, sustained observations of the water cycle on multiple scales.
- Close critical gaps in meteorological and related ocean observations, and enhance observational and information capabilities for the protection of life and property, especially with regard to high-impact events, and in the developing world.
- Establish, in conjunction with a comprehensive biodiversity observation network, a wide-ranging monitoring capability for all ecosystems and the human impacts on them, to improve the assessment, protection and sustainable management of terrestrial, coastal and marine resources and the delivery of associated ecosystem services.
- Improve the utilization of Earth observations and expanded application capabilities to advance sustainable agriculture, aquaculture, fisheries and forestry in areas including early warning, risk assessment, food security, market efficiency, and, as appropriate, combating desertification.
- Establish, in conjunction with a comprehensive ecosystem monitoring capability, a worldwide biodiversity observation network to collect, manage, share and analyse observations of the status and trends of the world's biodiversity, and enable decision-making in support of the conservation and improved management of natural resources.

INFRASTRUCTURE Data file

<i>Name of the program</i>	
GloboLakes - Global Observatory of Lake Response to Environmental Change	
GloboLakes is a five year research programme that will investigate the state of lakes and their response to climatic and other environmental drivers of change at a global scale through the realisation of a near-real time satellite based observatory with archive data processing to produce a 20-year time series, of observed ecological parameters and lake temperature supported by linked auxiliary data on catchment land-use and meteorological forcing.	
<i>Category of infrastructure</i>	
Others types of Projects/Possible Nodes	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Operational, 2012 - 2017	Remote sensing equipment and facilities - potential node in DANUBIUS
<i>Location</i>	
Global	
<i>Proposed objectives</i>	
<ul style="list-style-type: none"> • Remote sensing algorithms for estimating lake biogeochemical parameters for the retrieval of lake biogeochemical parameters for global processing and to adapt lake surface water temperature retrievals to an extended cohort of lakes; • Operationalisation of algorithms and data processing to retrieve functional indicators from archived and rolling satellite datasets & widely disseminate results; • Building data sets on environmental change drivers to compile integrated spatio-temporal climatic & catchment data for sentinel lakes; • Data integration and construction of uncertainty budgets to construct uncertainty budgets for each of the different data sources to incorporate in the EO calibration; • Detecting spatial and temporal patterns in lake water quality to assess the extent of temporal coherence for individual remotely-sensed lake characteristics and to define the nature of any clusters of coherent lakes; • Attributing the causes of lake response to environmental conditions to assess the effect of multiple pressures on lake structure, function & water security; • Interpretation and forecasting lake sensitivity to environmental change to predict the sensitivity of lake phytoplankton to regional climate change; • Apply data for lake management to engage with national & international stakeholder and to identify & prioritise lakes & lake types where management should be targeted to mitigate water security risks. <p>More info on: http://www.globolakes.ac.uk/.</p>	
<i>Description of the current infrastructure</i>	
<ul style="list-style-type: none"> • improved wavebands, spatial resolution and frequency of data collection from satellite sensors; • developed formulae to correct for atmospheric properties and to convert the detected reflected light to useful lake; • powerful computing that allows near real time and archived information from satellites to be processed. 	
<i>Human resources</i>	
>1000	
<i>Scientific agenda</i>	
<ul style="list-style-type: none"> • Development of robust algorithms for the remote sensing of biogeochemical parameters, primary production and LSWT for lakes at regional to global scales. Algorithms to include quantified uncertainty estimates. • Operationalization of these algorithms in a satellite-based Global Lake Observatory. • Compilation of integrated spatio-temporal information on ecosystem condition and function for global network of lakes and their catchments. 	

- Models forecasting the trajectory of lake responses, including impacts on ecosystem services, to climate and land use change on lakes across different climate zones.
- An assessment of the sensitivity and coherence of lake response to environmental change at a global scale.

The project focuses on the retrieval of surface water temperature as this has a fundamental effect on lake ecology, the concentration of coloured dissolved organic matter and suspended solids that derive largely from the catchment, the abundance of phytoplankton measured as the concentration of the pigment, chlorophyll a, and the abundance of cyanobacteria (blue-green algae) that can potentially be toxic. Knowledge of the conditions of lakes and their sensitivity to change is also extremely valuable for the management of lakes and reservoirs and GloboLakes will provide information and products specifically for environmental managers. A satellite due to be launched during the course of the project, called Sentinel 2, will provide even greater spatial resolution allowing data to be collected and exploited from even smaller lakes. This will be investigated by GloboLakes and incorporated into the framework of a global lake observatory.

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
GOOS – Global Ocean Observing System	
It is the Global Ocean Observing System. A single, contiguous, body of water encircles the globe. From the Arctic ice through the warm equatorial waters to the Antarctic Circumpolar Current all the Earth's oceans, seas, bays and inlets are connected. They form one body of water, the one Global Ocean. GOOS is designed and being implemented to embrace the oceans as a single entity, to provide a global view of the ocean system.	
<i>Category of infrastructure</i>	
UN Project	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Permanent global observation system since 1991	DANUBIUS must connect as data provider with GOOS
<i>Location</i>	
Global, main office in Paris, France	
<i>Proposed objectives</i>	
<ul style="list-style-type: none"> • Monitor, understand and predict weather and climate • Describe and forecast the state of the ocean, including living resources • Improve management of marine and coastal ecosystems and resources • Mitigate damage from natural hazards and pollution • Protect life and property on coasts and at sea • Enable scientific research <p>More info on: http://www.ioc-goos.org/.</p>	
<i>Description of the current infrastructure</i>	
<p>Many separate observing systems comprise the GOOS. These vary from a few buoys operated by a research lab, to intergovernmental cooperation which organizes globe spanning efforts. The GOOS seeks to find the value of associating these many systems together to create a value greater than the separate parts. By integrating disparate systems the unique data and distribution systems of each can become part of a greater system, enhancing the value and utility of the individual systems as well as creating a global view of the earth's oceans.</p> <ul style="list-style-type: none"> • 3000 Argo floats which collect high-quality temperature and salinity profiles from the upper 2000m of the ice-free global ocean and currents from intermediate depths • 1250 drifting buoys which record the currents of surface, the temperature and the atmospheric pressure • 350 embarked systems on commercial or cruising yachts which collect the temperature, salinity, the oxygen and the carbon dioxide (CO₂) in the ocean and the atmosphere, and the atmospheric pressure. • 100 research vessels which measure all the physical, chemical and biological parameters, between the surface of the sea and the ocean floors every 30 nautical miles out of 25 transoceanic lines. • 200 marigraphs and holographs which transmit information in quasi real time, thus providing the possibility of detecting tsunamis. • 50 commercial ships which launch probes measuring the temperature and salinity between the surface and the ocean floor on their transoceanic ways. • 200 moorings in open sea which are used as long-term observatories, recording weather, chemical and biological parameters on a fixed site between the surface and the bottom. 	
<i>Human resources</i>	
>1000	
<i>Scientific agenda</i>	
GOOS is a permanent global system for observations, modelling and analysis of marine and ocean variables to support operational ocean services worldwide. GOOS provides accurate descriptions of the present state	

of the oceans, including living resources; continuous forecasts of the future conditions of the sea for as far ahead as possible, and the basis for forecasts of climate change.

- Continuous Plankton Recorder

It has a number of specific aims, which include the development of the global Continuous Plankton Recorder (CPR) database, producing a regular Ecological Status Report for global plankton biodiversity, to ensure that common standards and methodologies are maintained, to provide an interface for plankton biodiversity with other global ocean observation programmes, to set up and maintain a website for publicity and data access, to facilitate new CPR surveys and develop capacity building procedures. to facilitate secondments of CPR scientists between GACS institutions.

- Global Sea Level Observing System (GLOSS)

It aims at the establishment of high quality global and regional sea level networks for application to climate, oceanographic and coastal sea level research.

- Argo Profiling Floats

The Argo floats are autonomous observation systems which drift with ocean currents making detailed physical measurements of the upper 2 km of the water column

- Hydrography

The workhorse of hydrography is the Niskin bottle which is often deployed in clusters on an instrumented rosette, which records Conductivity, Temperature, and Depth (CTD)

- Drifting Buoys

These buoys take measurements of surface seawater temperature and salinity and marine meteorological variables that are telemetered in real time through the World Meteorological Organization's Global Telecommunications System

- Census of Marine Life

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
IHE-UNESCO – Institute for Water Education	
It is an institute that carries out educational, research and capacity development activities that complement and reinforce each other in the broad fields of water engineering, water management, environment, sanitation, and governance.	
<i>Category of infrastructure</i>	
UN Institution	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Permanent institute, operational since 1957	UNESCO – IHE is one of the main supporters of DANUBIUS, while it has a global dimension and major RI's and education programmes. It will be able to give DANUBIUS the global dimension (education programmes developed on DANUBIUS platform, IHE infrastructures need to be properly used by DANUBIUS team, etc.).
<i>Location</i>	
Global, main office in Delft, Netherlands	
<i>Proposed objectives</i>	
<ul style="list-style-type: none"> • Education, training and scientific research – for water sector professionals, engineers, scientists, consultants and decision-makers working in the water and environment sectors • Water sector capacity development – for water sector ministries and departments, municipalities, water boards and water utilities, universities, training and research institutes, industries, non-governmental and private sector organisations • Partnership building and networking – among knowledge centres, public and private sector organisations • Standard setting for education and training – for water-related institutions, universities and other education and training agencies in the water sector • Policy forum on water – for UNESCO member states and other stakeholders <p>More info on: http://www.unesco-ihe.org/</p>	
<i>Description of the current infrastructure</i>	
<ul style="list-style-type: none"> • Four modern teaching and research laboratories: aquatic ecology, microbiology process and analytical laboratories • A library with online connections to a worldwide network of libraries, and a reading room containing many international journals and magazines • Multifunctional lecture theatres and a fully equipped auditorium that seats 300 • Extensive ICT facilities, including a studio with videoconferencing facilities • Innovative learning tools, including smart boards, WiFi and remote access to all digital resources 	
<i>Human resources</i>	
>14 500	
<i>Scientific agenda</i>	
<p>Water supply, sanitation and water resources are affected not only by climate change, rising demands for water and increasing pollution of sources but also by weak human and institutional capacity. Developing countries and countries in transition are often ill-equipped to tackle problems and to play their role in international negotiations and sustainable development, which sustains a situation of dependency. The Institute's demand-driven 6 research themes focus on and contribute to the knowledge base concerning water & development:</p> <ul style="list-style-type: none"> • Safe Drinking Water & Sanitation <p>Increasing access to safe, sufficient and affordable water for people to meet basic needs for drinking, sanitation and hygiene, to safeguard health and well-being, and to fulfill basic human rights.</p>	

- Water-Related Hazards & Climate Change

Water-related hazards like floods, droughts, pollution and related issues, are increasing in frequency and intensity around the globe due to population growth and effects of climate change.

- Water & Ecosystems Quality

Aquatic ecosystems as service providers for environmental and human well-being, development, and water integrity.

- Water Management & Governance

Social, biophysical and technological processes of water systems are intrinsically linked. Only by understanding the complexity of water systems and develop innovative ways of governing and managing water in sustainable ways.

- Water, Food & Energy Security

Better management of water for food and energy security, in a sustainable and equitable way, in synergy with natural ecosystems and compatible with the respective socio-economic context.

- Information & Knowledge Systems

Managing the information cycle of data acquisition, modelling, forecasting, optimisation and knowledge management supporting decisions related to water.

INFRASTRUCTURE Data file

<i>Name of the initiative/commission</i>	
IOC-UNESCO – Intergovernmental Oceanographic Commission of UNESCO	
It is the United Nations body for ocean science, ocean observatories, ocean data and information exchange, and ocean services such as Tsunami warning systems. Its mission is to promote international cooperation and to coordinate programmes in research, services and capacity building to learn more about the nature and resources of the oceans and coastal areas, and to apply this knowledge to improved management, sustainable development and protection of the marine environment and the decision making processes of States.	
<i>Category of infrastructure</i>	
UN Project	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Permanent programme, operational since 1960	DANUBIUS may become a major data provider to UNESCO IOC
<i>Location</i>	
Global, main office in Paris, France	
<i>Proposed objectives</i>	
<ul style="list-style-type: none"> • Prevention and Reduction of the Impacts of Marine Hazards • Mitigation of the Impacts of and Adaptation to Climate Change and Variability • Safeguarding the Health of Ocean Ecosystems • Management Procedures and Policies Leading to the Sustainability of Coastal and Ocean Environment and Resources <p>More info on: http://ioc-unesco.org/</p>	
<i>Description of the current infrastructure</i>	
The Global Ocean Observing System is the overarching coordination tool for the observation systems and has project offices in UNESCO Paris, France. The implementation of GOOS is through Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology which works with national agencies coordinating deployment of instrumentation systems.	
<i>Human resources</i>	
>1000	
<i>Scientific agenda</i>	
<p>The IOC programmes within UNESCO are priority areas through programmes in Global Climate Change, Small Island Developing States, Priority Africa and Capacity Development. Workplans for execution of programme elements is administered through Sections and Programmes.</p> <ul style="list-style-type: none"> • Capacity Development <p>IOC develops leadership capacity, including fund-raising, team building, and decision-making skills for directors of marine and coastal sciences institutes to strengthen scientific, legal and institutional structures.</p> <ul style="list-style-type: none"> • Ocean Observations & Services <p>The IOC Ocean Observations and Services Section collaborates with dozens of international programmes and organizations to coordinate global scale efforts transitioning oceanography science to operational oceanographic services and products providing societal benefits and protecting the environment.</p> <ul style="list-style-type: none"> • Ocean Science Section <p>The IOC Ocean Science Sections (OSS) plays a lead role in creating the conditions for good science and building networks of scientific logistic facilities at global and regional scale.</p> <ul style="list-style-type: none"> • Protecting People from Marine Hazards, Including Tsunamis <p>A consortium works to build sustainable tsunami early warning systems. The mission is to ensure appropriate design and development of tsunami warning systems and to ultimately provide adequate protection at local, regional, and global scales.</p>	

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
IUCN – International Commission for Conservation of Nature	
<i>Category of infrastructure</i>	
Other	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Permanent program	IUCN is a supporter for DANUBIUS, based on specific strategies and programmatic documents
<i>Location</i>	
World-wide distributed program with headquarter IUCN Conservation Centre, Rue Mauverney 28, 1196, Gland, Switzerland	
<i>Proposed objectives</i>	
<p>IUCN's work is oriented toward nature-based solutions to solve the issue of global production and consumption patterns which are destroying the life support IUCN's acts as the world's authority on biodiversity conservation, nature-based solutions and related environmental governance.</p> <p>IUCN has three key areas:</p> <p>Valuing and conserving nature by working on biodiversity conservation, emphasizing both tangible and intangible values of nature.</p> <p>Effective and equitable governance of nature's use by working on people-nature relations, rights and responsibilities, and the political economy of nature.</p> <p>Deploying nature-based solutions to global challenges in climate, food and development by tackling problems of sustainable development, particularly in climate change, food security and social and economic development.</p>	
<i>Description of the current infrastructure</i>	
The International Union for Conservation of Nature is the world's oldest and largest global environmental organization	
<i>Human resources</i>	
IUCN is a unique organization - a democratic membership union - composed of over 1,200 Members, 11,000 scientific experts in our thematic Commissions and 1,000 staff, who work together in more than 160 countries to help the world find pragmatic solutions to our most pressing environment and development challenges.	
<i>Scientific agenda</i>	
<p>The IUCN Programme 2013–2016 aims to mobilize communities working for biodiversity conservation, sustainable development and poverty reduction in common efforts to halt biodiversity loss and apply nature-based solutions to conserve biodiversity, enhance resilience, strengthen equity, reduce poverty and so improve the wellbeing of people on this planet.</p> <p>The Programme builds upon IUCN's niche as the world's authority on biodiversity conservation, nature-based solutions and related environmental governance. It has three Programme Areas:</p> <ol style="list-style-type: none"> 1. Valuing and Conserving Nature enhances IUCN's heartland work on biodiversity conservation, emphasizing both tangible and intangible values of nature. 2. Effective and Equitable Governance of Nature's Use consolidates IUCN's work on people-nature relations, rights and responsibilities, and the political economy of nature. 3. Deploying Nature-based Solutions to Global Challenges in Climate, Food and Development expands IUCN's work on nature's contribution to tackling problems of sustainable development, particularly in climate change, food security and social and economic development. 	

INFRASTRUCTURE Data file

<i>Name of the infrastructure</i>	
United Nations Environment Programme (UNEP)	
<i>Category of infrastructure</i>	
United Nations Programme	
<i>Status of the project</i>	<i>Category of infrastructure</i>
Permanent program	UNEP might act as potential funder for DANUBIUS by specific funding instruments.
<i>Location</i>	
World-wide distributed program, headquartered in Nairobi, Kenya, UNEP works through its divisions, regional, liaison and out-posted offices, plus a growing network of collaborating centres of excellence. UNEP also hosts several environmental conventions, secretariats and inter-agency coordinating bodies.	
<i>Proposed objectives</i>	
<ul style="list-style-type: none"> • Assessing global, regional and national environmental conditions and trends • Developing international and national environmental instruments • Strengthening institutions for the wise management of the environment <p>To provide leadership and encourage partnership in caring for the environment by inspiring, informing, and enabling nations and peoples to improve their quality of life without compromising that of future generations.</p> <p>To be the leading global environmental authority that sets the global environmental agenda, that promotes the coherent implementation of the environmental dimensions of sustainable development within the United Nations system and that serves as an authoritative advocate for the global environment</p> <p>Priorities: Climate Change, Disaster and conflicts, Ecosystem management, Environmental Governance, Harmful Substances, Resource Efficiency.</p>	
<i>Description of the current infrastructure</i>	
<p>UNEP, established in 1972, is the voice for the environment within the United Nations system. UNEP acts as a catalyst, advocate, educator and facilitator to promote the wise use and sustainable development of the global environment.</p>	
<i>Human resources</i>	
No available data	
<i>Scientific agenda</i>	
<p>Post-crisis environmental assessments methodologies</p> <p>Post-crisis environmental recovery methodologies</p> <p>Environmental cooperation for peacebuilding</p> <p>Disaster risk reduction</p>	

8.2. Comitetul Internațional de Inițiativă al DANUBIUS - RI

8.2.1. Anexa 3 – Caietul de sarcini aferent Comitetului Internațional de Inițiativă al DANUBIUS - RI



DANUBIUS - DANUBE International centre for advanced studies
for river – delta – sea **S**ystems

THE INTERNATIONAL INITIATIVE COMMITTEE

INTRODUCTION

1. At the preliminary meeting at Sf Gheorghe in September 2013 there was a discussion of proposed terms of reference for the International Initiative Committee (IIC). This paper presents revised terms of reference, discusses membership and presents proposals for establishing Working Groups.

REVISED TERMS OF REFERENCE

2. The proposal for an International Centre for Advanced Studies of River-Delta-Sea Systems (DANUBIUS) is being developed as a project under the leadership of Romania. The International Initiative Committee (IIC) has been established to provide help and advice to the DANUBIUS Coordinator in the next phase of the project: to deliver a successful application for inclusion in the ESFRI (European Strategy Forum for Research Infrastructures) Roadmap. The key role of the IIC will be to identify, contact and gather support from national and international funding agencies. In support of this, the IIC will provide advice and help on:
 - a. the scientific scope and quality of DANUBIUS;
 - b. the roles of the Hub and Nodes;
 - c. links with other research infrastructures and programmes;
 - d. principles of governance of DANUBIUS;
 - e. actions required, including establishment of further committees or bodies, and their prioritisation;
 - f. other issues identified or agreed by the Coordinator; and
 - g. transition to a new structure following a successful application for access to the ESFRI Roadmap.

3. The membership, including an independent chair, will be appointed by, and include, the Coordinator, who will ensure that secretariat support is provided as needed.

The IIC will form two Initiative Groups: one to provide help and advice on scientific and technical matters, and the other on management matters.

It is expected that much of the work of the IIC will be undertaken by correspondence or online meetings, but some physical meetings may be needed when travel and accommodation costs for members will be provided.

MEMBERSHIP

4. Members of the IIC are persons with major involvement in the development of the DANUBIUS ESFRI Proposal/Project. Thus, members of the IIC may be:
 - persons with a deep involvement in the development of the DANUBIUS ESFRI Proposal (both the Scientific Case Study as well as the management, governance and administration);
 - representatives of potential nodes of DANUBIUS
 - representatives of national communities of users
 - representatives of funding agencies involved in supporting the future ESFRI Proposal
 - other persons with major role in science and innovation of river-delta-sea systems.
5. The present membership is provisional, and it is expected to evolve as other research groups and organisations become involved in DANUBIUS. For this reason no membership list has yet been drawn up. The DANUBIUS Coordinators are Dr Adrian Stanica (GeoEcoMar, Romania) and Dr Manuela Sidoroff (NIBS, Romania) and the current IIC chair is Dr Michael Schultz (UK).

WORKING GROUPS

6. It is envisaged that the IIC will work partly in plenary session and partly as two Initiative Groups (IG). One (IG-ST) will focus on science and technology issues and the other (IG-M) on management, administration and governance issues. Some of the areas of the terms of reference above (eg a, d) fall clearly within the ambit of one of the IGs. However, other areas (eg b, c) are relevant to both IGs. The meeting will discuss how the IGs can be used to make the work of IIC most effective and efficient. The IGs are to be considered as the predecessors of the governance bodies of the future ESFRI RI. Thus, after acceptance of DANUBIUS on the ESFRI list the IG-ST will develop into a future International Scientific Committee, while the IG-M will become an International Management Committee.

8.2.2. Anexa 4 – Minuta ședinței CII Danubius, organizată în perioada 7 - 8 noiembrie 2013

DANUBIUS International Initiative Committee Summary report of meeting on 7-8 November 2013, Bucharest

Present

Michael Schultz	IIC Chair, <i>Emeritus</i> NERC, UK
Ekaterina Batchvarova	National Institute of Meteorology, Bulgaria
Nikolai Berlinski	Ukrainian Scientific Center of Ecology of the Sea
Petru Boeriu	UNESCO-IHE, Netherlands/international
Chris Bradley	University of Birmingham, UK
Miklos Bulla	Istvan Szeczeni University, Hungary
Deborah Chapman	University College Cork, Ireland
Lavinia Cioara	GeaStrategy & Consulting, Romania
Adriana Constantinescu	GeoEcoMar, Romania
Vesna Crnojeviæ- Bengin	University of Novi Sad, Serbia
Virgil Dinulescu	FM Management Consultancy SRL, Romania
Gheorghe Duca	Moldavian Academy of Sciences
Eva Feldbacher	WCL, Austria
Jeremy Gault	University College Cork, Ireland
Gretchen Gettel	UNESCO-IHE, Netherlands/international
Olivera Ður Iëiæ	University of Novi Sad, Serbia
Madalin Ionita	FM Management Consultancy SRL, Romania
Simona Carmen Litescu	Romanian National Institute for Biological Sciences
Jean Marie Martin	<i>Emeritus</i> JRC, Italy/France
Gheorghe Oaie	GeoEcoMar, Romania
Henriette Otter	DELTAIRES, Netherlands
Vangelis Papathanassiou	Hellenic Centre of Marine Researches, Greece
Andrei Paun	Romanian National Institute for Biological Sciences

Mihaela Paun	Romanian National Institute for Biological Sciences
Ioana Popescu	UNESCO-IHE, Netherlands/International
Angelika Riegler	BOKU, Austria
Agustin Sanchez-Arcilla	Catalonia University of Technology, Spain
Manuela Sidoroff	Romanian National Institute for Biological Sciences
Adrian Stanica	GeoEcoMar, Romania
Andrew Tyler	University of Stirling, UK
Viorel Vulturescu	Ministry of National Education, Romania

1. Welcome and introductions

DANUBIUS IIC meeting started on 7.11.2013 with the welcoming address from the organizing Romanian institutions. Dr Manuela Sidoroff, general director of the Romanian National Institute for Biological Sciences welcomed the participants at the second working meeting of DANUBIUS and also presented a brief agenda of the meeting. Dr. Gheorghe Oaie, general director of the Romanian National Institute for Marine Geology and GeoEcology – GeoEcoMar, also welcomed the participants and showed the importance of DANUBIUS as a future pan-European infrastructure and multi-disciplinary project, and pointed out that the Romanian government supports the project of DANUBIUS and its realization.

Formal around the table introductions followed, then discussions started.

Dr Michael Schultz, Chair of the DANUBIUS IIC, emphasized that DANUBIUS will be and must be a major infrastructure and not a research project and presented the goals of the meeting:

1. The role and operation of the Committee
2. Key aspects of the structure and role of DANUBIUS
3. Memoranda of Understanding
4. External and internal communications
5. Revisions to content and structure of the White Book/Blue Book
6. Way Forward workplan

An introduction to DANUBIUS followed, presented by Dr. Adrian Stanica. DANUBIUS aims to be an ESFRI Pan European R&D infrastructure in the field of integrated management of rivers-deltas-seas focused on Danube – Black Sea macrosystem, with a Hub in the Danube Delta – a truly natural laboratory and having Nodes that will be leading facilities and research centres dealing with processes, research methodologies and offering access to other parts of the Danube – Black Sea macrosystem. The concept of DANUBIUS implies a central Hub and several Nodes. Its mission will be to provide

innovative, science-based innovative solutions for major actual environmental-related problems and to set the framework for sustainable development of Danube – Danube Delta – Black Sea system, as best practice for large river – delta – sea systems worldwide. As agreed at the previous meeting in Sf. Gheorghe, in September 2013, Dr. Stanica announced that Deltares was developing the sustainability / socio-economic major pillar of DANUBIUS.

He then presented the main actors and the European institutions involved in the project, also stating that the list is open and since the meeting of September, other countries showed their interest (e.g. Netherlands, Serbia).

The aim is for DANUBIUS to function as an ESFRI Pan-European distributed Research Infrastructure, to have an ERIC (European Research Infrastructure Consortium) legal status, to have an international management, to have an International Scientific Board and to have an International General Council with participation of Shareholders.

Dr. Stanica continued his presentation with what had been done so far, the work in progress and steps to be taken. For the Hub, a 10 hectares lot is available at Murighiol, administrated by the Romanian National Institute for Biological Sciences (INSB). Topography studies are complete, reference borehole for water supply & geothermal gradient are completed, and obtaining the permits & authorizations for building (32 permits) is still work in progress.

Several Nodes are already available in Romania and they are represented by the research marine and fluvial infrastructures: R/V Mare Nigrum, R/V Istros, EUXINUS and GeoPontica network that are operational in the Black Sea and on the shores of Romania and Bulgaria) and a potential Node – the Sulina Branch of the Institute of Biology – Bucharest, Romanian Academy. Negotiations are underway with other research institutions to further develop Nodes – from Austria, Bulgaria, Hungary, France, Greece, Italy, Ireland, Moldova, Netherlands, Serbia, Spain, Ukraine, UK. Discussions are also being held with representatives of other ESFRI projects. Thus, DANUBIUS should develop facilities for the atmospheric (GHG) monitoring in the Delta – as contribution to ICOS. Also DANUBIUS should represent the upstream / inland continuation of EMSO, while in discussions with EURO ARGO the need to deploy ARGO floats to understand processes at river-sea contact zones – and also in the NW Black Sea – were considered of major importance by the EURO ARGO community. Dr Stanica mentioned that the list is open.

The future steps concentrate especially in preparing a successful ESFRI proposal, also by making best use of the results to come from the FP7 project DANCERS. Preparation of the Structural Funds Application for Romania Hub and Nodes, which is under development, needs to be timely and successful (Feasibility study and application for a major project, RO - Sectoral Operational Program for Research to include the *Centre* as a major project). As a mid-term plan, after acceptance on the ESFRI Roadmap and at the end of the Preparatory Phase, DANUBIUS should become an ERIC.

2. Updates

Professor Andrew Tyler presented a short overview of the meeting in September, in Sf. Gheorghe. He started by making a description of the two group discussions in Sf. Gheorghe. As an observation, he said that there is no synergy between the countries of the Danube basin and that they should develop a joined up understanding and find an interdisciplinary approach to any common problems. Then he

pointed out that there may be initiatives that overlap with DANUBIUS and that they should be brought together.

He raised questions regarding the future database containing the data from the Danube-Danube Delta-Black Sea system, how it will be transmitted and managed from the technical point of view (internet connexion, storing capacity) and how to use the system to develop the economy, also to find sustainable ways for development in the Danube region.

He then showed the importance of such a data and monitoring system that may be used to predict how other systems in the world will respond to same factors (e. g. climate change, human intervention).

Other points of discussion in the meeting of September were:

- World leading infrastructure will attract world leading scientists
- The centre should input into the education of the area, contribute to regional development, build opportunities with education networks and universities
- Use a data policy that everyone can sign up to
- The main challenge that was identified: Main challenge – build and keep updated a state of the art centre
- Identify grand societal challenges and try to understand the system as a whole from the social point of view

Dr. Stanica followed, presenting the recent developments of DANUBIUS. In the EU strategy for the Danube region, DANUBIUS was declared Flagship Project in the PA7 “Knowledge Society: of the EU Strategy for the Danube Region (September 24th, 2013). There is a strong necessity to develop a good coordination with the other 3 EUSDR flagship projects: DREAM (RI), DANUBE FUTURE (education / human potential), and DRRIF (strategic research programme).

3-4 October during the visit of DG R& I Commissioner, the Minister of Research and Higher Education presented DANUBIUS as major national project for the period 2014 – 2020.

The future competition for proposals to be accepted on the ESFRI roadmap will most probably be announced in 2014. Romania will make the proposal but it needs support from Member States, both from within the Danube region as well as from outside this area, but with strong communities that would provide major contributions to the development of DANUBIUS as a pan-EU distributed RI.

He also pointed out the critical importance of ensuring that DANUBIUS is seen as a Distributed RI rather than as an I3 (network of RIs = Integrated Infrastructure Initiative), as this would mean the automatic rejection from the ESFRI roadmap.

3. The International Initiative Committee

Michael Schultz introduced the Terms of Reference of the International Initiative Committee of DANUBIUS (Annex 2). He proposed that the present members of the IIC should divide into 2 groups: one that will be responsible for the scientific content of DANUBIUS (Science and Technology Initiative Group) and the other for the management part (Management Initiative Group). These two groups would represent the “nests” for the future governance bodies of the DANUBIUS ESFRI PP project and subsequent DANUBIUS ERIC.

He also proposed that the members identify other persons, representatives of the potential Node, funding agencies or with a major role in the scientific community from Europe or outside Europe that can participate in the future to DANUBIUS.

An important question from the participants was what kind of support should be expected at this stage from the funding agencies. Dr. Stanica replied that – for the time being, when the main purpose is to develop a successful ESFRI Proposal, there is a need to obtain the support of European funding agencies represented both in the “big” ESFRI Board, as well as in the ESFRI ENV Strategic Working Group. This is why a draft Memorandum of Understanding will be discussed during this meeting. Anyway – it was stated that support in the ESFRI board and groups has been considered as most needed at this stage.

Another question regarded the source of money that would be used for the construction of the centre and the answer from Dr. Stanica was that – at national level, each country must develop its own strategy. In Romania, for instance, the Hub will be built with Romanian funds as well as with Structural Regional Cohesion Funds.

4. Interactive session: vision/mission

Michael Schultz asked the participants to formulate the mission of DANUBIUS (role – one sentence) and its vision (where it will be in 10 years time – one sentence).

5. Structure of DANUBIUS as RI

The meeting continued with the discussion of key elements of the proposed structure of DANUBIUS as Research Infrastructure. The first element was on “Hubs and Nodes” and was presented by Michael Schultz. Several questions were addressed regarding the Nodes:

- What is a Node?
- What is a Node not?
- What are the criteria for becoming a Node?
- What services does a Node provide?
- Should there be competition to provide these services?
- What are the responsibilities of a Node?
- How is a Node funded?
- Should there be a maximum number of Nodes?
- Is there any benefit of being a Node?

Several comments were made and possible answers were given but questions were also raised:

- How does a scientist communicate with the Nodes? How do the Nodes communicate between themselves? Directly or via the Hub?
- Should DANUBIUS decide what it needs as Nodes or people come and say what they can provide?
- Nodes contain complementary infrastructure
- A Node provides a specific service – possible answer to the first question
- A centre of excellence is not enough to be a Node, it must provide a service
- Clear criteria for deciding on the Nodes (legal- binding agreement with the Hub for a certain period of time to provide the responsibilities)
- A Node is the infrastructure of a certain institute and / or a facility in an institute
- Clear criteria for deciding on the Nodes should be established (legal – binding agreement with the Hub for a certain period of time to provide the responsibilities)
- DANUBIUS develops themes and Nodes are the integration of themes?

- How a Node will be chosen? With a competition?
- A Node is a data provider? A service or a human capability provider?
- Define/Identify regional/thematic Nodes and define for each what service they provide
- Use existing living labs as Nodes, part of the geographical Nodes
- A host of the Node is expected to make a contribution but the users must pay a part of the services provided.
- In the end the idea was that – in order to understand processes along the Danube – Delta – Black Sea Macrosystem – regional Nodes should be developed along the waterway. In the meanwhile, thematic Nodes bringing in excellent expertise on specific topics should be developed in countries from outside the region.
-

It was agreed that Nodes could fall into one or both of two categories: Regional Nodes and Specialist Nodes, and that a small group should urgently work further on this principle.

Regarding the Hub several comments were made and questions asked:

- What does DANUBIUS need? There is a need to understand what will be based in the Hub
- Regional Nodes will make the measurement for different areas of the system and then the information goes to the Hub; conceive a real time processing system that deliver data to the Hub
- Major issue: working closely with DREAM
- Encourage people to see the benefits - and understand costs as investments in the future
- There is a potential danger of becoming a network (not to transform DANUBIUS from Distributed RI to I3 - network of RIs) – so always great attention must be made to preserve the philosophy of Distributed RI, and not of a network of RIs.

The following point of discussion was on “Community of users” and was presented by Michael Schultz.

He addressed three main questions:

- What are the categories of stakeholders?
- How do we identify, and engage with, key stakeholders (research groups, funding bodies, government bodies, NGOs) in each country? (19 countries in Danube Region, other EU Members States, other countries)
- How do we identify, and engage with, international/intergovernmental organisations?

Some comments were made on the subject:

- Need to know the key organization in each country and have a specific approach for each country
- Members of IIC are primary contacts and they should identify other people that must be at the table in the near future
- Communication material should be put together to be used to inform the stakeholders about - and promote DANUBIUS

The third point was “Data role and policy”. Several possibilities were presented:

- DANUBIUS will provide unique services for scientists and organisations to access dedicated virtual environments to ensure integrated access to river, delta and coastal data, analytical and modelling workflows and computational capacity
- DANUBIUS will provide the data from an integrated set of long-term observations throughout the Danube and Black Sea regions
- DANUBIUS will hold a mega database covering large river-delta-sea systems

- DANUBIUS will hold a metadatabase covering large river-delta–sea systems
- DANUBIUS will provide a portal to lots of data all over the place
- DANUBIUS will hold lots of data at the Hub, and probably also at the Nodes
- DANUBIUS is a platform and won't provide data services

Dr. Stanica suggested that the first option is to be considered, even though it is also the most difficult to achieve.

Other questions were asked by the participants and comments were made:

- What will be the policy of accessibility of the data?
- The data will be stored in a mega database or only a metadatabase will be created and maintained? What will be the total cost of such operations?
- The risk should be included in the data policy? Make a risk analysis for the data?
- Data from sensors can be released, uploaded, according to the policy of the data provider
- The “easy data” (e.g. hydrometric measurements all along the Danube) should be available (open access)
- Make a portal where different types of data can be visualised and downloaded
- Other issues: Intellectual property rights

All these aspects / questions should be answered / addressed and solutions must be found for each of them during the following IIC Meetings.

[The meeting continued on 8.11.2013]

The last three points of discussion from the day before were resumed. A proposal was made, that two small groups of IIC members should work to develop two main issues: *data role* and *Nodes role*. They will provide a material on the subject by the first week of December. Three members volunteered for each of these groups.

The MoU on the Preparatory Work of an Initiative for developing a pan-EU distributed research infrastructure dedicated to river-sea systems – The Danube International Centre for Advanced Studies for River-Delta-Sea Systems DANUBIUS is a document addressed to the funding agencies from partner countries. It is not financially binding and at this point is a draft.

The participants read the MoU and commented on the first draft.

Several suggestions were made and questions were asked:

- Regarding the definitions used in the MoU (Article 1), use the ones from the ESFRI website
- Comment on Article 5 point B – the ISC (national funding agencies – like a government) will delegate a IIC? It is safe? There will be a problem? The IIC will remain the same if the ISC gets involved?
- What is consensus? 100%? We want to reach consensus or have the vote of the majority?
- Commit to go towards to ESFRI proposal
- Then plan the infrastructure and have an idea of money
- In the ESFRI proposal is very important to say we have a MoU from x countries
- Art 6 – comment - do we need to mention R&D?
Suggestion – explain that the doc is not financially binding

Members were asked to send initial drafting comments on the MoU and also consult the funding authorities in their countries and ask for their opinion. Comments should be sent to the IIC Chair and DANUBIUS Coordinators.

A need for more technical letters of commitment between the Romanian coordinators and the partner research institutes to become partners in DANUBIUS was also identified.

6. Communications

The meeting continued with the communication issue, presented by Dr. Adrian Stanica. Three main issues were discussed:

1. Website: communicating with the outside world
2. Website: communications within the DANUBIUS Team and IIC
3. Raising the profile of DANUBIUS.

For the website, the public domain already exists, an old website was made but it is not functional in the present. The future website will contain:

- **Home – DANUBIUS, general idea behind it**
- **Main scientific topics**
- **Partners**
- **Events**
- **Links to major initiatives**
- **Links to ESFRI**
- **Contact**

Proposals:

- Add topics covered news, contact and initiatives at the moment, flagship status.
- Make the website functional by the end of the year and keep it simple
- Add links to other initiatives

For the DANUBIUS Team and IIC there should be a **reserved domain** (for partner use only) that will have:

- Sections to be developed as on-line folders for the development of the ESFRI Proposal
- Library of useful on-line resources (PDFs with regulations, laws, etc.) to be developed for the use of partners involved in the development of the project

In order to raise the profile of DANUBIUS:

- Scientific community: Disseminate the idea as much as possible. Discussions regarding Nodes and Communities of Users, as well as clustering with other RIs – are at the beginning
- Funding agencies: national community of users/ initiative groups for Nodes should engage discussions; develop a bottom – up approach. Meetings of the IIC coordinators with funding agencies – to be planned via national communities
- Wider audience: Develop a strategy to engage mass media once the shape of Hub & Nodes starts being more defined.
-

Several proposals were made:

- Core set of Power Point Presentations to be updated or executive summary with the main points, posters used at scientific meetings
- Disseminate DANUBIUS at international conferences, in order to make more people aware that it is a fact
- A bigger poster to take to conferences
- Present DANUBIUS at the DIGIMARE meeting – January 2014, Romania
- Present DANUBIUS and take work further at JPI WATER & JPI OCEANS
- Keep a diary of the relevant events and present DANUBIUS
- Make a Power Point Presentation where every country contributes, not only Romania or a leaflet or any type of material that may be used for showing DANUBIUS.
- Create synergies between DREAM and DANUBIUS because – if they will both apply to ESFRI – there is a major risk of failure for both. How to create these synergies? – Identify ways in meetings

A bilateral meeting of Romanian coordinators off DANUBIUS with Austrian coordinators of DREAM was proposed for January 2014.

7. White/Blue

Michael Schultz opened the discussions on the content of the White Book and especially on the Blue Book (the first draft at Annex A). He explained that the White Book is a longer document providing a single source for all relevant information. The Blue Book, which is based on information from the White Book, is a shorter document aimed at funding bodies and other stakeholder bodies.

- 10 to 12 pages must be the limit of the Blue Book
- What is missing?
- What can be cut out to 10 pages?

Other questions were asked:

- Internet connection in the Danube Delta that will ensure data transmission?
- Put more emphasis in working with stakeholders and link with the questions in the area
- Could we include governance as a scientific challenge; looking at governance from the scientific point of view.
- Develop the scientific description of DANUBIUS

8. Conclusions/workplan

Agreed actions from the meeting are summarised in the following table.

Action	Who	When
One page document on Nodes	Gretchen Gettel (Coordinator), Agustin Sanchez-Arcilla , Henriette Otter	6 December

One page document on Data	Deborah Chapman (Coordinator), Andrew Tyler, Ekaterina Batchvarova	6 December
Circulate draft Mission, Vision and 'Elevator Speech'	Michael Schultz, Adrian Stanica	15 November
Agree Mission, Vision, 'Elevator Speech'	All	29 November
Comment on draft MOU	All	20 November
Seek comments on draft MOU from national funding authorities	All	6 December
Develop and launch new website	Manuela Sidoroff, Adrian Stanica	20 December
Circulate draft publicity materials	Adrian Stanica, Michael Schultz	20 December
Set up diary of events	Adrian Stanica, Michael Schultz	20 November
Provide information on forthcoming events	All	Ongoing
Provide comments on additions/deletions from Blue Book	All	6 December
Check on data transfer & availability of connections in Murighiol	Andrei Paun	20 December
Governance & Stakeholders	Henriette Otter, Jos Brils	6 December
New DANUBIUS PPT – for intl. audience	Andrew Tyler, Henriette Otter, Chris Bradley, Michael Schultz, Adrian Stanica, Vangelis Papaphanassiou	20 December
Connections with other RI projects (ESFRI, EUSDR)	Angelika Riegler, Adrian Stanica, Helmut Habersack, Paolo Favali	20 December

The next meeting was proposed for March 2014.

ANNEX 1



**DANUBIUS - DANUBe International centre for advanced stUdies for river – delta –
Sea systems**

DANUBIUS INTERNATIONAL INITIATIVE COMMITTEE

7-8 November 2013

Draft Agenda

First day (Thursday, November 7th 2013)

1400 Welcome and introductions

1. *Welcome address from Romanian coordinating institutions*

Dr. Manuela Sidoroff, General Director of the Romanian National Institute for Biological Sciences

Dr. Gheorghe Oaie, General Director of the Romanian National Institute of Marine Geology and Geoecology - GeoEcoMar

2. *Goals of meeting*

Michael Schultz

3. *Introduction to DANUBIUS*

Adrian Stanica

1430 Updates

1. *Short report on September (Sf Gheorghe) meeting.*

Andrew Tyler

2. *The DANUBIUS Project*

Adrian Stanica

3. *European developments*

Adrian Stanica

1500 The International Initiative Committee

Michael Schultz

1525 Interactive session: vision/mission

organized by Michael Schultz

1625 Structure of DANUBIUS as RI

1. *Hub and Nodes*

Michael Schultz

2. *Community of users*

Adrian Stanica

3. *Data role and policy*

Adrian Stanica

1900 End of session.

2030 Working dinner. Hanul Berarilor – Casa Bucur

Second day (Friday, November 8th, 2013)

0900 Memoranda of Understanding

Ionel Andrei

0945 Communications

1. Website: communicating with the outside world

2. Website: communications within the DANUBIUS Team and IIC

3. Raising the profile of DANUBIUS

Adrian Stanica

1030 White/Blue Books

Michael Schultz

1115 Conclusions and workplan

Michael Schultz

1200 End of meeting



THE INTERNATIONAL INITIATIVE COMMITTEE

INTRODUCTION

1. At the preliminary meeting at Sf Gheorghe in September 2013 there was a discussion of proposed terms of reference for the International Initiative Committee (IIC). This paper presents revised terms of reference, discusses membership and presents proposals for establishing Working Groups.

REVISED TERMS OF REFERENCE

2. The proposal for an International Centre for Advanced Studies of River-Delta-Sea Systems (DANUBIUS) is being developed as a project under the leadership of Romania. The International Initiative Committee (IIC) has been established to provide help and advice to the DANUBIUS Coordinator in the next phase of the project: to deliver a successful application for inclusion in the ESFRI (European Strategy Forum for Research Infrastructures) Roadmap. The key role of the IIC will be to identify, contact and gather support from national and international funding agencies. In support of this, the IIC will provide advice and help on:
 - a. the scientific scope and quality of DANUBIUS;
 - b. the roles of the Hub and Nodes;
 - c. links with other research infrastructures and programmes;
 - d. principles of governance of DANUBIUS;
 - e. actions required, including establishment of further committees or bodies, and their prioritisation;
 - f. other issues identified or agreed by the Coordinator; and
 - g. transition to a new structure following a successful application for access to the ESFRI Roadmap.
3. The membership, including an independent chair, will be appointed by, and include, the Coordinator, who will ensure that secretariat support is provided as needed.

The IIC will form two Initiative Groups: one to provide help and advice on scientific and technical matters, and the other on management matters.

It is expected that much of the work of the IIC will be undertaken by correspondence or online meetings, but some physical meetings may be needed when travel and accommodation costs for members will be provided.

MEMBERSHIP

4. Members of the IIC are persons with major involvement in the development of the DANUBIUS ESFRI Proposal/Project. Thus, members of the IIC may be:
 - persons with a deep involvement in the development of the DANUBIUS ESFRI Proposal (both the Scientific Case Study as well as the management, governance and administration);
 - representatives of potential Nodes of DANUBIUS
 - representatives of national communities of users
 - representatives of funding agencies involved in supporting the future ESFRI Proposal
 - other persons with major role in science and innovation of river-delta-sea systems.
5. The present membership is provisional, and it is expected to evolve as other research groups and organisations become involved in DANUBIUS. For this reason no membership list has yet been drawn up. The DANUBIUS Coordinators are Dr Adrian Stanica (GeoEcoMar, Romania) and Dr Manuela Sidoroff (NIBS, Romania) and the current IIC chair is Dr Michael Schultz (UK).

WORKING GROUPS

6. It is envisaged that the IIC will work partly in plenary session and partly as two Initiative Groups (IG). One (IG-ST) will focus on science and technology issues and the other (IG-M) on management, administration and governance issues. Some of the areas of the terms of reference above (eg a, d) fall clearly within the ambit of one of the IGs. However, other areas (eg b, c) are relevant to both IGs. The meeting will discuss how the IGs can be used to make the work of IIC most effective and efficient. The IGs are to be considered as the predecessors of the governance bodies of the future ESFRI RI. Thus, after acceptance of DANUBIUS on the ESFRI list the IG-ST will develop into a future International Scientific Committee, while the IG-M will become an International Management Committee.

ANNEX 3



OUTLINE DESCRIPTION OF DANUBIUS (BLUE BOOK)

INTRODUCTION

1. The *Danube International Centre for Advanced Studies on River-Delta-Sea Systems* (DANUBIUS), a new pan-European research infrastructure (RI), which will take a leading role internationally to address key global challenges in large river-delta-sea (RDS) systems. It focuses on the whole river basin and delta of the Danube and the Black Sea, which together provide a natural laboratory offering many opportunities to improve our understanding of environmental processes both in this region and in similar systems worldwide. DANUBIUS, which has been designated as a Flagship Project of the EU Strategy for the Danube Region (EUSDR), is a distributed RI based in Romania (the *Hub*) and with a network of *Nodes* distributed throughout Europe both within and outside the Danube basin.
2. DANUBIUS will provide the infrastructure to study the key processes of large RDS systems and to develop sound solutions for sustainable management of these macrosystems. It will take a multi-disciplinary approach integrating basic and applied research. This will help deliver environmentally friendly solutions for economic development of these macrosystems, which will be identified by working closely with the appropriate stakeholders.
3. This *Blue Book* provides outline information for funding bodies and other interested organisations. It sets out the rationale for DANUBIUS, its scientific framework, its organisation and its relationship with existing research institutions and universities. More detailed information on DANUBIUS is available in the White Book, which is maintained as a ‘living document’ for researchers and all interested parties.

RIVER–DELTA– SEA SYSTEMS

4. Rivers, deltas, and coastal zones are experiencing increasing pressures largely driven by human development. There have been drastic changes in land use, over-exploitation of natural resources, and hydraulic re-engineering through damming, embankment and re-channelling. As a result, RDS systems globally are experiencing degradation. This has serious implications for human communities and environmental health (Lancelot *et al.*, 2002).
5. Land/water interface biodiversity *hotspots* provide essential ecosystem services and yet are characterized by extremely dynamic processes. Moreover, the ever-increasing demands from

the human population (both within the region and globally) exert a significant and growing pressure on the functionality of these potentially vulnerable natural systems. For a holistic approach, all these factors should be considered integral parts of the ecosystem and it is essential to identify and promote measures to ensure regional sustainability, optimising the balance between environmental protection and socio-economic development.

6. Examples of successful management of RDS macrosystems are largely confined to relatively small RDS systems in areas with sparse population (Syvitski et al., 2009, Bucx et al., 2010). Challenges due to the scale and complex dynamics (driven by both natural and manmade processes) of large RDS macrosystems have resulted in a general lack of integrated and adaptive management planning.
7. New integrated management and scientific plans are needed to advance the goal of sustainably managing the RDS system (as foreseen by the Land-Ocean Interactions in the Coastal Zone (LOICZ) project of the International Geosphere–Biosphere Programme (IGBP)). Best use must be made of the capabilities of the European Space Agency’s Copernicus (former GMES) programme and the Global Earth Observation System of Systems (GEOSS). This new integrated approach to large RDS macrosystems will address the recommendations of the World Business Council for Sustainable Development: supporting environmental health means also securing the economy because ultimately *“business cannot function if ecosystems and the services they deliver—like water, biodiversity, fiber, food, and climate—are degraded or out of balance.”* (MEA 2005).

THE DANUBE RIVER – DANUBE DELTA – BLACK SEA SYSTEM

8. The Danube River - Danube Delta - Black Sea system includes some of the richest and poorest areas in Europe, with a complex recent geopolitical history. This presents real challenges in balancing the needs and requirements of habitat conservation and restoration whilst ensuring sustainable economic development. With a basin of over 800,000 km² and a catchment encompassing 19 countries, the Danube River is the most international river in the world (Figure 1a), connecting people with differing economic, social, cultural, and environmental heritages, as well as different political backgrounds (Sommerwerk et al. 2010). Of the countries that share the Danube catchment, eleven are EU Member States (Austria, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Italy, Poland, Slovakia, Slovenia, Romania). The eight non-Member States (Albania, Bosnia and Herzegovina, Macedonia, Moldova, Montenegro, Serbia, Switzerland, Ukraine) are ICPDR members of the International Commission for the Protection of the Danube River and are committed to the EU Water Framework Directive.
9. After flowing for over 2,800 km across Central and Eastern Europe, the Danube River forms a wide delta, the Danube Delta (Figure 1b), at its confluence with the Black Sea (Sommerwerk et al. 2009). The Delta is the largest remaining natural wetland in the EU (~5 800 km²) and one of the most valuable European habitats for wildlife and biodiversity. It was declared a Biosphere Reserve in 1990 and is included in the World Natural Heritage List, the RAMSAR Convention List and the UNESCO Programme Man and Biosphere.

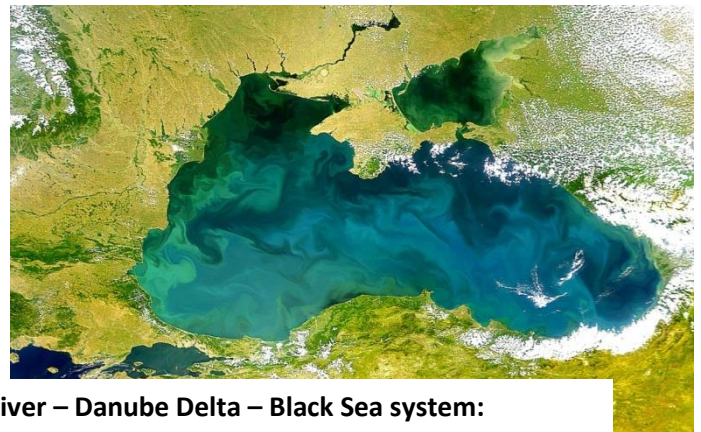


Fig. 1 – The three components of the Danube River – Danube Delta – Black Sea system:

(a) the Danube River drainage basin (area ~817.000 km²); (b) the Danube Delta (area ~5 800 km² – satellite image); (c) the Black Sea (area ~420.000 km² – satellite image)

10. The Black Sea (Figure 1c) has an area exceeding 430,000 km² and is surrounded by six countries: Bulgaria, Georgia, Romania, Russian Federation, Turkey and the Ukraine. It represents the physical boundary between Europe and Asia and has unique environmental characteristics. This semi-enclosed sea has a clear vertical stratification of water masses and is the largest anoxic basin in the world. Its salinity is significantly lower than the average of the Planetary Ocean and its water balance is controlled by the freshwater inputs from major rivers among which the Danube is the largest. The western Black Sea is strongly influenced by the water and sediment fluxes from the Danube (Ryann & Perkins 2011).
11. Both the Danube River and Black Sea are known to have been a major navigation route since ancient times, linking Asia and Europe. Their geo-strategic importance is still acknowledged today (e.g. the 7-th European Transport Corridor).

12. The Danube River Basin exemplifies many of the most serious and pressing problems confronting large RDS systems globally. It is estimated that over 80% of the former floodplains have been degraded or lost (www.icpdr.org), though in the Lower Danube and the Danube Delta such areas have been partly preserved, providing high habitat heterogeneity and rich biodiversity.
13. Future development in the Danube-Black Sea macroregion is threatened by the lack of integrated, comprehensive system planning (Bloesch et al., 2011). This is acknowledged in the *European Union Strategy for the Danube Region (EUSDR)*, which aims to implement an integrative policy in the region and enhance cross-border cooperation to achieve the overarching EU goal of sustainability (COM 400, 2009). The objectives of EUSDR are: connectivity, environmental protection, building prosperity, and strengthening the Danube Region. This is the first time that environmental protection has been considered when developing social and economic policies for the Danube Basin. While DANUBIUS addresses a number of EUSDR priorities, a specific EUSDR action is “*to strengthen the capacities of research infrastructure*”, with a secondary action “*to establish joint international research centres for advanced studies*” to attract world-class scientists and provide modern research infrastructure. Under this action, DANUBIUS has been designated as a EUSDR flagship project. Further information on EUSDR is at Annex A.
14. DANUBIUS also addresses priority areas with the *Europe 2020* – the EU’s growth strategy for the coming decade (COM 2010/2020) - on environment, climate change and biodiversity, starting from the model/case-study of the Danube-Danube Delta-Black Sea system. Europe 2020 focuses on five ambitious goals in the areas of employment, innovation, education, poverty reduction and climate/energy.” (<http://ec.europa.eu/europe2020/>). The interdisciplinary research facilitated by DANUBIUS will be essential in addressing the R&D challenges of Horizon 2020.

DANUBIUS

15. While most research organisations active in the specific fields of river, estuarine, deltaic and marine sciences undertake multi-disciplinary projects, there is a strong need for an integrative approach to specific questions pertaining to RDS systems. To move forward, a fundamental prerequisite is to re-evaluate the current state of our knowledge and understanding of these complex systems. Recent scientific and technological advances afford opportunities to monitor RDS macrosystems at the entire basin scale and in real time.
16. Opportunities provided by research in the natural laboratory of the Danube River – Danube Delta – Black Sea system will be maximised by building capacity with a new research infrastructure and by actively involving researchers and institutions from both within and outside the region. By bringing together the capacities within the Danube Region and internationally, DANUBIUS will deliver the critical mass required to tackle complex problems across the different components of RDS systems in an integrated way. This exemplar will provide research outputs that will be transferrable to other large RDS macrosystems globally.
17. DANUBIUS will become an ambitious and unique platform for research on RDS systems through integrating knowledge and understanding contributed by different disciplines including the Earth, Environmental, Social and Economic sciences. It will facilitate and coordinate

research and will offer an infrastructure to deploy and maintain monitoring stations spanning the river catchment system down to the deep sea basin. It will ensure quality assurance of all data collected, its storage and dissemination.

18. Through taking a leading role in summarising the current state of knowledge, DANUBIUS will develop the scientific agenda by defining research priorities and setting scientific goals. It will advance fundamental research in RDS systems and find solutions to critical, timely and controversial issues.

THE ROLE OF DANUBIUS

19. DANUBIUS will provide the infrastructure to:
 - study the processes that influence the evolution of river, wetland, delta, lagoon and coastal ecosystems;
 - develop a knowledge-based economy to support sustainable economic growth in the RDS areas while conserving natural biodiversity;
 - educate through Masters, PhD and post-doctoral programmes in conjunction with universities across Europe;
 - engage with the wider community through conferences, specialized training courses, workshops, summer schools, developing e-learning facilities and ecological educational programmes for the local communities and tourists.
20. These activities will be carried out in close collaboration with the Danube Delta Biosphere Reserve Administration, managers of nature reserves, local communities and stakeholders in order to achieve sustainable management of wetlands and floodplains from the Danube catchment, the Delta, Black Sea coastal zone and of the coastal sea. It is envisaged that this philosophy will provide the frameworks and best practice solutions for comparable systems outside the Danube Region.
21. The core scientific capabilities of DANUBIUS will comprise a pyramid of knowledge upon to base the effective integrated management of a large RDS macrosystem. The scientific capabilities of DANUBIUS will include (Figure 2):
 - an appropriate monitoring infrastructure, where improved, detailed and continuous data and sample collection will be performed
 - the potential to develop new and more advanced analytical and experimental methodologies
 - the development and application of new and improved environmental models of large RDS systems to allow for predictions
 - the development and application of new and improved approaches within environmental economics to evaluate the connections between society and nature
 - the identification of management solutions based upon the detailed forecasting and analysis of future scenarios of environmental change.

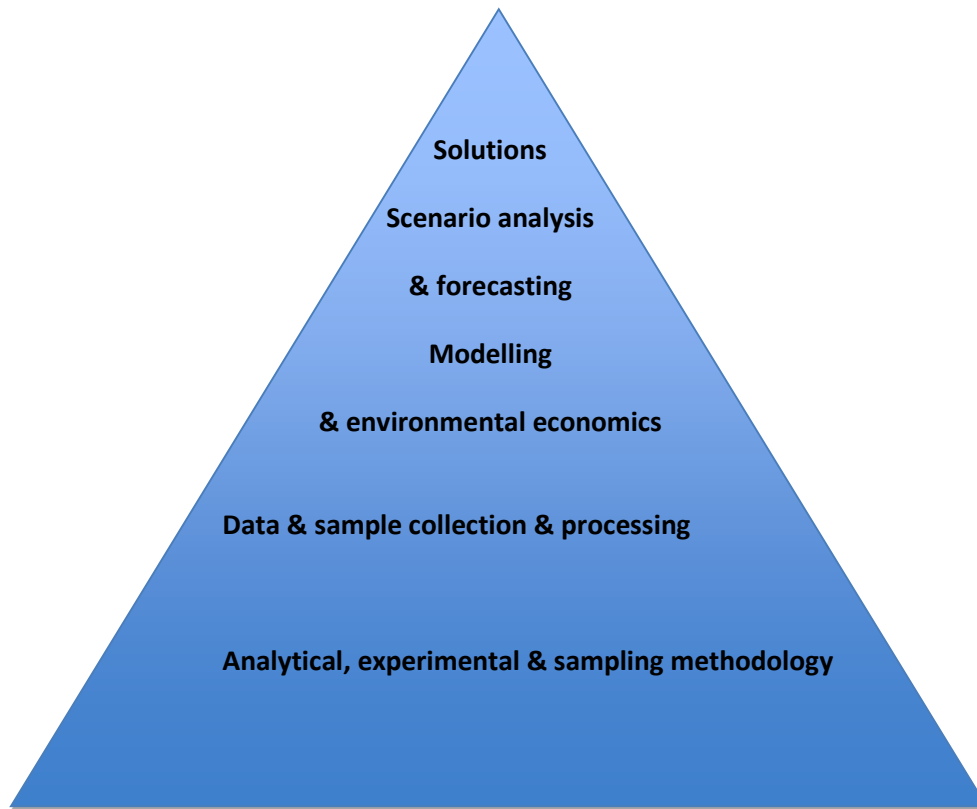


Figure 2. Core scientific capabilities of DANUBIUS

22. DANUBIUS will advance the integrated management of RDS systems through engagement in core research programmes that address major global scientific challenges, including:
- understanding the genesis and natural evolution of large RDS systems
 - quantifying the impact of anthropogenic changes on large RDS macrosystems
 - determining the vulnerability and/or resilience of large RDS macrosystems under a changing climate
 - characterizing biogeochemical cycles in large RDS macrosystems
 - advancing integrated management of catastrophic floods/droughts or hazardous materials in large RDS macrosystems
 - investigating the consequences of physical destruction of morphological structures and habitats (e.g. through channelization, embankments, damming) and develop measures for hydromorphological restoration
 - conserving and restoring the biodiversity in large RDS macrosystems
 - enhancing and protecting the ecosystem services provided by large RDS macrosystems
 - developing management solutions for existing and future framework policies (for example the WFD)
 - providing scientific expertise to develop, improve and test tools to advance policy and guidelines for environmental protection.
- Possible science research areas for DANUBIUS are shown in Annex B.
23. An analysis of the national, international and pan-European funded projects on the integrated management in the Danube River – Danube Delta – Black Sea System will be developed in the FP7 Project DANCERS. DANUBIUS will build upon these projects. It will further initiate,

and participate in, projects within international frameworks by cooperating with other major research organisations.

24. In addition to these scientific and management topics, DANUBIUS will play an important role in:
 - facilitating and promoting education – supporting common international and national environmental programmes on the study of large RDS systems; environmental education to increase awareness of RDS systems
 - environmental laws and regulations - providing the scientific basis to improve and test tools for the implementation of EU policy and guidelines for environmental protection
 - development of innovative green products and technologies – focusing on valuing natural resources in RDS systems according to the accepted principles of sustainable development
 - development of innovative R&D technologies, equipment and ICT – new monitoring, measurement and modelling techniques, as well as data collection, processing, storage and transfer require novel technical and ICT capabilities
 - development of a reliable meta-database by integrating historical literature data and data from DANUBIUS's own research programmes with those from other organisations within the Danube – Black Sea Region.
25. As a leading research, education and innovation infrastructure for natural and socio-economic sciences, DANUBIUS will enhance knowledge transfer in this area by working closely with existing research and education organisations. DANUBIUS will comprise a tight network of pan-European institutions and Universities from its initiation and so will benefit from expertise already available. It will cooperate with other research teams to tackle significant problems across large RDS systems.
26. Top scientists will be invited to form core teams to work on the DANUBIUS research programmes. Their presence will attract young scientists as well as undergraduate and graduate students wishing to gain experience in these attractive and challenging areas. Field samples necessary for these studies will be taken, preserved and analysed in-house or in laboratories of other research organisations.
27. The education platform offered by DANUBIUS will provide significant added value by creating a forum for knowledge exchange among scientists and between scientists and students. In so doing, the forum will promote cooperative projects, particularly between teams from eastern and western Europe. Intensive courses, summer schools, conferences and seminars will be invaluable mechanisms of knowledge dissemination. Additionally, DANUBIUS will raise awareness of the value of the natural environment and its role in human well-being through ecological tours and talks designed for local communities, teachers or tourists.

LOCATION OF DANUBIUS

28. As a pan-European distributed Research Infrastructure, DANUBIUS will be coordinated by a physical *Hub* based in the Danube Delta Biosphere Reserve and a series of *Nodes* across Europe

(both within and outside the Danube Region). The *Hub* will provide an administrative centre, educational facilities, new laboratories, and the gate to the Danube Delta natural laboratory. The *Nodes* will be leading facilities and centres of research excellence dealing with processes, research methodology and offering access to other comparable macrosystems (or parts of the macrosystems). The *Hub* and *Nodes* will all be directly connected (Figure 3).

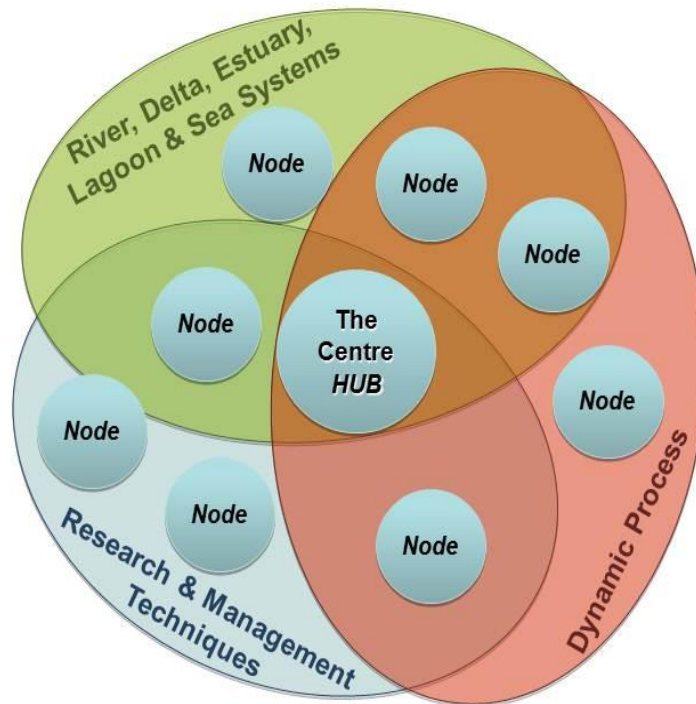


Figure 3. Schematic diagram showing the concept of the distributed research infrastructure with the *Hub* Murighiol and the *Nodes* throughout Europe

29. The structure of DANUBIUS with the *Hub* in the Romanian part of the Danube Delta and *Nodes* distributed across Europe will provide the best expertise and capabilities within Europe for the Danube River – Delta – Black Sea macrosystem and other similar large macrosystems globally. The international expertise brought together under this umbrella, working within the environmental, earth, and socio-economic sciences, provides an excellent basis to develop a network on the sustainability of RDS systems.
30. Romania has a history of supporting relevant research over the past two decades, has taken the lead in developing plans for DANUBIUS, and has committed land and resources for the *Hub*. The location of the *Hub* was selected from eleven sites within the Danube Delta Biosphere Reserve. It will be located on the right bank of the St. Gheorghe arm, within the Danube Delta Biosphere Reserve, at Murighiol (Figure 4). This location ensures easy access by road and via the Danube River. It offers immediate access to the Danube Delta, as well as easy access to the coastal zone and the Danube River before the delta's apex. The Murighiol Local Council has approved ten hectares of land for the *Hub*. Location in the Danube Delta offers new

opportunities for the development of the regional economy. DANUBIUS will work with local communities, offering significant educational outreach and developing the knowledge-based economy.

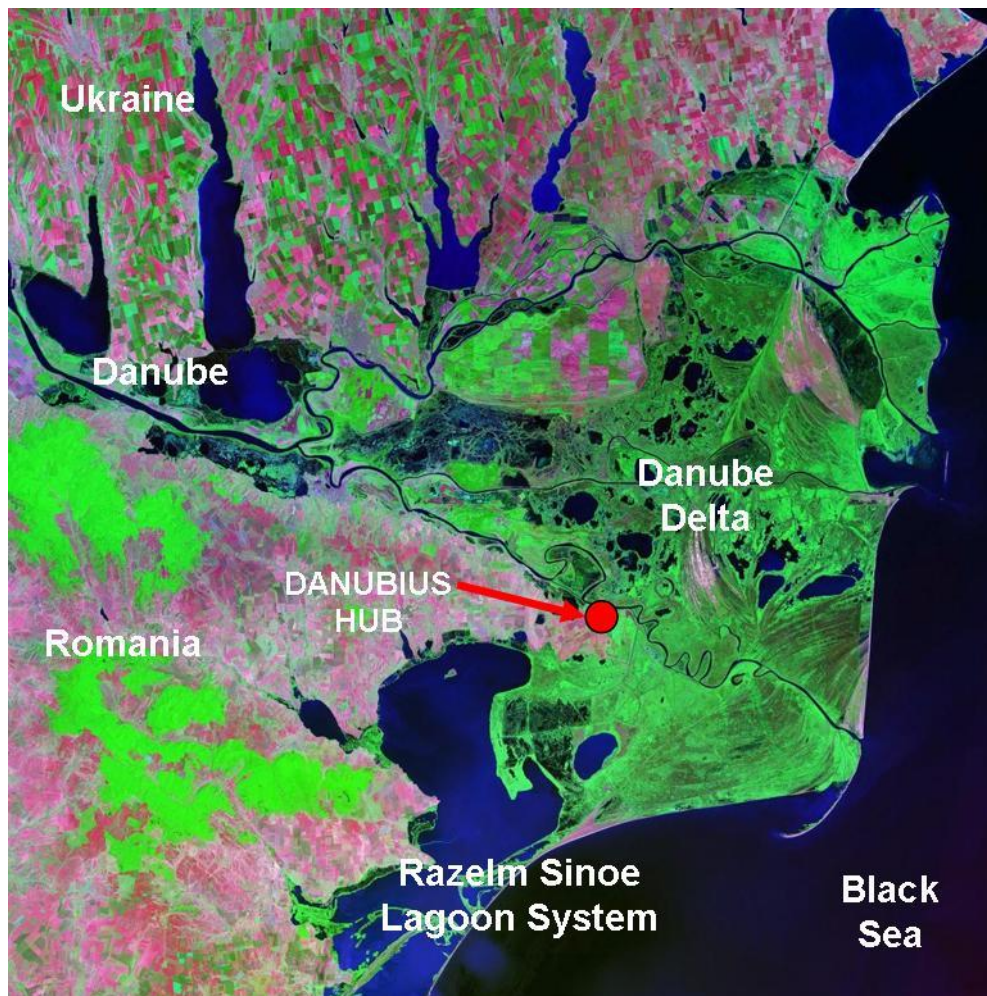


Figure 4. Location of the DANUBIUS Hub (Background image LANDSAT 2000)

PARTNERS

31. A range of national and international organisations are charged with the environmental and sustainable management of specific elements of the Danube River – Danube Delta – Black Sea. DANUBIUS will actively engage with these organisations by jointly establishing plans to solve some of the major challenges within the Danube – Black Sea macrosystem. These plans will be facilitated by the data repositories within DANUBIUS and the ability of DANUBIUS to draw upon new and emerging methods, approaches and models for the integrated environmental management of the macrosystem.
32. Within Romania, national funding has been available both in specific programmes for R&D provided by the National Authority for Scientific Research, and in programmes coordinated by other Ministries.

33. Many European and international research and educational institutions are already involved, or have expressed interest in, studies on the Danube system in the framework of DANUBIUS. A provisional list of these institutions interest is given in Annex C.
34. Training and education is planned to be developed with the major universities from the Danube Region. Close collaboration on the topic of DANUBIUS will be made with DANUBE FUTURE, the EUSDR flagship project that is endorsed by the Alps Adriatic Rectors' Conference (AARC), and the Danube Rectors' Conference (DRC) and that plans to develop high performance education programmes in a network of universities from the wider Danube Region. There will also be collaboration with the Black Sea Universities Network, which comprises in excess of 100 institutions of higher education from the Black Sea Region (including Turkey, Georgia, Armenia, Azerbaijan, Ukraine, Moldova, Romania, Bulgaria, Greece, Albania, Serbia) and is coordinated by the University "Ovidius" of Constanta, Romania.
35. DANUBIUS will seek to become part of the European Strategy Forum on Research Infrastructures (ESFRI) Programme, collaborating in particular with the following major ESFRI projects:
- *LIFE WATCH* - science and technology infrastructure for biodiversity data and observatories. DANUBIUS will provide the facilities needed to acquire data on aquatic ecosystems from RDS macrosystems.
 - *EPOS* - research Infrastructure and e-Science for Data and Observatories on Earthquakes, Volcanoes, Surface Dynamics and Tectonics. DANUBIUS will benefit from the distributed infrastructure provided by the geodynamic observatories component of EPOS.
 - *EURO-ARGO* - research infrastructure for ocean science and observations. Major information collected by the EURO-ARGO floats will be used to better understand the water and sediment dynamics at river-sea interaction zones.
 - *EMSO* - European multidisciplinary seafloor observation infrastructure. The sea-floor observatories will represent the major infrastructures studying the latter part of RDS macrosystems.
 - *ANAEE* – experimental facilities to be developed within DANUBIUS will be made available to mutually enhance the capabilities of both ESFRI Research Infrastructures.
 - *ICOS* – DANUBIUS will deploy a major facility to monitor green-house gas emissions in natural deltaic and coastal wetland environments.

DANUBIUS GOVERNANCE

36. It is envisaged that, as a distributed RI, DANUBIUS will be constituted as a European Research Infrastructure Consortium (ERIC) with governance arrangements following ERIC guidelines. The *Hub* will be part of the ERIC while some *Nodes* are expected to be outside the ERIC. Membership of DANUBIUS will be open to EU Member States, other countries, and international organisations. Details of DANUBIUS structure and management will be developed during a preparatory phase project.

37. During the early phase of DANUBIUS development, there is a Project Coordinator (Dr Adrian Stanica) at the Romanian National Institute for Marine Geology and Geoecology (GeoEcoMar), supported by an International Initiative Committee, with representatives from all countries expressing support, and with Working Groups separately covering scientific and management aspects.

CONSTRUCTION OF THE INFRASTRUCTURE

38. The establishment of DANUBIUS will proceed in three phases. The *first phase* (2013-2016) will involve the construction of the *Hub* (including accommodation and storage facilities, laboratories and office equipment) and development of connections with existing national and international RIs. The *second phase* (2016-2018) involves installing specialized scientific equipment. The *third phase* (2018-2020) will be marked by the continuation of development of infrastructural capabilities including research vessels.

COSTS AND FUNDING

39. The initial estimated total capital investment of the Hub for buildings, equipment and installations (exclusive of personnel and running costs) is of 200 million Euros:

-	Phase 1 2014-2016	80 million Euros
-	Phase 2 2016-2018	40 million Euros
-	Phase 3 2018-2020	80 million Euros

Operational costs (personnel, logistics, infrastructure maintenance and partial research funding) are expected to be:

40. More accurate figures will be determined by a feasibility study in 2014-2015, which will consider all the aspects related to the construction, equipment and installation of the *Hub* and to its connection to different facilities.
41. Funding for the development of the concept, construction and operation of DANUBIUS will be sought from a number of sources, including:
- For the development of the “scientific philosophy” – EC framework programme funding through projects and national projects;
 - For the construction and operation of the *Hub* – ERDC funds (the 2014-2020 budget – dedicated Structural Funds) and Romanian Government national budget.

ANNEX A

EUROPEAN UNION STRATEGY FOR THE DANUBE REGION

The EUSDR was adopted by the European Commission in June 2011 to address the following challenges of the Danube Region:

- environmental threats (water pollution, floods, climate change)
- untapped shipping potential and lack of road and rail transport connections
- insufficient energy connections
- uneven socio-economic development
- uncoordinated education, research and innovation systems
- shortcomings in safety and security

It was recognised that better coordination and cooperation between the countries and regions is needed to address these challenges. The Strategy aims at better coordination and alignment of policies and funding.

In order to improve:

- transport connections
- energy connections
- the environment
- socio-economic development
- security

Eleven priority areas were identified:

- to improve mobility and intermodality
- to encourage more sustainable energy
- to promote culture and tourism, people to people contacts
- to restore and maintain the quality of water
- to manage environmental risks
- to preserve biodiversity, landscapes and the quality of air and soils
- to develop the knowledge society
- to support the competitiveness of enterprises
- to invest in people and skills
- to step up institutional capacity and cooperation
- to work together to tackle security and organised crime.

Under Priority Area 7 – Knowledge Society, four projects have been declared so far as “Flagship Projects for the EUSDR”. Besides DANUBIUS, these projects are: DREAM, DRIF and DANUBE FUTURE.

All four projects are of major importance for the development of the knowledge society in the Danube Region and must work together in close cooperation.

DRIF (Danube Region Research and Innovation Fund) aims at defining a research and innovation programme to deal with the critical issues from the region. DANUBE FUTURE groups together major universities from the wider Danube Region (Danube Region and Alps – Adriatic Region) willing to promote excellence in education and promote R&I among the younger generation. DREAM (Danube River REsearch and Management) and DANUBIUS are complementary distributed research infrastructures covering the Danube Region. Plans for further development of the four flagship projects will need to be developed together, in order to make best use of the existing plans. Ex. education programmes from DANUBE FUTURE in the various aspects of integrated river management will be developed using the research facilities offered by DREAM and DANUBIUS.

DREAM deals mainly with the critical problems related to the navigation along the entire Danube River, trying to find solutions to the critical issues of maintenance of the minimum navigation depth from the Upper Danube to the Lower Danube. It covers aspects of hydraulic engineering that are entirely complementary to DANUBIUS. Common domains between the two projects are hydrology and geomorphology, dealt with from different angles. DREAM, as a distributed RI, will have the Hub in Vienna, while the Romanian node will be built in the Danube Delta and will also be a Node of DANUBIUS. As complementary flagship research infrastructure projects for the Danube Region, DREAM and DANUBIUS are being developed in close cooperation, in order to obtain best synergy and make best use of the existing resources.

ANNEX B

DANUBIUS SCIENTIFIC DOMAINS

The following are indicative of the research topics that will be addressed by DANUBIUS:

System characterisation including the Genesis and Evolution of large RDS systems:

- geodynamic processes influencing large RDS systems,
- regional paleoclimate, paleolimnology and paleogeography, sediment transport, biogeochemical cycling, hydrology and morpho-dynamics,
- assessment of the ecosystems evolution.

Environmental Change including the impact of Global Change:

- assessment of changes in ecosystem structure and functionality under natural and anthropogenic pressures,
- real-time and continuous assessment of environmental quality; development of complex early-warning system to support risk management,
- recommendations and guidelines to improve ecological status of ecosystems with lost functionality and conserve endangered species and habitats.

Adaptive and sustainable management of large river-delta-sea systems:

- methods and models for sustainable development using the interdisciplinary, holistic approach
- system resilience in the context of environmental change (both natural and anthropogenic influences)
- evaluate social dynamics of local communities in the framework of sustainable development.

Traditionally, research on these systems has been discipline specific. DANUBIUS will pioneer a new approach to integrate across cognate disciplines to find definitive holistic solutions drawing upon the work of multidisciplinary research teams. Further information is tabulated below.

System characterization	
ORIGIN & EVOLUTION OF THE DANUBE RIVER-DELTA-BLACK SEA	Genesis of the river & basin; geological structure; Earth crust dynamics and river evolution; interactions between the river and the sea (relation to sea-level changes and connections to other basins; delta formation; evolution of depocentres, etc.).
GEODYNAMIC PROCESSES	Neo-tectonics; uplift processes in orogenic zones and formation and evolution of river terraces; subsidence and sediment compaction; correlation with system evolution.

HYDROLOGY, HYDRODYNAMICS AND SEDIMENTOLOGY	Water and sediment fluxes in the river – delta - coast – sea system; the sediment cycle (source – transfer – sink); bio- & geo-chemistry of water & sediment throughout the system; hydrodynamic processes at the river/sea interface and in coastal wetlands.
ECOSYSTEM ASSESSMENT AND FUNCTION	Evaluation of the biotic and abiotic status of the river-delta-sea ecosystems; System pollution, eutrophication, toxicity, biodiversity; Evaluation of food-chains, population dynamics and ecosystem function; green-house gas fluxes in wetlands, lakes & sea.
Environmental change	
IN-SITU ECOSYSTEM MONITORING	Real-time and permanent environmental quality assessment in the river-delta-sea system; application of new types of on-line sensors and equipment (including micro- and mesocosm techniques); use of biomarkers; Establishing long-term data series to study process changes.
EARTH OBSERVATION AND REMOTE SENSING	Characterizing land and water in the RDS systems, monitoring morphological & hydrological changes, studying and monitoring water currents and river plumes, eutrophic conditions, sediment dynamics and seafloor conditions.
GEO-HAZARDS AND RISK ASSESSMENT	Understanding extreme events, their natural & anthropogenic triggering mechanisms at different scales, such as floods, draughts, landslides, storms; earthquakes; slope instability on the continental margin; geo-hazards originating from gas-hydrates.
MODELLING, SIMULATION AND HYPOTHESIS TESTING	Predictive tools to assess environmental response; climate and environmental change modelling including impacts on the RDS system; effects of extreme events on the system; impacts of sea-level rise.
ANTHROPOGENIC IMPACT ON ECOSYSTEM GOODS AND SERVICES	Damages induced by anthropogenic activity on ecosystems; evaluating the social dynamics of local communities & identify economic opportunities for sustainable development while minimizing biodiversity loss.
Adaptive and sustainable management	
ADAPTIVE ECOSYSTEM MANAGEMENT	Provision of the scientific basis for sustainably managing of river-delta-sea systems using an appropriate range of methods and models.
NATURE CONSERVATION & RESTORATION	Improve the ecological status, habitat restoration, bioremediation, restoration of connectivity; guidelines to conserve endangered species & habitats; implementation of EU environmental legislation; assessment of invasive species.
NATURAL RESOURCE ASSESSMENT AND EVALUATION	Studies advancing the sustainable management of biotic and abiotic resources through knowledge-based development and use of a wide range of methods and models (e.g. valuing ecosystem services).
EVALUATING DEVELOPMENT SCENARIOS FOR SUSTAINABLE USE	Interdisciplinary and holistic approach to developing new strategies for sustainable management. Develop methods for and apply/test Decision Support Systems (DSS) and Multi-Criteria Decision Aids (MCDA).

ANNEX C

ORGANISATIONS EXPRESSING SUPPORT OR INTEREST

Austria

- The Interuniversity Centre for Aquatic Ecosystem Research, WasserCluster
- University of Natural Resources and Life Sciences (BOKU), Vienna

France

- Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER)

Germany

- Helmholtz-Zentrum Geesthacht (HZG)
- Center for Materials and Coastal Research
- Federal Institute of Hydrology, Koblenz

Greece

- **Hellenic Centre of Marine Researches**

Ireland

- **University College Cork**

Italy

- **Institute of Marine Researches (ISMAR), CNR (National Research Council)**
- **National Institute for Geophysics and Vulcanology (INGV)**

Moldova

- **Moldavian Academy of Sciences, Chisinau**

Romania

Proposal coordinators

- **National Institute of R & D for Marine Geology and Geo-ecology (GeoEcoMar)**
- **National Institute of R & D for Biological Sciences**

Community of potential beneficiary and partner institutions

- **“Danube Delta” National Institute for Research and Development**
- **“Grigore Antipa” Romanian Marine Research and Development Institute (RMRI)**
- **Institute of Biology - Bucharest, Romanian Academy**
- **National Research and Development Institute for Environment Protection (NRDIEP)**
- **“Ovidius” University of Constanta**

- **University of Bucharest**
- **Technical University of Constructions, Bucharest**
- **Alexandru Ioan Cuza University, Iasi**
- **Babes Bolyai University, Cluj Napoca**
- **Politehnica University, Bucharest**
- **National Institute for Earth Physics, Magurele**
- **National Institute for OptoElectronics (INOE), Magurele**
- **National Administration of Meteorology, Bucharest**
- **National Institute of Hydrology and Water Management, Bucharest**
- **Institute of Geography, Bucharest, Romanian Academy**
- **Grigore Antipa Museum of Natural History, Bucharest**
- **Lucian Blaga University, Sibiu**
- **Western University Vasile Goldis, Arad**
- **Aurel Vlaicu University, Arad**
- **Western University of Timisoara**
- **Oradea University**

Spain

- **International Centre for Coastal Resources Research (CIIRC)**

Switzerland

- **Swiss Federal Institute of Aquatic Science and Technology (EAWAG)**

United Kingdom

- **University of Stirling**
- **University of Birmingham**
- **University of Hull**
- **Scottish Universities Environmental Research Centre (SUERC)**
- **NERC Centre for Ecology and Hydrology**

UNESCO

- **Institute for Water Education (UNESCO-IHE)**

8.3. Vizibilitate și inițiative de sprijin pentru DANUBIUS - RI

8.3.1. Anexa 6 – Calitatea de proiect fanion a DANUBIUS - RI



EUSDR Priority Area 7:

To develop the Knowledge Society through research, education and information technologies

In reference to the minutes from the sixth PA7 Steering Group meeting

LABEL PRIORITY AREA 7 FLAGSHIP PROJECT

The project proposal **DANUBIUS - DANUBE INTERNATIONAL CENTRE FOR ADVANCED STUDIES FOR RIVER-DELTA-SEA SYSTEMS**, proposed by Romanian consortium represented by Dr. Adrian Stanica, Scientific Director of the National Institute of Marine Geology and Geoecology – GeoEcoMar Bucharest, Manuela Sidoroff – director general of National Research and Development Institute for Biological Sciences and Viorel VULTURESCU – counselor at Ministry of National Education, was unanimously elected for the “Label Priority Area 7 Flagship Project” within European Union Strategy for the Danube Region, Priority Area 7, at the sixth PA7 Steering Group meeting held on 24 September 2013 in Ulm, which was attended by the official representatives of 7 EUSDR countries (Germany: Baden Wurttemberg and Bavaria, Austria, Czech Republic, Slovakia, Hungary, Serbia and Romania).

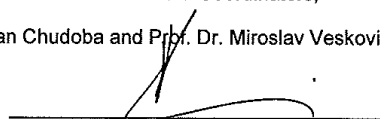
The Priority Area 7 Flagship Projects are outstanding projects which are expected to make a significant impact on the Danube Region as a whole in the field of research, education and/or information technologies. To be eligible for the Label the project must be jointly developed by a minimum of three Danube Region countries having a decisive impact in at least five Danube regions.

The “Label Priority Area 7 Flagship Projects” acknowledges the extraordinary importance of a project for the Danube Region Knowledge Society.

Novi Sad, 2 October, 2013.

no: 03-156/29

On behalf of EUSDR PA7 Coordinators,
Mr. Stefan Chudoba and Prof. Dr. Miroslav Vesković



Prof. Dr. Miroslav Vesković,
Rector, University of Novi Sad

1

EU STRATEGY FOR THE DANUBE REGION (EUSDR) | www.danube-region.eu

8.3.2. Anexa 7 – Asistență din partea EMSO pentru DANUBIUS - RI

I 00143 Roma
Via di Vigna Murata 605
Tel: (0039) 06518601
Fax: (0039) 0651860580
URL: www.ingv.it
email: info.roma@pec.ingv.it



Istituto Nazionale di
Geofisica e Vulcanologia



Letter of support to DANUBIUS

To whomever interested

As Coordinator of EMSO (European Multidisciplinary Seafloor and Water-Column Observatory, <http://emso-eu.org>) ESFRI Research Infrastructure, that ended its Preparatory Phase last year and now is in the interim period towards the establishment of the legal entity, ERIC (European Research Infrastructure Consortium), managing and coordinating the EMSO infrastructure, I hereby present my support towards the creation and development of DANUBIUS - the Danube International Centre for Advanced Studies for River-Delta-Sea Systems as future proposal to be submitted towards ESFRI.

Due to its specific objectives and structure, EMSO, as distributed pan-European research infrastructure dedicated to the study of marine seafloor and water-column processes, supports the development of DANUBIUS, that aims to understand the evolution and dynamics of major river-delta/estuary-sea systems, which are major factors influencing the state of seas and oceans. Even more, as DANUBIUS intends to use as case study also the Danube River - Danube Delta - Black Sea macro-system, its development will provide a precious contribution to the better development of the EMSO node in the Black Sea. It has already been established that a common node of connection between EMSO and DANUBIUS is represented by the EUXINUS seafloor and water-column observatories positioned during the MARINE GEOHAZARD project on the NW Black Sea shelf.

Roma, 28th November 2013

Dr. Paolo Favali
Research Director
EMSO-Interim Office Lead
Istituto Nazionale di Geofisica e Vulcanologia (INGV)
e-mail: interim.office@emso-eu.org
website: <http://www.emso-eu.org>

Survey of existing research infrastructure facilities and expertise on the water cycle in Europe

Introduction

The Ministry of National Education has appointed a consortium formed of *National Research and Development Institute for Marine Geology and Geoecology* (GeoEcoMar) – leader, *National Institute of Research and Development for Biological Sciences* (INSB) - partner no. 1, *SC FM Management Consultancy SRL* (FMCC) - partner no. 2 and *SC Gea Strategy & Consulting S.A. (GEASC)* - partner no. 3, to implement the contract ***Preparation of the proposal for the Danube International Centre for Advanced studies on River – Delta – Sea Systems to be included on the future ESFRI Roadmap.***

This questionnaire seeks general information about the existing research infrastructure facilities and expertise on the water cycle, mainly on river – delta – sea systems in Europe, as well as the envisaged future needs development.

We kindly ask you answer the questions and return the completed document at the end of the 4 days' workshop organized in Romania, Danube Delta (2 – 6 September 2013) to organizers of the event.

We thank you in advance for your participation and should you have any further questions please do not hesitate to contact Dr. Adrian Stănică, Scientific Director at GeoEcoMar.

Date: September 1st, 2013

1.1.1. ICOS

Question 1. Respondent contact details and information regarding the organization

Name: Marjut Kaukolehto

Respondent e-mail address: marjut.kaukolehto@helsinki.fi

Organization: University of Helsinki, Dep. of Physics, Div. of Atmospheric sciences; ICOS RI Interim Head Office

Position within the organization: Research coordinator (1); member of the ICOS Head Office set up team and Interim RI Committee (2)

Main areas of scientific research of your organization: Meteorology and atmospheric sciences, climate research; Geosciences; Forest sciences; Analytical chemistry; Environmental research

(1) The Department of Physics of the University of Helsinki is one of the largest departments in the University of Helsinki. Division of atmospheric sciences covers physical, meteorological and chemical processes in the atmosphere, focusing especially on:

- Atmospheric aerosols: climate change and health effects;
- Micrometeorology: interactions between ecosystem and the atmosphere, carbon sinks;
- Meteorological modelling: climate research, development of weather forecast models, Martian gas sphere and;
- Weather radar: development of radar measurements.

The Department of Physics coordinates the atmospheric and earth system sciences centre (ATM) in Finland.

(2) Pan-European research infrastructure ICOS RI aims to enable research to understand the greenhouse gas budgets and perturbations by providing long-term observations required to understand the present state and predict future behavior of the global carbon cycle and greenhouse gas emissions. Observations are carried out by the distributed National Networks of atmospheric and ecosystem measurement towers and oceanic measurement points. The measurement technique, calibration and data processing are standardised and organised by Central Facilities. Carbon Portal distributes various levels of data products. (<http://icos-infrastructure-transition.eu>)

Scientific areas of the organization related to water cycle (river, delta, sea, etc.):

The description below concerns ICOS RI.

The observations collected by ICOS RI will enable researchers to gain full understanding of the exchange of greenhouse gases over the European continent, and of its driving forces, using:

- Atmospheric greenhouse gas concentrations of CO₂, CH₄, CO and radiocarbon-CO₂ to quantify the fossil fuel component
- Ecosystem fluxes of CO₂, CH₄, H₂O, and heat together with ecosystem variables needed to understand processes
- Marine measurements of atmospheric and ocean partial pressure of CO₂, sea surface temperature, sea surface salinity, wind speed and atmospheric pressure, and flask measurements of atmospheric CO, CO₂, CH₄, N₂O SF₆, H₂, and N₂/O₂.

Marine ICOS will provide the long-term oceanic observations required to understand the present state and predict future behavior of the global carbon cycle and climate-relevant gas emissions. Marine ICOS will support a network of observations in the oceans particularly in the North Atlantic, Nordic Seas, Baltic and Mediterranean. Marine ICOS will build on expertise and results gained during EU-funded science projects (CAVASSOO, CARBO-OCEAN and CARBOCHANGE). In addition, as the observation of CO₂ fluxes is global concern, marine ICOS will work with the global observing community the further the development of network of global observations. Currently this coordination exists through the work of the IOC International Ocean Carbon Coordination Project (IOCCP, <http://www.ioccp.org/>). Marine ICOS will consequently support appropriate observations in ocean areas other than the North Atlantic as observing platforms extend beyond the core ICOS area.

ICOS ecosystem stations are a set-up of instruments, usually on a tower, that measures the flux of relevant greenhouse gases (GHGs), energy and momentum representing local surface surrounding the measurement site, typically within 100 m - 1 km. Additional measurements of ancillary parameters on air, plants and soil (or water body) are also made within this footprint area. The surface can consist of bare soil, vegetation or water. One of the main changes in the ICOS ecosystem station organization occurred in 2012 has been the decision to add also the inland water ecosystems. Inland waters have a significant role in the sequestration, transport and mineralization of organic carbon. Although inland waters are especially important in lateral transporters of carbon, their direct carbon exchange with the atmosphere has also been recognized to be a significant component in the global carbon budget.

More information on the concepts of ICOS observations can be found from the stakeholders handbook:

http://www.atm.helsinki.fi/icoseu/sites/atm.helsinki.fi.icoseu/files/MASTER_ICOS_SHB_05032013_final.pdf.

It includes the concept descriptions of the ICOS measurement stations and central facilities, and overall information on the ICOS RI organization.

(European or/and national) Research facilities in which your organization is involved (e.g. ESFRI project name, if the case):

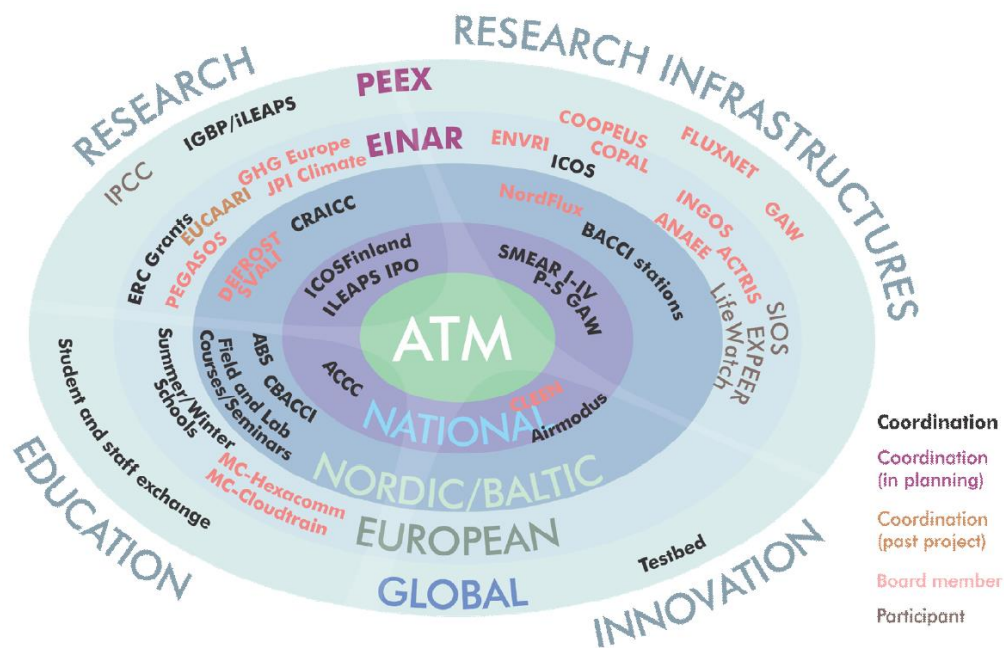
The description below concerns the Department of Physics of the University of Helsinki and the Division of atmospheric sciences. The division operates national core infrastructure that contributes to the following European RIs: EU ICOS (Integrated Carbon Observation System), AnaEE (Infrastructure for Analysis and Experimentation on Ecosystems), ACTRIS (Aerosols, Clouds, and Trace gases Research InfraStructure Network), InGOS (Integrated Non-CO₂ Greenhouse Gas Observing System), EXPEER (Distributed infrastructure for EXPERimentation in Ecosystem Research), and to the EU cluster projects ENVRI and COOPEUS. Synergies are also found with Euro-Argo, LifeWatch, SIOS (Svalbard Integrated Observation System). We have the leading role in ICOS.

Question 2. Main research infrastructure facilities (to be) used by the organization to conduct research activities related to the area of water cycle

Please outline the main research infrastructure facilities within your organization (i.e. research laboratories, large scale equipment, etc.):

The facilities in Finland for integrated atmospheric and earth system sciences (ATM) include research infrastructure having the following main components: (i) field station network (ii) laboratories, (iii) modeling & super-computer capacity, (iv) remote sensing data, (v) airborne measurements.

In figure below illustrates the research infrastructure, research, education and innovation activities of the integrated atmospheric and earth system sciences community in Finland.



More specifically as an example 1 in Finland, at the SMEAR II comprehensive measurement site (<http://www.atm.helsinki.fi/SMEAR/index.php/sme-ar-ii>), the water balance of two adjacent micro-catchments in evergreen coniferous forest has been measured continuously since 1997. Measurements include precipitation, throughfall, snow depth, soil water content, runoff and evapotranspiration. The measuring station includes two adjacent micro catchments (0.12 ha in total) that allow continuous and accurate measurement of the drainage flux.

More specifically as an example 2 from ICOS, ICOS Ecosystem Station network over the Europe measure hydrological variables, such as H₂O fluxes and concentration and ground water height.

Please outline the main research infrastructure facilities accessed by your organization to conduct (collaborative) research (at national and international level) activities or projects. Please indicate the names of the main (up to 5) partner organizations.

-

Please indicate the main research infrastructure facilities that your scientific community would need to conduct top-level research activities in your respective field:

-

Question 3. Scientific agenda of your organization in the area of water cycle

Please indicate the main scientific research areas in water cycle indicating the progress achieved:

Below are shown some research results in published journals:

1. Dinsmore K.J., Wallin M.B., Johnson M.S., Billett M.F., Bishop K., Pumpanen J. and Ojala A. 2013. Contrasting stormflow CO₂ concentration dynamics in headwater streams: a multi-catchment comparison. *Journal of Geophysical Research*. 118(2): 445-461.
2. Dinsmore K. J., Wallin M. B., Johnson M. S., Billett M. F., Bishop K., Pumpanen J. and Ojala A. 2013. Examining CO₂ concentrations and flow dynamics in streams. *Eos* vol. 94 No 23 P. 212 Research Spotlight (AGU).
3. Rasilo T., Ojala A., Huotari J. and Pumpanen J. 2012. Rain induced changes in CO₂ concentrations in the soil – lake – brook continuum of a boreal forested catchment. *Vadose Zone Journal*. doi: doi:10.2136/vzj2011.0039.
4. Wu C., Chen J.M., Pumpanen J., Cescatti A., Marcolla B., Blanken P.D., Ardö J., Tang Y., Magliulo B., Georgiadis T., Soegaard H., Cook D.R. and Harding R.J. 2012. An underestimated role of precipitation frequency in regulating summer soil moisture. *Environmental Research Letters*. doi:10.1088/1748-9326/7/2/024011.
5. Yvon-Durocher G., Caffrey J.M., Cescatti A., Dossena M., del Giorgio P., Gasol J.M., Montoya J.M., Pumpanen J., Staehr P.A., Trimmer M., Woodward G. and Allen A.P. 2012. Reconciling differences in the temperature-dependence of ecosystem respiration across time scales and ecosystem types. *Nature*. 487: 472-476.
6. Huotari J., Ojala A., Peltomaa E., Nordbo A., Launiainen S., Pumpanen J., Rasilo T., Hari P. and Vesala T. 2011. Long-term direct CO₂ flux measurements over a boreal lake: Five years of eddy covariance data. *Geophysical Research Letters*. VOL. 38, LXXXXX, doi:10.1029/2011GL048753
7. Ilvesniemi H., Pumpanen J., Duursma R., Hari P., Keronen P., Kolari P., Kulmala M., Mammarella I., Nikinmaa E., Rannik Ü., Pohja T., Siivola E. and Vesala T. 2010. Water balance of a boreal Scots pine forest. *Boreal Environment Research* 15: 375-396.
8. Huotari J., Ojala A., Peltomaa E., Pumpanen J., Hari P. and Vesala T. 2009. Temporal variations in surface water CO₂ concentration in a boreal humic lake based on high- frequency measure-ments. *Boreal Environment Research*. Volume 14 (supplement A) 48-60.
9. Rutter N., Essery R., Pomeroy J., Altimir N., Andreadis K., Baker I., Barr A., Bartlett P., Boone A., Deng H., Douville H., Dutra E., Elder K., Ellis C., Feng X., Gelfan A., Goodbody A., Gusev Y., Gustafsson D., Hellström R., Hirabayashi Y., Hirota T., Jonas T., Koren V., Kuragina A., Lettenmaier D., Li W-P., Luce C., Martin E., Nasonova O., Pumpanen J., Pyles R.D., Samuelsson P., Sandells M., Schädler G., Shmakin A., Smirnova T.G., Stähli M., Stöckli R., Strasser U., Su H., Suzuki K., Takata K., Tanaka K., Thompson E., Vesala

T., Viterbo P., Wiltshire A., Xia K., Xue Y., Yamazaki T. 2009. Evaluation of forest snow processes models (SnowMIP2). *Journal of Geophysical Research - Atmospheres* 114, D06111, doi:10.1029/2008JD011063.

10. Hari P., Pumpanen J., Huotari J., Kolari P., Grace J., Vesala T. and Ojala A. 2008. High-frequency measurements of productivity of planktonic algae using rugged nondispersive infrared carbon dioxide probes. *Limnology and Oceanography: Methods* 6: 347-354.

11. Pumpanen J., Ilvesniemi H. 2005. Calibration of time domain reflectometry for forest soil humus layers. *Boreal Environment Research* 10: 589-595.

Please indicate the main scientific areas on water cycle where your organization attains research excellence:

-

Question 4. Research personnel of the organization:

Please describe your organization's research personnel (total numbers of researchers, researchers participating in mobility programs, current training needs, PhD programs):

The ATM centre includes 16 professors, 16 senior scientists, 55 post-docts, 66 PhD students, 21 MSc students, and technical and coordinative staff.

Research personnel of your organization in the area of water cycle:

-

Question 5. Major unsolved challenges of your organization's research infrastructure and human capital:

Please highlight the major unsolved challenges of the organization's research infrastructure facility, needed to conduct top-level research in your respective field:

We are currently working to secure *sustainable funding commitments* for comprehensive research infrastructures in the field of integrated atmospheric and earth system sciences. *Data* infrastructure questions (e.g. common policies, interoperability with other fields of env res.).

Please highlight the major unsolved challenges of the organization's research human resources, needed to conduct top-level research in your respective field: -

Question 6. Please rank the top 3 research organizations in your geographic area (neighboring countries, outside or inside the EU), which conduct top level research activities in the area of water cycle :

-

Question 7. Any additional information or comments:

1.1.2. Institute for Environment and Sustainability, Joint Research Centre, European Commission

Question 1. Respondent contact details and information regarding the organization

Name: Giovanni Bidoglio

Respondent e-mail address: giovanni.bidoglio@jrc.ec.europa.eu

Organization: Institute for Environment and Sustainability, Joint Research Centre, European Commission

Position within the organization: Head of Water Resources Unit

Main areas of scientific research of your organization:

- Provide scientific and technical support to the development and implementation of EU policies and Directives

Scientific areas of the organization related to water cycle (river, delta, sea, etc.):

- Water resources in its broad sense is the area of scientific interest, comprising then the whole water system from freshwaters (aquifers, lakes and rivers) to transitional water bodies (estuaries, lagoons, deltas) and to large marine ecosystems and open oceans.

(European or/and national) Research facilities in which your organization is involved (e.g. ESFRI project name, if the case):

- AERONET-OC (Aerosol Robotic Network-Ocean Colour)

Question 2. Main research infrastructure facilities (to be) used by the organization to conduct research activities related to the area of water cycle

Please outline the main research infrastructure facilities within your organization (i.e. research laboratories, large scale equipment, etc.):

- Research laboratories with standard equipment for sample pre-treatment, analyses of inorganic trace metals and nutrients as well as some cutting-edge instrumentation, e.g. for LC-MS/MS identification and analyses of polar contaminants, High-resolution Gas Chromatography Mass Spectrometry for the analyses of Persistent Organic Pollutants (POPs) or molecular biology techniques to investigate stressors in the aquatic environments. We work closely with the official Member States' authorities, their designated laboratories and renowned experts in research centres and academia, often in collaborative field trials (e.g. the Joint Danube Survey 3).

Please outline the main research infrastructure facilities accessed by your organization to conduct (collaborative) research (at national and international level) activities or projects. Please indicate the names of the main (up to 5) partner organizations.

- AERONET-Ocean Colour: A sub-network of the Aerosol Robotic Network (AERONET) comprising a system of autonomous radiometers operated on fixed platforms in coastal regions for quality-control and standardisation of Earth Observation products and ocean colour validation. NASA manages the network infrastructure (i.e. handles the instruments calibration and data collection, processing and distribution within AERONET). JRC has the scientific responsibility

of the processing algorithms and performs the quality assurance of data products. Please indicate the main research infrastructure facilities that your scientific community would need to conduct top-level research activities in your respective field:

- A network of combined river basins-coastal areas in Europe to be used as observational points providing long-term data records on hydrology, meteorology and hydrochemistry for the assessment of the consequences of climate variability and change on water resources, and for testing and development of new sensor technologies for monitoring the hydrological cycle and river, delta and coastal water quality.

Question 3. Scientific agenda of your organization in the area of water cycle

Please indicate the main scientific research areas in water cycle indicating the progress achieved:

- Assessing current and future water demand, availability, scarcity and quality at European, regional and river basin scales under different scenarios of water allocation, improvement in water efficiency and climate change
- Supporting the implementation of water for growth initiatives in developing countries and in EU neighbouring countries, including dissemination of knowledge on water resources management
- Addressing the Water-Agriculture-Energy-Ecosystems Nexus in trans-boundary river basins in Europe, the entire Mediterranean region and in Africa
- Implementing water research projects in collaboration with countries in the Danube river basin as a support to the Danube Strategy
- Coordinating the intercalibration exercise for the ecological classification of lakes, rivers, transitional waters and coastal waters
- Providing targeted data sets, measurement support and technical assistance on EUwide chemical monitoring of priority substances and emerging pollutants in inland, coastal and marine waters
- Assessing the changing marine environment and climate, through targeted modelling and monitoring activities of European Regional seas as a support to the development of measures to achieve Good Environmental Status in marine waters by the year 2020
- Evaluating the status and change of coastal and marine biodiversity and habitats in relation to different pressure scenarios both for European regional seas and globally
- Mapping the provision of freshwater, coastal and marine ecosystem services including their economic valuation
- Standardisation and validation of space-based marine and climate observations, including the generation of quality controlled datasets from autonomous platforms and dedicated oceanographic campaigns.

Please indicate the main scientific areas on water cycle where your organization attains research excellence:

- Hydro-economic and water quality modelling and scenario analyses for an integrated impact assessment of water resources, coastal and marine ecosystems
- Aquatic ecology investigations and chemical monitoring of freshwater, coastal and marine environments
- Earth observational approaches including standardisation for the assessment of the ocean environment and impacts of climate change

Question 4. Research personnel of the organization:

Please describe your organization's research personnel (total numbers of researchers, researchers participating in mobility programs, current training needs,, PhD programs):

- The JRC Institute for Environment and Sustainability has about 400 staff, including scientists and administrators. The JRC does not have its own PhD programme, but it hosts students enrolled in PhD programmes of European universities.

Research personnel of your organization in the area of water cycle:

- About 75 scientists and technical staff are involved in water and marine research.

Question 5. Major unsolved challenges of your organization`s research infrastructure and human capital:

Please highlight the major unsolved challenges of the organization's research infrastructure facility, needed to conduct top-level research in your respective field:

Please highlight the major unsolved challenges of the organization's research human

resources, needed to conduct top-level research in your respective field:

Question 6. Please rank the top 3 research organizations in your geographic area (neighboring countries, outside or inside the EU), which conduct top level research activities in the area of water cycle :

- CEH - Center for Ecology and Hydrology, UK
- DELTARES, NL
- UFZ – Zentrum fuer Umweltforschung, Helmholtz Centre for Environmental Research, D

1.1.3. WCL

Question 1. Respondent contact details and information regarding the organization

Name: ___Thomas Hein_____

Respondent e-mail address: ___thomas.hein@boku.ac.at_____

Organization: _____WasserCluster Lunz_____

Position within the organization: _____Scientific managing dir._____

Main areas of scientific research of your organization:

___aquatic ecosystem research, aquatic food web analysis, biodiversity, _____

___carbon and nutrient dynamics, water management, restoration ecology_____

___aquaculture related research, biofilm research, plankton ecology_____

Scientific areas of the organization related to water cycle (river, delta, sea, etc.):

___river, streams, lakes, floodplains and wetlands_____

___focus on pre-alpine and alpine systems, also cooperations in other countries in Eu
and _____ non-
EU _____

(European or/and national) Research facilities in which your organization is involved
(e.g. ESFRI project name, if the case):

___none currently_____

___planned cooperation in DREAM_____

Question 2. Main research infrastructure facilities (to be) used by the organization to conduct research activities related to the area of water cycle

Please outline the main research infrastructure facilities within your organization (i.e. research laboratories, large scale equipment, etc.):

___biogeochemical analytics (nutrients, carbon, lipids, algal pigments), field
devices_____

___microscopes and confocal laser scanning microscope_____

Please outline the main research infrastructure facilities accessed by your organization to conduct (collaborative) research (at national and international level) activities or projects. Please indicate the names of the main (up to 5) partner organizations.

_____large scale flumes of different sizes, mesocosm experiments in the lake_____

_____laboratory and teaching facilities_____

Please indicate the main research infrastructure facilities that your scientific community would need to conduct top-level research activities in your respective field:

_____high end field instruments (fluorescence, nutrients, carbon and other environmental parameters)

_____eddy flux tower, GC and related analytical devices, stage 2 of current exp facilities (flumes run in cooperation with BOKU Vienna and University Vienna)_____

Question 3. Scientific agenda of your organization in the area of water cycle

Please indicate the main scientific research areas in water cycle indicating the progress achieved:

_aquatic biodiversity, carbon related research and biodiversity research in aquatic ecosystems, related aspects in water management, river restoration_____

Please indicate the main scientific areas on water cycle where your organization attains research excellence:

aquatic ecosystem research with emphasis on biogeochemical cycles, biodiversity research

Question 4. Research personnel of the organization:

Please describe your organization's research personnel (total numbers of researchers, researchers participating in mobility programs, current training needs,, PhD programs):

_____15 scientists, 2 fellows, 4 PhDs_____

_____connected to program of two universities_____

Research personnel of your organization in the area of water cycle:

_____see above (all)_____

Question 5. Major unsolved challenges of your organization`s research infrastructure and human capital:

Please highlight the major unsolved challenges of the organization's research infrastructure facility, needed to conduct top-level research in your respective field:

___upgrade and long term maintenance of existing infrastructure

Please highlight the major unsolved challenges of the organization's research human resources, needed to conduct top-level research in your respective field:

-

_mobility programs for young researchers and senior researchers to perform joint experiments (compare programs such as interact for boreal research stations)___

Question 6. Please rank the top 3 research organizations in your geographic area (neighboring countries, outside or inside the EU), which conduct top level research activities in the area of water cycle :

___EAWAG Swiss_____

___IGB Berlin_____

___UFZ
Germany_____

Question 7. Any additional information or comments:

1.1.4. NERC Centre for Ecology & Hydrology, UK

Question 1. Respondent contact details and information regarding the organization

Name: ___Alan Jenkins___

Respondent e-mail address: ___jinx@ceh.ac.uk___

Organization: NERC Centre for Ecology & Hydrology, UK_____

Position within the organization: _Deputy Director and Water and Pollution Science Director

Main areas of scientific research of your organization: _Water, Biodiversity, Biogeochemistry_____

Scientific areas of the organization related to water cycle (river, delta, sea, etc.):

Focus on rivers to the tidal limit. Opportunity to extend work into estuarine areas_____

(European or/and national) Research facilities in which your organization is involved (e.g. ESFRI project name, if the case): ___LIFEWATCH, ICOS___

Question 2. Main research infrastructure facilities (to be) used by the organization to conduct research activities related to the area of water cycle

Please outline the main research infrastructure facilities within your organization (i.e. research laboratories, large scale equipment, etc.): _Distributed environmental monitoring stations – water quantity and quality, gas fluxes, soil moisture, land cover. Experimental manipulation facilities – climate change, atmospheric pollution. Experimental river, flumes and mesocosms.

Please outline the main research infrastructure facilities accessed by your organization to conduct (collaborative) research (at national and international level) activities or projects. Please indicate the names of the main (up to 5) partner organizations.

__International/national data and databases_____

__Monitored catchments_____

Please indicate the main research infrastructure facilities that your scientific community would need to conduct top-level research activities in your respective field:

__A consistent network of hydrological observatories

Question 3. Scientific agenda of your organization in the area of water cycle

Please indicate the main scientific research areas in water cycle indicating the progress achieved:

__Quantification of hydrological hazards (focus on flood forecasting and drought assessment)_____

__Assessment of the status of water resources (river flow, groundwater, soil moisture, monitoring and modeling based. _____

__Determination and attribution of changes in water resources, including climate change, urbanization, land pressure, policy pressure_____

Please indicate the main scientific areas on water cycle where your organization attains research excellence:

_____Design Flood Estimation

Flood forecasting modeling

Catchment water resource modelling

Water quality modelling

Question 4. Research personnel of the organization:

Please describe your organization's research personnel (total numbers of researchers, researchers participating in mobility programs, current training needs,, PhD programs):

__330 scientists

8 Marie Curie Fellows

120 PhD students_____

Research personnel of your organization in the area of water cycle:

_100 staff

30 PhD students_____

Question 5. Major unsolved challenges of your organization's research infrastructure and human capital:

Please highlight the major unsolved challenges of the organization's research infrastructure facility, needed to conduct top-level research in your respective field:

Please highlight the major unsolved challenges of the organization's research human resources, needed to conduct top-level research in your respective field:

Question 6. Please rank the top 3 research organizations in your geographic area (neighboring countries, outside or inside the EU), which conduct top level research activities in the area of water cycle :

__Deltares (The Netherlands)

SYKE (Finland)

UFZ (Germany_____)

1.1.5. University of Natural Resources and Life Sciences, Vienna

Question 1. Respondent contact details and information regarding the organization

Name: _____ Helmut
HABERSACK _____

Respondent e-mail address: _____ helmut.habersack@boku.ac.at _____

Organization: _____ University of Natural Resources and Life Sciences, Vienna

Position within the organization: _____ Head of the Institute of Water Management, Hydrology and Hydraulic Engineering, Head of the Christian Doppler Laboratory for Advanced Methods in River Monitoring, Modelling and Engineering _____

Main areas of scientific research of your organization:

hydraulics; hydrology; hydrometry; hydropower development; impacts of climate change; precipitation-runoff models; sediment transport; statistics of extremes; water engineering modelling;

Scientific areas of the organization related to water cycle (river, delta, sea, etc.):

rivers (precipitation-runoff models; sediment transport; statistics of extremes)

(European or/and national) Research facilities in which your organization is involved (e.g. ESFRI project name, if the case): _____ Christian Doppler Laboratory for Advanced Methods in River Monitoring, Modelling and Engineering

Question 2. Main research infrastructure facilities (to be) used by the organization to conduct research activities related to the area of water cycle

Please outline the main research infrastructure facilities within your organization (i.e. research laboratories, large scale equipment, etc.):

Hydraulic engineering laboratory; ground penetrating radar echo sounder geoelectrical equipment (Lund Imaging System) bed load and sediment samplers GPS hydraulics laboratory hydrometeorological field instrumentation TDR (Time Domain Reflectory) telemetry unit geodetic instruments 3D flow velocity instruments _____

Please outline the main research infrastructure facilities accessed by your organization to conduct (collaborative) research (at national and international level) activities or projects. Please indicate the names of the main (up to 5) partner organizations.

-

Please indicate the main research infrastructure facilities that your scientific community would need to conduct top-level research activities in your respective field:

Question 3. Scientific agenda of your organization in the area of water cycle

Please indicate the main scientific research areas in water cycle indicating the progress achieved:

Please indicate the main scientific areas on water cycle where your organization attains research excellence:

_____Sediment Transport Monitoring and Modelling, Physical hydraulic models_____

Question 4. Research personnel of the organization:

Please describe your organization's research personnel (total numbers of researchers, researchers participating in mobility programs, current training needs, PhD programs):

_____~ 50 staff: 2 professors, 4 university lecturer, 12 senior scientists (thereof 9 PhDs), 23 scientific project staff, 2 senior lecturer, 3 lecturer, 3 admin. staff_____

Research personnel of your organization in the area of water cycle:

_____9
staff_____

Question 5. Major unsolved challenges of your organization's research infrastructure and human capital:

Please highlight the major unsolved challenges of the organization's research infrastructure facility, needed to conduct top-level research in your respective field:

Please highlight the major unsolved challenges of the organization's research human resources, needed to conduct top-level research in your respective field:

-

1.1.6. UK Natural Environment Research Council (NERC) (until June 2013)

Question 1. Respondent contact details and information regarding the organization

Name: [Dr Michael Schultz](#)

Respondent e-mail address: michaelschultzuk@gmail.com

Organization: [UK Natural Environment Research Council \(NERC\) \(until June 2013\)](#)

Position within the organization: [Head of National Capability](#)

Main areas of scientific research of your organization: [Geology, oceanography, atmospheric science, remote sensing, polar science, ecology, freshwater biology, marine biology](#)

Scientific areas of the organization related to water cycle (river, delta, sea, etc.):

[Physics, chemistry and biology of rivers, deltas and seas. Atmospheric sciences and geology.](#)

(European or/and national) Research facilities in which your organization is involved (e.g. ESFRI project name, if the case): [British Geological Survey, National Oceanography Centre, Centre for Ecology and Hydrology, National Centre for Atmospheric Sciences and National Centre for Earth Observation](#) are all part of NERC. NERC is involved in the following relevant ESFRI projects: [EuroARGO, EMSO, ICOS and EPOS.](#)

Question 2. Main research infrastructure facilities (to be) used by the organization to conduct research activities related to the area of water cycle

Please outline the main research infrastructure facilities within your organization (i.e. research laboratories, large scale equipment, etc.): [The NERC facilities listed in question 1, together with other facilities in UK universities, are used by NERC to undertake research activities related to the water cycle.](#)

Please outline the main research infrastructure facilities accessed by your organization to conduct (collaborative) research (at national and international level) activities or projects. Please indicate the names of the main (up to 5) partner organizations.

Research ships, autonomous underwater vessels, earth observation data provision, research aircraft, environmental monitoring, high level computing, genomic analysis and data centres. Partner organisations include: UK Meteorological Office, UK Environment Agency, European Space Agency.

Please indicate the main research infrastructure facilities that your scientific community would need to conduct top-level research activities in your respective field: *As above*

Question 3. Scientific agenda of your organization in the area of water cycle

Please indicate the main scientific research areas in water cycle indicating the progress achieved:

River flow. Flood (river and coastal) and drought risks. Monitoring environmental change and climate change impacts. Groundwater science. Satellite remote sensing. Tides and waves. Seafloor mapping and monitoring.

Information on NERC science themes and progress can be found at <http://www.nerc.ac.uk/about/strategy/documents.asp>

Please indicate the main scientific areas on water cycle where your organization attains research excellence:

As above.

Question 4. Research personnel of the organization:

Please describe your organization's research personnel (total numbers of researchers, researchers participating in mobility programs, current training needs, PhD programs): *NERC employs around 2500 staff, mainly researchers, in its six centres and headquarters.*

Research personnel of your organization in the area of water cycle:

It is estimated that several hundred NERC staff are involved in all aspects of the water cycle.

Question 5. Major unsolved challenges of your organization's research infrastructure and human capital:

Please highlight the major unsolved challenges of the organization's research infrastructure facility, needed to conduct top-level research in your respective field:

Priorities for additional infrastructure in these fields include: environmental monitoring, e-infrastructure (including high level computing and data management), autonomous and robotic systems, research aircraft.

Please highlight the major unsolved challenges of the organization's research human resources, needed to conduct top-level research in your respective field:

Please rank the top 3 research organizations in your geographic area (neighboring countries, outside or inside the EU), which conduct top level research activities in the area of water cycle:

Centre for Ecology and Hydrology
National Oceanography Centre
British Geological Survey

Question 6. Any additional information or comments:

Information on other research facilities supported by NERC can be found at <http://www.nerc.ac.uk/research/sites/facilities/list.asp>

Thank you for your support!

1.1.7. Danube Delta National Institute for Research and Developmet – Tulcea (DDNI – Tulcea)

Question 1. Respondent contact details and information regarding the organization

Name: _____Iulian NICHERSU_____

Respondent e-mail address: _____iuli@indd.tim.ro_____

Organization: _____Danube Delta National Institute for Research and Developmet – Tulcea (DDNI – Tulcea)_____

Position within the organization: ____President of the Scientific Council (senior scientific researcher)_____

Main areas of scientific research of your organization:

_____Environment_____

Scientific areas of the organization related to water cycle (river, delta, sea, etc.):

_____Deltas and other wetlands_____

(European or/and national) Research facilities in which your organization is involved (e.g. ESFRI project name, if the case):

_____European Topic Center – Spatial Information Analysis (ETC-SIA)_____

Question 2. Main research infrastructure facilities (to be) used by the organization to conduct research activities related to the area of water cycle

Please outline the main research infrastructure facilities within your organization (i.e. research laboratories, large scale equipment, etc.):

- hydrobiology Laboratory
- Chemistry Laoboratory
- Molecular Biology Laboratory
- GIS and Spatial Planning research infrastructure

Please outline the main research infrastructure facilities accessed by your organization to conduct (collaborative) research (at national and international level) activities or projects.

Please indicate the names of the main (up to 5) partner organizations.

Project UAS-BIRDD – National Program for Research “Parteneriate” – equipment facilities infrastructure: camcopters and drones for environment assessment (DDNI, Aerocontrol, TehnoGIS Group, Ad Net Market Media, Wing Computer Group, Universitatea Alexandru Ioan Cuza)

CARTODD – POS Mediu Project – LIDAR data Danube Delta – DDNI, DDBRA, Primul Meridian, Tulcea County Council, RomSilva, Apele Romane.

Please indicate the main research infrastructure facilities that your scientific community would need to conduct top-level research activities in your respective field:

LIDAR

Question 3. Scientific agenda of your organization in the area of water cycle

Please indicate the main scientific research areas in water cycle indicating the progress achieved:

___ Hydraulic modeling - The Danube Delta water circulation model

Please indicate the main scientific areas on water cycle where your organization attains research excellence:

_____ Hydraulic modeling

Question 4. Research personnel of the organization:

Please describe your organization’s research personnel (total numbers of researchers, researchers participating in mobility programs, current training needs,, PhD programs):

- Senior Scientific Researcher degree I and II (10 persons)
- Dipl. engineers degree I (4 persons)
- Junior Scientific Researcher degree III (19 persons)
- Scientific Researcher and Research assistant (10 persons)
- Engineers (3 persons)

Research personnel of your organization in the area of water cycle:

10 persons

Question 5. Major unsolved challenges of your organization`s research infrastructure and human capital:

Please highlight the major unsolved challenges of the organization’s research infrastructure facility, needed to conduct top-level research in your respective field:

Please highlight the major unsolved challenges of the organization's research human resources, needed to conduct top-level research in your respective field:

Question 6. Please rank the top 3 research organizations in your geographic area (neighboring countries, outside or inside the EU), which conduct top level research activities in the area of water cycle :

_____ International Association for Danube (IAD)

_____ European Environment Agency (EEA)

1.1.8. UNESCO-IHE, Institute for Water Education

Question 1. Respondent contact details and information regarding the organization

Name:

Kenneth Irvine, UNESCO-IHE, Institute for Water Education

Respondent e-mail address: *k.irvine@unesco-ihe.org*

Organization:

UNESCO-IHE Institute for Water Education, Westvest 7, 2611 AX Delft, The Netherlands

Position within the organization: *Chair of Aquatic Ecosystems Group*

Main areas of scientific research of your organization

Water related research, teaching and capacity development. This covers the breadth of topics for sustainable water use, from engineering based solutions to governance

Scientific areas of the organization related to water cycle (river, delta, sea, etc.):

- 1. Inland surface waters*
- 2. Groundwaters*
- 3. Coastal zones*
- 4. Floodplain and ecosystem modelling*
- 5. Ecology and hydrology*
- 6. Hydroinformatics*
- 7. Hydraulic engineering*
- 8. Sediment transport*
- 9. Remote sensing*
- 10. Water supply and sanitation*
- 11. Integrated Water Resource management,*
- 12 Economics and law.*

(European or/and national) Research facilities in which your organization is involved (e.g. ESFRI project name, if the case):

Currently running FP7 projects only

FP7 EnviroGRIDS "Gridded Management System on Environmental Sustainability and Vulnerability"

FP7 DANCERS "Danube Macroregion: Capacity Building and Excellence in River Systems"

FP7 SAPH PANI "Enhancement of natural water systems and treatment methods for safe and sustainable water supply in India"

FP7 AFROMAISON "Adaptive and Integrative Tools and Strategies on Natural Resources Management"

FP7 KULTURISK "Knowledge based approach to develop a prevention culture of water risk"

FP7 ICEWATER "ICT Solutions for Efficient Water Resources Management"

FP7 MyWater "Merging Hydrologic Models and EO Data for Reliable Information on Water"

FP7 DEWFORA "Improved Drought Early Warning and Forecasting"

FP7 WETwin "River Basin Twinning Initiatives as a Tool to Implement EU Water Initiatives"

FP7-INCO-LAB SWAN "Sustainable Water ActioN: building research links between EU and US"

7FP: Lenvis

7FP: MyWater

7FP: WeSenseIT

PvW: DSS Romania

2nd: Era-Net CRUE: DIANE-CM

Question 2. Main research infrastructure facilities (to be) used by the organization to conduct research activities related to the area of water cycle

Please outline the main research infrastructure facilities within your organization (i.e. research laboratories, large scale equipment, etc.):

UNESCO-IHE laboratory facilities include 2 educational labs [accommodating 50 people] for chemistry and (micro) biology together with some 800 square meter of research lab. The research facilities consist of a process lab for larger scale (column) set-ups, temperature rooms, separate rooms with analytical equipment such as ICP-MS, Gas chromatographs, Ion chromatographs, Organic carbon analyzers among other smaller analytical equipment. Most basic and sometimes advanced parameters for ground-, surface-, drinking-, sea- and waste water can be measured in our facilities.

The research lab can hold up to 40 short time, MSc-researchers together with about 15 long-term PhD students.

Please outline the main research infrastructure facilities accessed by your organization to conduct (collaborative) research (at national and international level) activities or projects. Please indicate the names of the main (up to 5) partner organizations.

Technical University Delft, the Netherlands

Wageningen University, the Netherlands

Please indicate the main research infrastructure facilities that your scientific community would need to conduct top-level research activities in your respective field:

Monitoring infrastructure, including hydrological gauging and weirs, automatic water samplers,

Satellite imagery

Field sampling capacity, including boats, sampling equipment, probes

Wet and dry laboratory facilities, including equipment for basis water chemistry and microscopy

Question 3. Scientific agenda of your organization in the area of water cycle

Please indicate the main scientific research areas in water cycle indicating the progress achieved:

Knowledge acquisition to support sustainable natural resource use. This includes linking catchments to water systems, pollutant and sediment transport, biogeochemical cycling, wetland and livelihoods socioeconomics, wetland ecology, ecohydrology, flooding studies, information systems, collaborative modelling for stakeholder involvement, water and agriculture

Please indicate the main scientific areas on water cycle where your organization attains research excellence:

Hydrology, Groundwater pollution, water governance, wetland, river and lake ecology, hydroinformatics, flood risk management, decision support systems for aquatic systems.

Question 4. Research personnel of the organization:

Please describe your organization's research personnel (total numbers of researchers, researchers participating in mobility programs, current training needs,, PhD programs):

105,15 FTE academics employed

4 zero nomination Professors

143 PhD fellows,

Research personnel of your organization in the area of water cycle:

All research personnel are linked to the water cycle

Question 5. Major unsolved challenges of your organization`s research infrastructure and human capital:

Please highlight the major unsolved challenges of the organization`s research infrastructure facility, needed to conduct top-level research in your respective field:

The Institute has state of the art capacity to support its research and teaching mission. It links with local partners where specialised equipment or large experimental infrastructure is required.

Please highlight the major unsolved challenges of the organization`s research human resources, needed to conduct top-level research in your respective field:

The institute covers an extensive range of water related research. This requires being responsive to emerging areas, but with inevitable time-lags in some areas of human resource. This has been an ongoing challenge for the last decade but one that the Institute has, overall, kept pace with.

Please rank the top 3 research organizations in your geographic area (neighboring countries, outside or inside the EU), which conduct top level research activities in the area of water cycle :

WAGENINGEN UNIVERSITY, ALTERRA Wageningen, the Netherlands

IGB BERLIN, Germany

DELTARES, The Netherlands

Question 6. Any additional information or comments:

UNESCO-IHE focusses on Capacity Building, benefiting from a highly diverse range of staff expertise in all issues related to water and through synergies with national and international partners. Much of the teaching and research is effected through partnership with developing countries and countries in transition in order to maximise knowledge transfer.

1.1.9. Centre Internacional d'Investigació dels Recursos Costaners (CIIRC)

Question 1. Respondent contact details and information regarding the organization

Name:

Vicente Garcia

Respondent e-mail address:

Vicente.garcia@upc.edu

Organization:

Centre Internacional d'Investigació dels Recursos Costaners (CIIRC)

Position within the organization:

Senior scientific researcher

Main areas of scientific research of your organization:

Management of the coastal zone and coastal resources, Climate and quality of the marine environment, Coastal morphology, Coastal and estuarine hydrodynamics, Oceanographic physics and engineering, Renewable energies, Port coastal and offshore engineering

Scientific areas of the organization related to water cycle (river, delta, sea, etc.):
Management of the coastal zone and coastal resources, Climate and quality of the marine environment, Coastal morphology, Coastal and estuarine hydrodynamics, Oceanographic physics and engineering, Renewable energies, Port coastal and offshore engineering

(European or/and national) Research facilities in which your organization is involved (e.g. ESFRI project name, if the case):

The HYDRALAB European research project and the Spanish ICTS programme (Instalación Científica Técnica Singular, in Spanish)

Question 2. Main research infrastructure facilities (to be) used by the organization to conduct research activities related to the area of water cycle

Please outline the main research infrastructure facilities within your organization (i.e. research laboratories, large scale equipment, etc.):

Large Scale Physical Lab, which includes the CIEM wave and currents flume. This 100 meter-long, 3 meter- wide and up to 7 meter-deep flume has been recognized since 1996 as a "Large Scale Facility" by the DG Research of the European Commission (EU), and as a ICTS by the Spanish Ministry of Science and Education since 2006.

Small Scale Physical Lab which includes the CIEMITO wave-and-current flume. A 18x0.38x0.56 (in m) 2DV flume structure.

The LaBassA basin. A 12x4.6 m basin with a maximum depth of 2.5 m whose main purpose is the testing of reduced scale models of offshore structures such as marine wind turbines, anchoring structures, at-sea berthing structures, underwater robots, etc

The network for shelf observations, including the XIOM network which consists of a set of buoys, tide gauges and meteorological stations deployed along the Catalan coast to monitor the most significant shelf and coastal variables.

The Pont del Petroli pier. An out-of-use pier, built in an open beach, which extends about 250 m into the sea, reaching a water depth of about 12 m, and is used socially as a promenade. One of the offshoremost pier pillars has been instrumented in order to acquire environmental and biological measurements that permit taking advantage of the uniqueness of this structure. The pier has been fitted permanently with a meteorological station, a currentmeter with a pressure sensor for wave measurements, and sensors for water temperature and conductivity; this equipment is supplemented by additional scientific gear when carrying out extensive project-related campaigns.

Please outline the main research infrastructure facilities accessed by your organization to conduct (collaborative) research (at national and international level) activities or projects. Please indicate the names of the main (up to 5) partner organizations.

The Large Scale Physical Lab, CIEM.

The Small Scale Physical Lab, CIEMITO

The basin, LaBassA.

The network for shelf observations.

The Pont del Petroli pier.

Please indicate the main research infrastructure facilities that your scientific community would need to conduct top-level research activities in your respective field:

Combining large scale laboratory and field facilities using new types of high resolution and non intrusive sensors

Question 3. Scientific agenda of your organization in the area of water cycle

Please indicate the main scientific research areas in water cycle indicating the progress achieved:

The research of the CIIRC – LIM group in the water cycle makes reference mainly to the continental discharge into the coastal ocean.

Please indicate the main scientific areas on water cycle where your organization attains research excellence:

We have been working for the last five years on the river and distributed discharge from land into coastal seas, paying attention to the vertical and horizontal distributions of a given discharge and how that affects the fate of the corresponding freshwater plume. We have also applied high resolution numerical model simulations to this problem, both for water and suspended sediment fluxes.

Question 4. Research personnel of the organization:

Please describe your organization's research personnel (total numbers of researchers, researchers participating in mobility programs, current training needs,, PhD programs):

The high interdisciplinarity of CIIRC-LIM is manifested in the academic and professional background of the about 40 researchers and research-support technicians that make up the group: - Civil engineers - Marine Sciences graduates / Oceanographers - Physicists - Geologists - Telecommunications engineers - IT engineers - Workshop technicians

The group CIIRC-LIM also coordinates the PhD Programme in Marine Sciences in Barcelona, where all Marine Research groups participate (UPC, University of Barcelona, Universitat Autònoma de Barcelona and CSIC with the two institutes Instituto de Ciencias del Mar and Centro de Estudios Avanzados de Blanes). We have also promoted and organized a mobility programme for both students and academic staff for more than 20 years, linking our research group to similar on-going efforts in other countries from the European Union and elsewhere.

Research personnel of your organization in the area of water cycle:

40 researchers and research-support technicians that make up the group: - Civil engineers - Marine Sciences graduates / Oceanographers - Physicists - Geologists - Telecommunications engineers - IT engineers - Workshop technicians

Question 5. Major unsolved challenges of your organization`s research infrastructure and human capital:

Please highlight the major unsolved challenges of the organization's research infrastructure facility, needed to conduct top-level research in your respective field:

Combining numerical, hydraulic and field models at a commensurate level.

Please highlight the major unsolved challenges of the organization's research human resources, needed to conduct top-level research in your respective field:

Stability and training programmes for human resources.

Question 6. Please rank the top 3 research organizations in your geographic area (neighboring countries, outside or inside the EU), which conduct top level research activities in the area of water cycle :

The members of recent and on-going European projects such as Hydralab (coordinated by Deltares) and many others.

Question 7. Any additional information or comments:

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