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D4.4 Report on EGIDA Methodology Transfer Use-case: Mediterranean region

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Executive Summary

The use case aims to incept a catalogue's networking, conceived for sharing environmental information (metadata) within the Mediterranean Region, by the establishment of National nodes to be implemented in the frame of the UNEP-MAP and GEO networks. These nodes are intended to interoperate by the meaning of international standards, both for catalogue interfaces (CSW) and metadata schema (ISO 19115). The use of common standards is supported by the adoption of informatics tools developed by consolidated open source communities. The incepted networking infrastructure is based on the model of "System of Systems", and it makes possible to discover, harvest and share environmental information with others systems.



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Acronyms and Abbreviations

Abbreviation	Name
BP-RAC	Blue Plan Regional Activity Centre of UNEP-MAP
CP-RAC	Cleaner production Regional Activity Centre of UNEP-MAP
EC	European Commission
CNR	National Research Council of Italy
EU	European Union
ENPI-SEIS/South	European Neighbourhood Partnership Instrument – Shared Environmental System for Europe / South component
FP7	Seventh Framework Programme
GEO	Group on Earth Observations
GEOSS	Global Earth Observation System of Systems
GMES	Global Monitoring for Environment and Security
IGN	National Geographic Institute of Spain
Info-MAP	The information system of the Barcelona Convention
Info-RAC	Information and Communication Regional Activity Centre of UNEP-MAP
INSPIRE	Infrastructure for Spatial Information in Europe
IPR	Intellectual Property Right
ISPRA	Italian National Institute for Environmental Protection and Research
IT	Information Technology
MS	Member State
MED POL	The marine pollution assessment and control component of MAP
PAP-RAC	Priority Action Plan Regional Activity Centre of the UNEP-MAP
RAC	Regional Activity centre of the UNEP-MAP



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REMPEC	The Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea
R&D	Research and Development
SDI	Spatial Data Infrastructure
SEIS	Shared Environmental Information System
SPA-RAC	Specially Protected Areas Regional Activity Centre of UNEP-MAP
ST-09-01	GEO Task ST-09-01: Catalyzing Research and Development (R&D) Funding for GEOSS
ST-09-02	GEO Task ST-09-02: Promoting Awareness and Benefits of GEO
T	Task
UNEP-MAP	United Nations Environment Programme - Mediterranean Action Plan
WP	Work Package



1 Introduction

To better exploit any environmental dataset it is necessary to provide detailed information (metadata) capable to furnish the best data description. With regard to environmental metadata networking and delivery, it is important to note that there are differences between the existing IT infrastructures in European countries (that typically have already implemented networking nodes) and those in neighbouring ones (Asia and Africa). To bring closer IT developments, taking into account economic sustainability, it is important to share experiences and knowledge to improve the accessibility of environmental information to users, through models that do not penalise distributed environmental information discovery.

Operating environmental data and information networking also requires the long-term investment of financial and human resources. As these resources are scarce, ensuring sustainability can be a struggle. Then, to use more effectively human and economic resources and to avoid duplication, it is essential to test existing models and, where appropriate, replicate strategies and experiences.

For the above reasons it has been programmed to develop the use case in the Mediterranean Region to:

- demonstrate that the adoption of open source and free software can significantly support the alignment of IT resources and knowledge and
- support the inception and testing of environmental information sharing.

The use case results relate to a metadata catalogue's networking conceived for sharing environmental metadata within the Mediterranean Region. In this context, the use contributed to the implementation of EGIDA Methodology transfer process that, in turn, supports the creation of National nodes (replication process) both from the technical and organisational point of views. The conceived networking model is based on the concept of System of Systems. By the incepted Mediterranean SoS it is already possible to share environmental metadata and services with on-going (European and global) projects and programmes.



2 Use-case objective

This task aims to provide a use-case for the EGIDA methodology transfer process, focusing on partnership, infrastructures, products and services involving southern Mediterranean Countries.

The use case aims to target the following points:

- improve the contribution to GEOSS from existing infrastructures (Spanish and Egyptian test cases - Implementation of the EGIDA methodology transfer process);
- Support the implementation of national information nodes in the context of international initiative/project (UNEP-MAP and GEO - application of the EGIDA methodology transfer process);
- analyse possible re-engineering process of national/regional infrastructure (Egyptian use case - application of the EGIDA methodology transfer process);
- analyse and remove barriers occurred during the above activities (*fine-tuning* implementation of the EGIDA methodology transfer process).

3 Use-case description

With the aim to contribute the EGIDA Methodology transfer process implementation, this use-case intend to support metadata networking at Mediterranean scale by promoting, to European Neighbour Countries, the reuse of consolidated OS technology capable to permit a congruous and continuous metadata management and networking.

Considering that the reuse of existing informatics/informative tools can permit a faster IT alignment, both for expertise and technology deployment, the use case target four main goals:

1. data management and integration capabilities from data source to data delivery;
2. system interoperability promotion;



3. conduct system interoperability tests with willing stakeholders;
4. support decision makers by data integration.

As one of the EGIDA methodology transfer process aim is also to support data standardisation, in the use case development it has been also focused the management of datasets (especially in the frame of the UNEP-MAP) taking into account the most used archiving format related to vector and raster products.

As noted during the meeting held to promote the use case (Nice, may 2010), most of the participants use to work with Google earth instead professional tools to manage and delivery official spatial information.

To promote and accomplish interoperability tests within the use case, technologies that fully support international standards (OGC and ISO) have been promoted to support interoperability with the most relevant European and global initiatives. By the conceived system, when fully operational, it will be possible to better support decision makers providing them a wider access to environmental data and information through an international/regional federated system.

4 Description of the EGIDA Methodology Transfer process

In order to identify and describe the best/good practice for the replication activity of the the EGIDA methodology transfer process, it has been planned to target different networks belonging to programs and projects of different nature, such as the INFO-RAC (Information and Communication Regional Activity Centre of the Barcelona Convention – UNEP-MAP) and GEO (The Group on Earth Observations).

To develop the use case in the targeted networks it has been followed the consolidated draft of the EGIDA methodology as shown in figure 1.

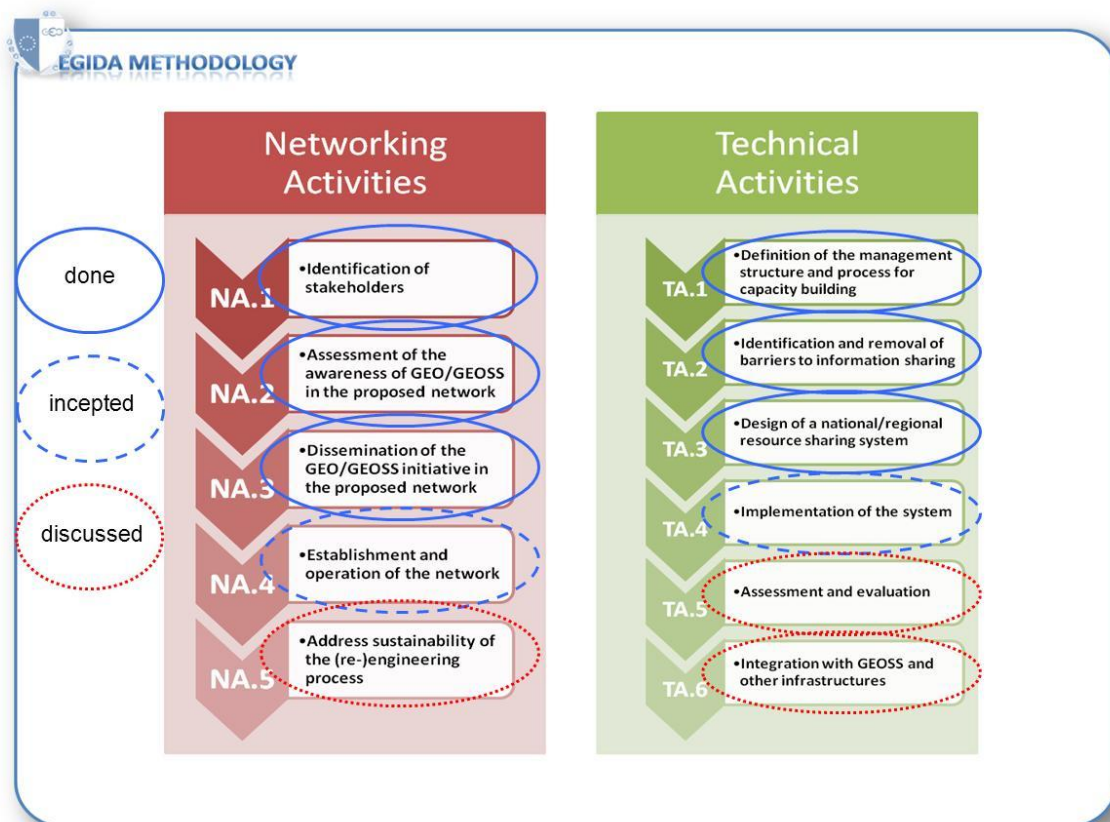


Figure 1 - EGIDA methodology generic schema used for developing the Mediterranean use case

Two events have been planned to promote the use case in the frame on the UNEP-MAP, and two in the frame of GEO. For further events, updates will be enclosed as annex in this deliverable.



4.1. *Actions and sub-actions applied*

4.1.1. Networking activities

Identification of stakeholders (NA1)

In order to identify northern African stakeholders willing to be involved in the planned activities, it has been chosen to target the main supra-European networks that ISPRA (Responsible for the use case development) is particularly active within, that are GEO (The Group on Earth Observations) and UNEP-MAP (United Nation Environment Programme - Mediterranean Action Plan). In the frame of GEO, ISPRA support the development of different activities related to SBA and general issues. In the frame of UNEP-MAP, ISPRA develops and manage the Regional Centre for Information and Communication of the Barcelona Convention.

The targeted networks are participated by stakeholders playing the role of information providers and intermediate users at Governmental level.

Assessment of the awareness of GEO/GEOSS and dissemination of the related activities in the proposed network (NA2+NA3)

As one of the EGIDA project main goal is to promote GEO and GEOSS in S&T Communities, during the Plan Bleu, PAP-RAC and INFO-RAC Focal Points meeting (Nice, 11-13 May, 2010) have been presented the GEO general framework, the GEOSS GCI, the GEOSS SBA (Social Benefit Areas), the EGIDA projects and its activity related to the Mediterranean Region (Tasks 4.5.1 & 4.5.2).

It has been chosen to present the relevance of the GEO and GEOSS to UNEP/MAP representatives because 14/22 of the MAP Contracting Parties are GEO members (Algeria, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Malta, Morocco, Slovenia, Spain, Tunisia, Turkey and the European Commission).



In particular, considering UNEP-MAP is implementing a data sharing strategy to be applied in the frame of the Ecosystem Approach roadmap implementation, the GEOSS Data Sharing Guidelines and Action Plan have been presented as an example to take into account to implement a potential data sharing policy.

By the intervention from the floor emerged that only few of the UNEP-MAP participants were aware about GEO and GEOSS and, consequently, national UNEP-MAP and GEO representatives often do not know each other.

Establishment and operation of the network (NA4)

By the participation of EGIDA representatives in the planned meetings, agreements for piloting interoperability activities have been made with Spain, Morocco and Egypt (Info-RAC National Focal Points) in the frame of UNEP-MAP, and with Egypt and Morocco in the frame of GEO.

It has been chosen to involve different stakeholders belonging to the same country (Morocco and Egypt) to support potential alignment between the two different networks (GEO and MAP).

Also, the activities planned by the Info-RAC roadmap (supported by the Decision 20/4 taken at the COP17), related to the development of the Barcelona Convention Information System, will strongly support the collection and delivery of environmental data and metadata by the *due* involvement of stakeholders belonging to UNEP-MAP Programme. Those stakeholders, in turn, will be capable to benefit from the EGIDA methodology transfer process (that will be promoted and supported in the near future by Info-RAC) for the establishment of national information nodes.

Address sustainability of the re-engineering process (NA5).

Discussions with stakeholders took place during the planned meeting to understand how to improve the accessibility of environmental information to users (final and



intermediate) through models that do not penalise distributed environmental information discovery.

From discussions emerged that potential re-engineering process, promoted for the development of the Mediterranean use case, must impact lightly in already operating infrastructures to be sustainable from the management and economic point of view (as well as the contribution to GEOSS and to other programmes, also the re-engineering process must be sustainable).

To address such of sustainability, only open source software supported by strong communities are taken into account for the use case development.

4.1.2. Technical activity

Definition of the management structure and processes for capacity building (TA1).

Being Info-RAC the Regional Activity Centre for Information and Communication of the Barcelona Convention, that Centre has been identified as the management structure to promote and replicate the use case, by applying the EGIDA methodology, for the establishment of national nodes across the Mediterranean Region (Top-down component).

To achieve the replication/transfer process it is important guarantee the sustainability on the management of the proposed re-engineered node (Bottom-up component). To support such of sustainability, *on-line demonstration* has been organised in the frame of UNEP-MAP network to showcase the utilisation of specific open source tools (Geonetwork and GI-CAT), focusing on *specific functionality (Metadata creation, view, download, discovery and harvesting)*.



Identification and removal of barriers to information sharing (TA2).

As resulted from the conducted activity, barriers to achieve information sharing exist, and they can relate to the following points:

1. unclear national data (sharing) policy to regulate the use of data and information;
2. absence of datasets;
3. behavioural and cultural reasons;
4. unawareness of the benefits related to information sharing;
5. IT gaps.

Many international Organisation and on-going Projects that operate for the benefit of the environment are nowadays facing the need to demonstrate their effectiveness by supporting decision makers. To do that, it results essential to define a specific data sharing policy between them and their participants to catalyse resources useful for the understanding of the enviromental processes that regulate regional and global changes, both in the near, medium and long term periods.

Evidences of the needs of specific data sharing policy exists, such as the GEOSS Data Sharing Principles implementation, the UNEP-MAP Decision 20/4 for the data sharing policy implementation to support the Ecosystem approach roadmap and the data policy developed by the UNEP-WCMC (World Conservation Monitoring Centre - http://www.unep-wcmc.org/data-policy_596.html). International agreement related to data sharing can, indeed, support the implementation of national policy.

Sometime, reticence on exchange environmental data and information are masked under the absence of them. In this case, it would be useful in the future to include, within projects involving EU neighbour countries, the creation of datasets preferably aligned with the European products (Current and past EC FP, GMES, Horizon 2020) to be shared with a specific data policy.

Strong efforts are still needed to break behavioural and cultural barrier to increase the awareness on the benefits derived from data and information sharing. During the EGIDA project, in each meeting planned or participated to develop the use case, information

have been furnished about the main European and Global activities (e.g. www.geoportal.org, <http://inspire-geoportal.ec.europa.eu>,...) that provide environmental data and information and the related benefit (environmental and economic) derived from the data sharing activities.

In the frame of IT development, nowadays technology exists and is readily available to implement or to re-engineer a national node (e.g. to support the national sustainable contribution to GEO or to support the UNEP-MAP regional information networking). In this context, the EGIDA methodology application can support both technical and organisational implementation on the basis of the SoS model.

Design of the Regional resource sharing system (TA3)

The proposed SoS foresees the implementation of the easiest infrastructure built upon freely accessible technologies to network environmental information across the Mediterranean Region (fig. 2).

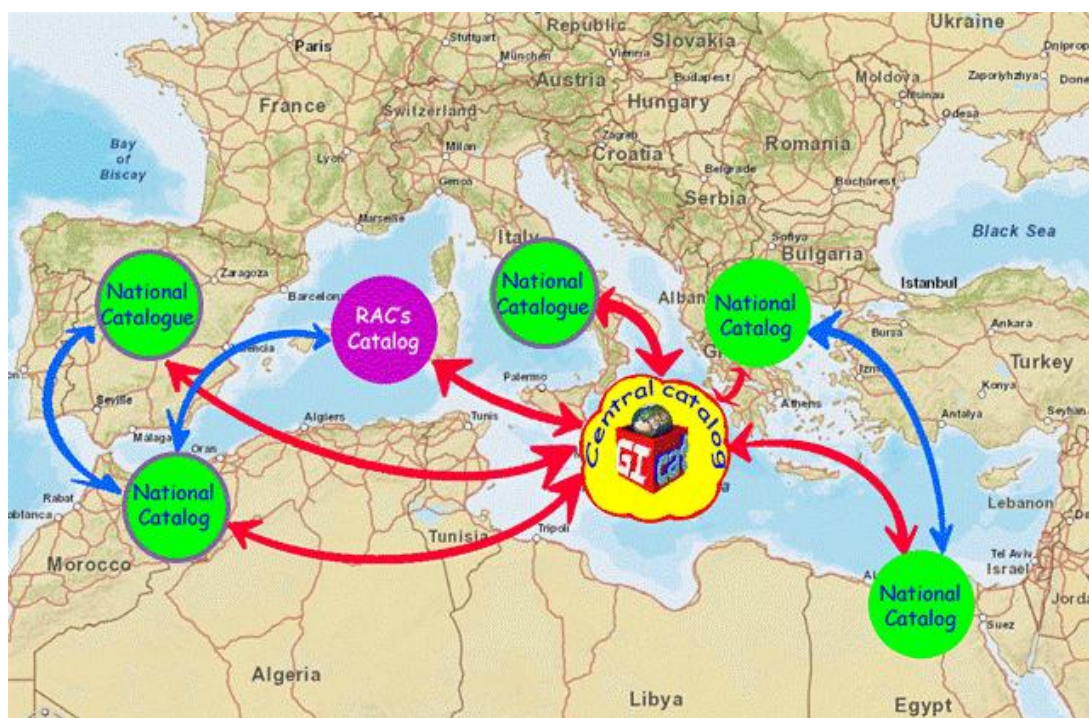


Figure 2 – The conceptual model of the proposed network: each node can interoperate with other nodes and with the central catalogue. The violet board contouring the “National Catalogues circles” identify the project pilot participants.

A central catalogue have been deployed by INFO-RAC to perform as “hub” of available information at Mediterranean scale, and each node can independently interoperate with all the other nodes of the network. The main scope of the central catalogue is to furnish a single point access to supply environmental information to external users (environmental agencies, research institutes and private sector).

By the SoS model incepted through the use case it is possible to perform the following actions:

- 1) to discover and collect all the information harvested in the Mediterranean region (node-to-broker);
- 2) to discover and collect only the required the environmental information by linking a specific catalogue (node-to-node);
- 3) to make available the description and access condition of existing datasets to the community;
- 4) to operate the discovery services within the SoS by each node.

Implementation of the system (TA4).

The implementation of the (data and) metadata networking at Mediterranean scale will be completed in parallel with the Info-MAP information system development (that is already taking advantage from the use case results). Currently, Info-MAP already supports data and metadata discovery and view services (available at <https://www.securemais.sinanet.isprambiente.it>) and it deploys the technology promoted by the use case.

Assessment and evaluation (TA5).

To support the full interoperability at Mediterranean scale, the promotion of the application of the EGIDA methodology transfer process will be persecuted in the frame of future Info-RAC activities. National Authorities already involved (and those willing to be



involved) in the use case development will be supported in the re-engineering process. Currently, positive results capable to be replicated have been furnished by the interoperability tests conducted with Spain (UNEP-MAP network) and Egypt (GEO network) as described in section 6.

Integration with GEOSS and others infrastructure (TA6).

By the utilisation of international interoperability standards adopted for the implementation of the Info-MAP information system, it is already possible to provide GEOSS and other relevant programmes and Projects with a meta-dataset covering part of the Mediterranean Region (Spain-Italy-Egypt) through the broker (Info-RAC) and the Italian National catalog.

5 EGIDA Methodology Assessment

5.1. Results

5.1.1. Test case 1: Info-RAC (UNEP-MAP) network approach

During the Info-RAC NFP meeting, the relevance of the GEO/GEOSS to UNEP/MAP was presented as:

- A voluntary governmental and international partnership where most MAP CPs (15 out of 22) are partners;
- a global initiative to collect and share earth observation data that could complement the in-situ monitoring of marine and coastal areas;
- data sharing documents (GEOSS DS guidelines and Action Plan) relevant to the UNEP/MAP data policy implementation.



The 7FP Project EGIDA was presented as a supporting action where catalogs interoperability testing among Mediterranean Countries will be supported on the basis of the SEIS and GEOSS Data Sharing Principles.

The presentation of GEO and its related activities were understood by the meeting participants and the MAP secretariat, and the result of dissemination activity is included in the decision IG.20/4 taken at the UNEP-MAP 17th Meeting of the Contracting Parties (UNEP(DEPI)/MED IG 20/8 Annex II- Implementing MAP ecosystem approach roadmap: Mediterranean Ecological and Operational Objectives, Indicators and Timetable for implementing the ecosystem approach roadmap) that states:

"...Considering the need to establish an effective governance of the knowledge and information generated through an appropriate data sharing policy which takes fully into account the GEOSS Data Sharing Action Plan for the implementation of the GEOSS Data Sharing Principles which was adopted by the GEO-VII Plenary of 3-4 November 2010 and which have been ratified by nearly all Contracting Parties to the Barcelona Convention..."

About technical aspect related to data and metadata, the most active Regional Activity Centres furnished the link to their databases (e.g. MED-POL monitoring sampling points database and REMPEC), and the IGN (Geographic National Institute of Spain – Info-RAC National Focal Point) metadata catalog has been federated. The access point for the data and metadata collected so far at Mediterranean scale can be found at: <https://www.securemais.isprambiente.it> (View, and discovery services based on OGC standards), <http://193.206.192.214/geonetwork> (Italian National node) and at <http://193.206.192.214/GI-cat> (broker). All the catalogues interoperate by CWS 2.0.2 protocols.

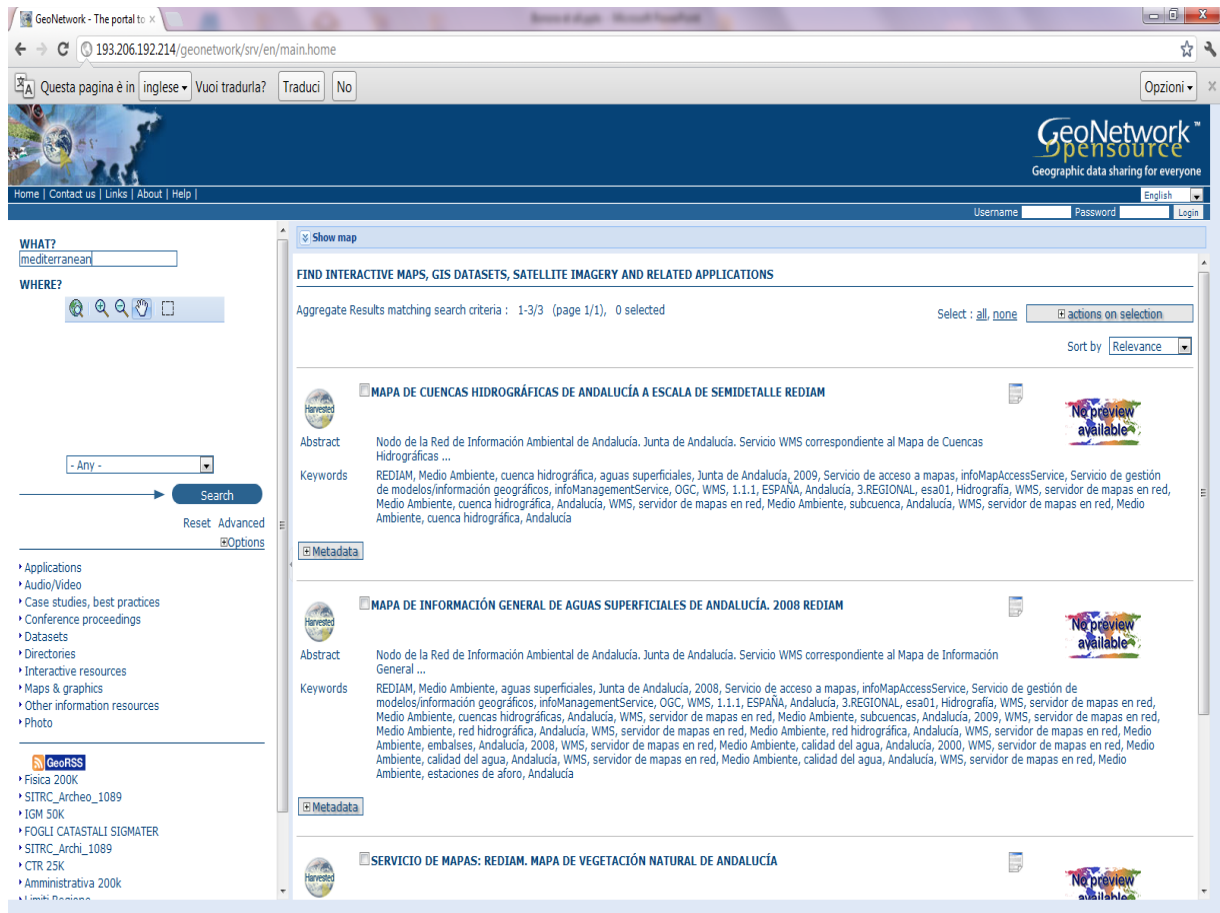


Figure 3 - interoperability test with the Info-RAC Spanish national focal point (Geographic National Institute) using CSW 2.0.2 protocol provided by Geonetwork SW (node-to-node interoperability test).

5.1.2. Test case 2: Egyptian use case (GEO Network)

The 14 March 2012 a meeting at NARSS venue (Cairo - Egypt) has been taken to discuss potential involvement of Egyptian representatives in the EGIDA Mediterranean Use Case. The meeting has been participated by ISPRA, CNR, NARSS (National Authority for Remote Sensing and Space Sciences of Egypt – GEO delegates) and EEAA (Egyptian Environmental Affairs Agency of Egypt on the role of Info-RAC NFP).



The EGIDA project has been presented with particular focus on the implementation of the EGIDA Methodology and on the Mediterranean use cases (Mediterranean Region and Hotspot Pollution).

After the presentation the discussion took place. Egyptian Representatives found the EGIDA project potentially helpful for their national and sub-national coordination activities. In this specific case the EGIDA Methodology could be applied to demonstrate its effectiveness.

It has been communicated by the Egyptian Representatives that, on the basis of their experiences on cooperating with northern African Countries, a good level of interoperability at Mediterranean scale could result feasible within 3-4 years: two years to build the partnership and to implement a SoS prototype; 1-2 years for IT tool deployment.

The Egyptian Representatives expressed their interest to coordinate the northern African Countries in future cooperation for the sustainable Mediterranean contribution to GEOSS. This activity could lead to the Mediterranean GEO development in further EU project participated also by Asian and African EU neighbours.

On the frame of the GEO Egypt development, it has been communicated that there is not an implementation at national level, and the EGIDA methodology is welcomed also in this case to support such of implementation.

Last, the Egyptian Representatives asked for personal user ID and PWD to be used in already existing environmental metadata catalog to get familiar with the tool and to furnish discovery elements related existing Egyptian or NARSS related datasets.

Results of this activity are related to *node to broker* interoperability tests, as shown in figure 4 and 5. By the tests it has been possible to incept the Egyptian system federation, enclosing in the broker catalog the exposed environmental services by the meaning of OGC standards.

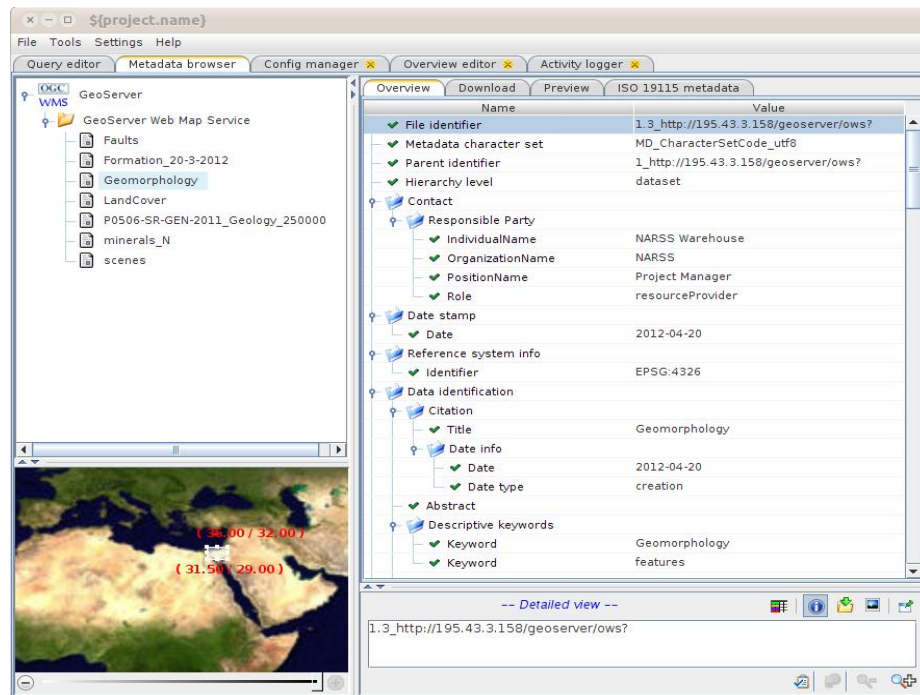


Figure 4 – Metadata related to WMS service shared with NARSS.

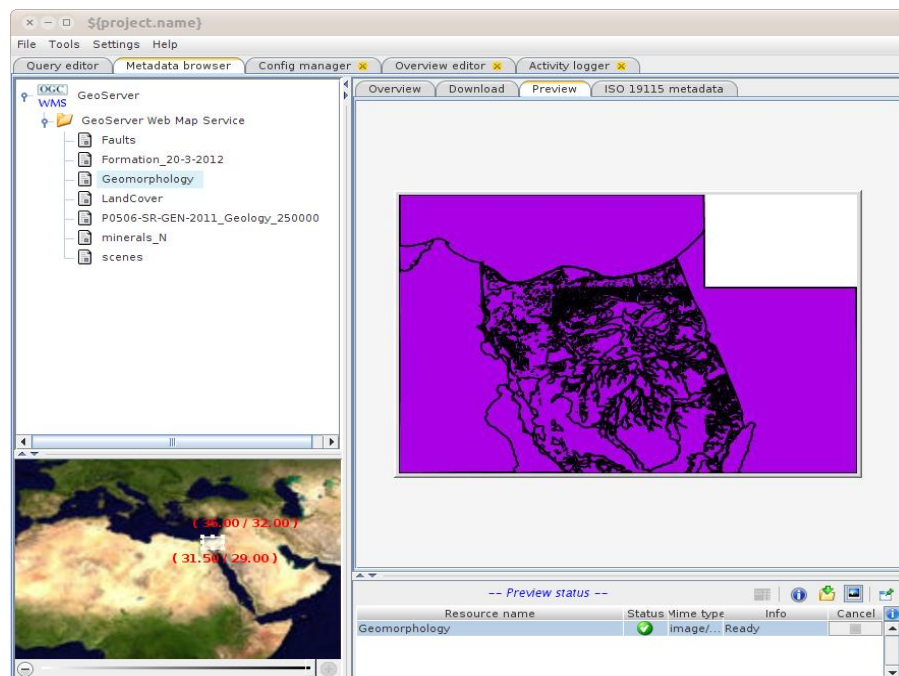


Figure 5 - Preview of the exchanged WMS services (Nilo river delta).



Last, NARSS participated as co-author in the production of the abstract "Networking environmental metadata: a pilot project for the Mediterranean Region", presented at the EGU General Assembly (April 2012, Vienna).

5.1.3. Test case 3: Moroccan use case (GEO network)

During the last GEO plenary (Istanbul, 2011) contacts with the GEO delegation of Morocco have been taken to promote the developing of common initiatives for : a) the sustainable Mediterranean contribution to GEOSS and b) how to take advantage of existing initiatives financed by the current EC Framework Program on Research and Development (e.g. the EGIDA Project) in view of developing possible future co-operations within the same programme.

There was a positive response by Morocco, and it was asked us to keep in touch to build a common proposal. It has been asked the Moroccan Delegate (Dr. Nouredine Filali Bourbahmi) to meet at its venue to discuss the potential involvement in the EGIDA use cases and future cooperation on the frame of the Mediterranean Region.

The proposed meeting would have to be finalized, in a preliminary way, as follow:

- existing information nodes useful to provide inputs to GEOSS Common Infrastructures;
- how they can possibly be improved and mainstreamed;
- future actions to improve the overall contribution of the Mediterranean to GEO, taking into account the Moroccan experience;
- identification of existing practices for metadata collection and sharing at national/regional level, already or potentially useful for GEOSS;
- replication potential in the region.

The communication containing the meeting proposal and the above agenda has been sent by the Italian GEO Principal. It has been replied that Moroccan GEO representatives are willing to support the development of the EGIDA project in the frame of



Mediterranean activities by guesting EGIDA representatives for deeper discussions. The meeting is planned to be held in the first week of July 2012 in Rabat or Casablanca.

5.1.4. Test case 4: Info-RAC (UNEP-MAP) network approach - webinar. INFO/RAC activities in the frame of IT and European Scientific Project: toward future collaboration in the Mediterranean Region.

The planned webinar aimed to present the result of the re-engineering process that supported the implementation of the Info-MAP catalog component and to promote the replication processes of existing IT infrastructures through cooperation between Mediterranean Countries and INFO-RAC (the regional Activity Centre for Information and Communication of the Barcelona Convention).

It has been also shown the potentiality of open source tools useful to equalize IT technical equipment and expertise across the Mediterranean Region.

At the end of the webinar it has been asked the participants *a)* to express their opinions and suggestions to improve the presented activities and also *b)* to express potential interest for future collaborations in the frame of the Mediterranean Region.

Some participants, in particular the RAC's (Regional Activity Centres), expressed their willingness to participate on future collaboration in the frame of data and information sharing within UNEP-MAP through system interoperability.

There was a particular interest on the EGIDA Mediterranean Use Case from REMPEC representatives, on the matter of their activities tied to MEDESS-4MS project (Mediterranean decision support System for Marine Safety). Considering REMPEC is leading a task aimed to improve the risks evaluation and monitoring in order to identify areas with high risk of oil marine pollution in the Mediterranean region, they would need to gather information on maritime traffic, offshore and other oil handling facilities as potential source of oil pollution as well as other environment and socio-economic data, accident data, oil spill response equipment inventory data. It is supposed the MEDESS-



4MS project could result also useful for future development of the Mediterranean Pollution use case.

To incept data sharing in the frame of UNEP-MAP, it has been suggested from REMPEC to produce a list of existing datasets owned by all the Regional Activity Centres (BP-RAC, PAP-RAC SPA-RAC, Info-RAC, CP-RAC, MED POL and REMPEC) and to promote this activity in the near-future by web events.

Positive comments reached by the Info-RAC Focal Point of Spain (IGN), who express the willingness to collaborate and be involved inside R&D activities related the Mediterranean region.

Positive comments reached from the European Commission (Michail Papadoyannakis), who expressed appreciation for the R&D and IT dissemination activity oriented to EU neighbours countries and MAP Components.

Considering the RAC's role on collecting environmental data and information from UNEP-MAP Contracting Parties, it is important to strengthen the cooperation between RACs and on-going/living projects, (e.g. GEOSS, FP7) to maximize the data and information flow between existing systems. To do that, it is also important to improve National IT capabilities to support interoperability between Mediterranean Member States, RACs, EC, regional and Global Projects and Programmes.

5.2. Failures

5.2.1. Moroccan use case (UNEP-MAP network)

During Info-RAC session event it has been proposed to Morocco NFP to participate in the EGIDA Mediterranean use case. After discussion it has been reached the agreement to build a common proposal to demonstrate that environmental metadata sharing in the Mediterranean Region can be feasible in the short time period using in-kind human resources.

The Info-RAC Focal Point of Morocco, being back from a positive experience carried-out in the frame of the ENPI-SEIS/South project Country visit, suggested to take also into



account the SEIS principles, proposing the ambitious target to enforce the data and information flow between national and subnational Institutions.

We have been asked from Morocco Info-RAC Focal Point to prepare a draft proposal to better evaluate their role within the pilot project. The draft proposal has been circulated around June 2011. They kindly asked us to provide the French version too, in order to make them capture at the best the proposal's aims. The French version of the proposal has been circulated in October 2010. The pilot proposal is contained in annex I.

Since we sent out the last version of the proposal, any feed-back or communication has been provided by Morocco Info-RAC NFP. In following UNEP-MAP meetings it has been possible to meet other Moroccan representatives that, aware about the e-mail exchange and the pilot proposal, they encouraged us to insist to be feed-backed. Several communications have been sent to the Info-RAC Focal Point of Morocco to understand what was wrong with the proposal. No replies have been provided so far.

5.3. Recommendations for new actions/sub-actions

As emerged during the meeting held at Cairo, for the implementation of future projects calls that will foresee the involvement of EU neighbour Countries (Asian or African), it is suggested to make one of the extra EU Authorities (that is already involved in consolidated network) to lead the coordination of non-EU countries. In this way, there would be higher chances to contact and work with non-EU stakeholders having interests related to networking activities.

It is also suggested to include in the EGIDA methodology the dissemination of the outcomes through scientific journals or technical symposium. This activity is in itself a good feedback related the targeted achievements.



5.4. *Recommendations of new guidelines for existing actions/sub-actions*

Before TA2, a *process for rising awareness on the benefit of data sharing* should facilitate the removal of barriers, especially the ones tied to behavioural and the institutional (e.g. policy constraint) components.

In TA3 is suggested to enclose the *reuse* (as concept) of already implemented infrastructures and available tools.

User's guidelines related to the access of the implemented/re-engineered system should be drafted.

Training session should also be planned to improve capacity building on managing national nodes/infrastructures.



6 Appendix - Main criticality encountered so far and possible solution

1. **C)** Difficulties on activating collaboration/cooperation with EU neighbor Countries if not already planned in existing Programs and Projects.

S) It would be useful to plan more pilot activities or test cases in the frame of future projects to improve national capabilities. The pilot results will help in the definition of replication processes.

2. **C)** As highlighted in the frame of the cooperation with Egypt, the feasibility in the short time (3-4 years) of the planned metadata networking in the Mediterranean Region can be achieved with the active involvement of EU Neighbors.

S) The EC is suggested to keep focusing on the involvement of Neighbor countries in future project calls.

3. **C)** The coordination of EU neighbor countries should be led by one of their representatives because of they own knowledge and experience on the mechanism leading relationships.

S) NARSS (Egypt) expressed availability to coordinate northern African countries in future common activities.

4. **C)** Considering the difficulties encountered on data and metadata sharing, because of internal restrITed policy or absence of datasets, **S)** it is suggested to foresee, in future projects, also the production of specific datasets (maybe aligned with EU products and services) to be shared with a specific data policy within new or existing IT infrastructures.



7 General References

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8 ANNEX 1

Pilot project proposal sent to Info-RAC National Focal Point of Morocco



Pilot project proposal

Networking environmental metadata within the UNEP-MAP and GEOSS in the framework of the EU FP7 EGIDA Project: a pilot project for the Mediterranean
Création de réseaux de métadonnées environnementales au sein du PNUE-PAM et GEOSS dans le cadre du Project Européen EGIDA, septième programme-cadre (7^e PC): un projet pilote pour la Méditerranée.

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Abstract

To better exploit any environmental dataset it is necessary to provide detailed information (metadata) capable to furnish the best data description.

With regard to environmental metadata networking and delivery, it is important to note that there are differences between the existing IT infrastructures in European countries (that typically have already implemented networking nodes) and those in neighbouring ones. To bring closer IT developments, taking into account economic sustainability, it is important to share experiences improving the accessibility of environmental information to users, through models that do not penalise distributed environmental information discovery.

Operating environmental data and information networking also requires the long-term investment of financial and human resources. As these resources are scarce, ensuring sustainability can be a struggle. Then, to use more effectively human and economic resources and to avoid duplication, it is essential to test existing models and, where appropriate, replicate strategies and experiences.

For the above reasons, it has been programmed to pilot a project to implement and test a metadata catalogue's networking, involving Countries afferent the Mediterranean Region, to demonstrate that the adoption of open source and free software can contribute to the alignment of IT resources and knowledge to achieve data and information sharing.

This networking pilot project can be carried out within the 7FP European Project EGIDA (www.egida-project.eu), that aims to develop a methodology to apply the System of Systems architecture already adopted within GEOSS (<http://www.earthobservations.org/geoss.shtml>), and can be enacted through INFO-RAC.

The pilot project will contribute EGIDA to implement the above methodology in order to be applied in Europe and in the Mediterranean Countries and, in turn, UNEP-MAP will benefit from EGIDA by the realisation of a metadata catalogues networking across the Mediterranean Region.

This pilot project foresees the involvement of European and African Partners of the Mediterranean Basin (starting with Morocco and Spain) to:

- a) further motivate UNEP-MAP Participants to share environmental information (metadata) to be circulated in the Mediterranean Region;*
- b) prototype and test the environmental information flow from local to national scale on the basis of SEIS Communication through the ENPI/SEIS-South project;*



- c) build capacity on Information and Communication Technology (IT) within the Mediterranean Region through replication activities;*
- d) increase the ability of developing countries to play a more prominent role in the Mediterranean Region increasing the availability of environmental information.*

The pilot project's results will relate to a catalogue's networking conceived for sharing environmental metadata within the Mediterranean Region. The National nodes implemented by CPs will interoperate within the network by the meaning of international standards, both for metadata editing and catalogue's interface. The use of common standards will be ensured by the adoption of informatics tools supported by strong developer and user community oriented to supply open source software. The resulting networking model will be based on the concept of System of Systems, where environmental metadata will be made available to be shared within the Mediterranean Region. Also, by the proposed information infrastructure it will be possible to discover and harvest useful information stored in other systems. Thus, this pilot project will promote not only environmental data and information sharing within UNEP-MAP but also with other larger initiatives such as GEO/GEOSS.



Introduction

With the increasing production of environmental data, their description through metadata becomes more and more important. International standards for geographic metadata already exist, as well as standards to support the exchange of environmental information. Sometimes, the problem of information sharing is solved by isolated solutions that make the search and discovery difficult over the web or specific networks.

Also, modern science, international programmes and projects have to rely with different environmental data and information formats, which are often incomparable. In turn, those data and information need to be integrated, reused, and shared in order to maximise their value.

Furthermore, considering data are collected by countries at different national scale, diverse conditions may exist regarding confidentiality. In some cases, data are readily available for download, in other cases data are just collected and not shared because of restrictions led by existing national or sub-national policies. It is evident that a description of existing datasets is necessary, both for scientific contents and access conditions.

The context

The activity can be carried out within the 7FP European Project EGIDA (www.egida-project.eu), and enacted through INFO-RAC.

The main goals of EGIDA are:

- a) to support both, the broader implementation and effectiveness of the GEOSS Science and Technology Roadmap and the mission of GEOSS (www.earthobservations.org) through coherent and interoperable networking between national and international initiatives; and
- b) to develop a methodology to apply the System of Systems architecture already adopted within GEOSS.

Specifically, one of EGIDA project's tasks aims to provide a *use-case* capable to support the implementation of a replication methodology that focuses on partnership, infrastructures, products and services involving Southern Mediterranean Countries.

This task is coordinated by ISPRA, which has a large experience in cooperating with EC neighbour countries, particularly in the Mediterranean Region, and in developing environmental information systems, indicators and clearing houses.



The pilot project will contribute EGIDA to implement the above methodology in order to be applied in Europe and in the Mediterranean Countries and, in turn, UNEP-MAP will benefit from EGIDA by the realisation of a metadata catalogues networking across the Mediterranean Region.

Targets of the proposal

This document presents a pilot project that provides a replicable methodology for the implementation of an environmental information sharing network, within the framework of Info-MAP implementation, for sharing environmental information (metadata) in the context of UNEP-MAP.

This use-case will be based on the re-use of existing infrastructures/technologies. Such of reuse, based on OS tools and worldwide accepted interoperability standards, can permit the IT alignment between new and existing communities overcoming technological barriers in the exchange of environmental information.

To achieve the above target, it is needed to satisfy the following conditions:

- 1) the adoption of open source technologies capable to support international standards, both for system interoperability and metadata compiling;
- 2) the adoption of open source technology fully supported by a strong community of developers and users.

To perform the interoperability test it is proposed to engage both CPs and RACs. In this pilot INFO/RAC will act as technology supporter, informative node and metadata provider. The chosen countries, one from Africa (Morocco) and one from Europe (Spain), will act as informative node, metadata providers and technology tester.

The choice of the partners have been made above the following conditions: 1) awareness of mechanisms related to interoperability; 2) capacity to manage environmental information services.

The partners will also be involved in the drafting of best practices related to the replication process for the implementation of national nodes to network metadata.

Also, to be compliant and aligned with the on-going ENPI/SEIS – South project, it is proposed to involve subnational actors, to be identified in the project development, in order to prototype the implementation of an informative shared chain capable to connect local and central institutions.

Piloting information sharing to support data policy implementation



To better exploit any environmental dataset it is necessary to provide detailed information (metadata) capable to furnish the best data description.

Also, operating environmental data and information networking requires the long-term investment of financial and human resources. As these resources are scarce, ensuring sustainability can be a struggle. Then, to use more effectively human and economic resources and to avoid duplication, it is essential to test existing models and, where appropriate, replicate strategies and experiences.

Another important point is related to the motivation of partners to share data and information: it requires a corresponding incentive. Access to – and being the main point of contact and distribution of – national environmental information, could provide such incentive.

For example, in the frame of GEOSS data providers are encouraged to make their environmental data and information available free of charge or at no more than the costs of reproduction and distribution. The presumption is that users will produce socially and economically beneficial results based on such privileged access conditions, as long as the maximum benefit is accompanied by a concomitant absence of reuse or re-dissemination restrITions.

Last, the recognition and analysis of metadata (description of contents, levels of access and further constraints) will make possible to identify the different data license typology co-existing in the Mediterranean Region. This activity is an essential step to address the implementation of the UNEP-MAP's common data sharing policy.

Implementing the article 13 of Barcelona Convention to support scientific research

There are many international programs and projects that provide free and unrestrITed environmental information. In many cases, data and information sharing is promoted by both official research policy (e.g., through terms and conditions of public research grants) and by the norms of many discipline communities [Interim Report on Data Sharing – Document 27. GEO IV, 2007].

To support Article 11 of the Barcelona Convention⁽¹⁾, open access to and sharing of data and metadata from publicly-funded activities and initiatives offer many research and educational

⁽¹⁾ 1. The Contracting Parties. undertake as far as possible to co-operate directly, or when appropriate through competent regional or other international organizations, in the fields of science and technology and to exchange data as well as other scientific information for the purpose of this Convention.



advantages over a closed, proprietary system that places high barriers to both access and subsequent re-use. In particular, open access to such data:

- reinforces open scientific inquiry,
- encourages diversity of analysis and opinion,
- promotes new research and new types of research,
- allows the verification of previous results,
- makes possible the testing of new or alternative hypotheses and methods of analysis,
- establishes a broader base set of data than any researcher can hope to collect, thereby providing a greater baseline of factual information for the research community,
- supports studies on data collection methods and measurement,
- facilitates the training of new researchers,
- enables the exploration of topics not envisioned by the initial investigators,
- permits the creation of new data sets, information, and knowledge when data from multiple sources are combined,
- helps transfer factual information to and promotes development and capacity building in developing countries,
- promotes interdisciplinary, inter- sectorial, inter-institutional, and international research, and

2. The Contracting Parties undertake as far as possible to develop and co-ordinate their national research programmes relating to all types of marine pollution in the Mediterranean Sea area and to co-operate in the establishment and implementation of regional and other international research programmes for the purposes of this Convention.

3. The Contracting Parties undertake to co-operate in the provision of technical and other possible assistance in fields relating to marine pollution, with priority to be given to the special needs of developing countries in the Mediterranean region.

- generally helps to maximize the research potential of new digital technologies and networks, thereby providing greater returns from the public investment in data collection and research [GEOSS Data Sharing Action Plan – Document 7. GEO VII, 2011].

The conceptual model

With regard to environmental metadata networking and delivery, it is important to note that there are differences between the existing IT infrastructure in European countries (who typically have already implemented networking nodes) and those in neighbouring ones. To align IT solutions, taking into account economic sustainability, it is important to share experiences improving the accessibility of environmental information to users, through models that do not penalise distributed environmental information discovery.

The model of the proposed network is based on the concept of a distributed System of Systems (SoS), that foresees the implementation of the easiest infrastructure built upon freely accessible technology (open source software) to discover and exchange environmental information across the Mediterranean Region (Fig. 1).

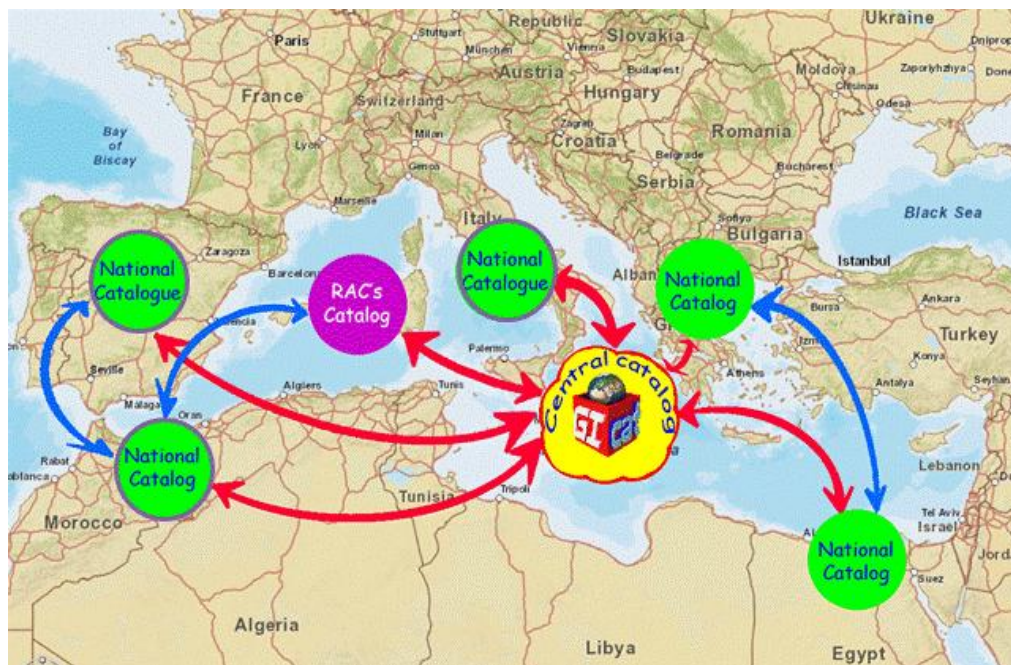




Figure 1 – The conceptual model of the proposed network: each node can interoperate with other nodes and with the central catalogue. The violet board contouring the “National Catalogues circles” identify the project pilot participants.

To implement the SoS model, it is important to adopt technology capable to expose international standard to achieve interoperability.

A central catalogue will be implemented by INFO-RAC to perform the “hub” of available information at Mediterranean scale. Being the nature of the SoS based on the *distributed* concept, the central catalogue plays a marginal role in the implementation of the network. In fact, each node can independently interoperate with all the other nodes of the network. The main scope of the central catalogue is to furnish a single point access to supply environmental information to external further users (environmental agencies, research institutes and private sector). The central catalogue is not conceived to compile metadata but only to collect and share.

By the SoS model it will be possible to perform the following actions:

- 5) to discover and collect all the information harvested at Mediterranean scale (central to National);
- 6) to discover and collect only the required the environmental information by linking a specific catalogue (national to national);
- 7) to make available the description and access condition of existing datasets to the community;
- 4) to operate the *search services* within the SoS by each node.

Reaching a technical compromise within the Mediterranean Region: the proposed tool

GEONETWORK

To implement the pilot, on the basis of the four points listed above, it has been identified a software (Geonetwork: metadata catalogue – <http://geonetwork-opensource.org/>) matching all the necessary conditions to achieve the targets.

Geonetwork is an open source software supported by a wide community of users and developers. It is capable to interoperate with different standard protocols and to expose itself as a standard node to share the information recorded in its infrastructure.

GeoNetwork is a catalogue application to manage spatially referenced resources. It provides metadata editing and search functions as well as an embedded interactive web map viewer. It is currently used in numerous spatial data infrastructure initiatives across the world.



GeoNetwork has been developed to connect spatial information communities and their data using a modern architecture, which is at the same time powerful and low cost, based on the principles of Free and Open Source Software (FOSS) and international and open standards for services and protocols (a.o. from ISO/TC211 and OGC).

The software provides an easy to use web interface to search geospatial data across multiple catalogues, combine distributed map services in the embedded map viewer, publish geospatial data using the online metadata editing tools and optionally the embedded GeoServer map server. Administrators have the option to manage user and group accounts, configure the server through web based and desktop utilities and schedule metadata harvesting from other catalogues.

The main software features relates to:

- immediate search access to local and distributed geospatial catalogues,
- up- and downloading of data, graphics, documents, pdf files and any other content types,
- an interactive web map viewer to combine web map services from distributed servers around the world,
- online editing of metadata with a powerful template system,
- scheduled harvesting and synchronization of metadata between distributed catalogues,
- support for OGC-CSW 2.0.2 ISO Profile, OAI-PMH, Z39.50 protocols,
- fine-grained access control with group and user management,
- multi-lingual user interface (english, french, spanish and others).

A single, platform independent installer allows to install and run the software on a PC or a server on Windows, Linux and Mac OS X. The installer can be downloaded as an executable Windows file or as a platform independent '.jar' installer. It creates a start menu on Windows computers. Command line installations are also possible for remote installations. Please refer to the manual for detailed installation instructions.

Expected results

The pilot project results will relate to a catalogue's networking conceived for sharing environmental information (metadata) within the Mediterranean Region. The National nodes, implemented by CPs, will interoperate within the network by the meaning of international standards, both for metadata



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editing (ISO 19115) and catalogue interfaces (CSW). The use of common standards will be ensured by the adoption of informatics tools supported by strong developer and user communities oriented to supply open source software. The resulting networking model will be based on the concept of "System of Systems", where metadata will be made available. Also, by the proposed informative infrastructure it will be possible to discover and harvest useful information provided by other systems.



Resumé

Afin de mieux exploiter un ensemble de données, il est nécessaire de fournir des informations détaillées (métadonnées) capable de décrire au mieux celui-ci.

En ce qui concerne la création de réseaux de métadonnées environnementales et leur distribution, il est important de noter les différences existant entre les infrastructures ITC des pays européens (qui en général ont déjà réalisé des centres de connexion) et celles des pays voisins. Afin de comparer les développements des ITC, prenant en compte la durabilité économique, il est important de partager des expériences en améliorant l'accessibilité des utilisateurs à l'information environnementale grâce à des modèles qui n'en pénalisent pas la divulgation.

L'exploitation des données environnementales et la création de réseaux d'information nécessitent aussi des investissements en ressources financières et humaines à long terme. Comme ces ressources sont insuffisantes, en assurer la durabilité pourrait être un vrai défi. Donc pour les utiliser de façon plus efficace et pour éviter un double travail, il est essentiel de tester les modèles existants et, le cas échéant, de répliquer les stratégies et les expériences.

Pour les raisons citées ci-dessus, il a été planifier la mise à l'essai d'un projet afin de réaliser et tester la création d'un réseau de catalogue de métadonnées , impliquant les pays de la région méditerranéenne, dans le but de démontrer que l'adoption de logiciels libres et open source peuvent contribuer à l'alignement des ressources et des connaissances IT afin d'obtenir le partage des données et de l'information.

Ce projet pilote de création de réseaux peut être réalisé au sein du Projet Européen FP7 EGIDA (www.egida-project.eu) dont le but est de développer une méthodologie mettant en pratique le Système de l'architecture des Systèmes déjà adoptée au sein du GEOSS (<http://www.earthobservations.org/geoss.shtml>). Ce projet peut être publié par INFO-RAC.

Le projet pilote contribuera, dans le projet EGIDA, à la mise en pratique de la méthodologie citée ci-dessus afin qu'elle soit appliquée en Europe et dans les pays méditerranéens. le PNUE-PAM, pour sa part, bénéficiera d' EGIDA grâce à la création d'un réseau de catalogues de métadonnées dans la Région Méditerranéenne.

Ce projet pilote prévoit la participation de Partenaires Européens et Maghrébins (à commencer par le Maroc et l'Espagne) dans le but de:



- a. motiver davantage le PNUE-PAM à partager les informations environnementales (métadonnées) utiles à la Région Méditerranéenne;*
- b. développer un prototype et évaluer la circulation des informations environnementales de l'échelle locale à celle nationale sur la base de la communication SEIS à travers le projet ENPI/SEIS-South;*
- c. renforcer les capacités de ITC (Information et Techniques de Communication) dans la Région de la Méditerranée par des répliques;*
- d. augmenter la possibilité des pays en développement de jouer un rôle beaucoup plus important dans la Région Méditerranéenne en augmentant la quantité d'informations environnementales.*

Les résultats du projet pilote seront utilisés pour la création de réseaux de catalogue conçu pour la distribution de métadonnées environnementales dans la Région Méditerranéenne. Les centres nationaux établis par les Parties Contractantes interagiront au sein du réseau selon les normes internationales, tant pour l'édition des métadonnées que pour l'interface des catalogues. L'utilisation des normes communes sera assurée par l'adoption d'outils informatiques tolérés par de grandes communautés de développeurs (créateurs de logiciel) et d'utilisateurs destinées à fournir des logiciels open source. Le modèle de réseau qui en résultera se basera sur le concept «Système des Systèmes», où les métadonnées environnementales seront mises à disposition afin d'être distribuées dans la Région de la Méditerranée. Aussi, grâce à l'infrastructure informative proposée, il sera possible de découvrir et collecter des informations utiles stockées dans d'autres systèmes. Ainsi, ce projet pilote va promouvoir non seulement la distribution des données et informations environnementales au sein du PNUE-PAM mais aussi au sein d'initiatives importantes telles que GEO/GEOSS.



Introduction

Avec l'augmentation de la production des données environnementales, leur description par le biais de métadonnées devient de plus en plus importante. Les normes internationales sur les métadonnées géographiques existent déjà, de même que celles qui soutiennent l'échange d'informations environnementales. Parfois, le problème de la distribution de l'information est résolu grâce à des solutions individuelles qui rendent difficiles la recherche et la découverte sur le web ou sur des réseaux spécifiques.

Les sciences modernes, les programmes et les projets internationaux doivent aussi tenir compte des différents modèles de données et informations environnementales qui sont souvent incomparables. En retour, ces données et informations doivent être intégrées, réutilisées et partagées afin de maximiser leur valeur.

En outre, vu que les données sont recueillies par les pays à divers échelle nationale, il peut exister des conditions différentes en matière de confidentialité. Dans certains cas, les données sont facilement disponibles pour le téléchargement, dans d'autres elles sont seulement recueillies et pas distribuées à cause des restrictions apportées par les politiques nationales ou sous-nationales actuelles. Il est évident qu'une description des ensembles de données existants est nécessaire, tant pour le contenu scientifique que pour les conditions d'accès.

Le contexte

L'activité peut être réalisée au sein du Projet Européen EGIDA, septième Programme-Cadre (www.egida-project.eu), et publiée par INFO-RAC.

Les principaux objectifs d' EGIDA sont:

- a) soutenir la plus importante réalisation et productivité de la Science GEOSS de même que le plan d'action technologique et la mission du GEOSS (www.earthobservations.org) par l'intermédiaire de réseaux cohérents et interactifs entre les initiatives nationales et internationales,
- b) développer une méthodologie pour appliquer le Système de l'architecture des Systèmes déjà adopté au sein du GEOSS.

En particulier, l'une des missions du projet EGIDA vise à présenter un cas d'utilisation capable de garantir l'application d'une méthodologie de réplique qui se focalise sur le partenariat, les infrastructures, les produits et les services impliquant les pays sud méditerranéen.

Cette mission est coordonnée par ISPRA, qui a une grande expérience de coopération avec les pays voisins de la Communauté Européenne (CE), en particulier dans la région méditerranéenne, mais aussi de développement de systèmes d'information environnementale, d'indicateurs et de chambres de compensation.



Le projet pilote contribuera, dans le projet EGIDA, à la mise en pratique de la méthodologie citée ci-dessus afin qu'elle soit appliquée en Europe et dans les pays méditerranéens. Le PNUE-PAM, pour sa part, bénéficiera d'EGIDA grâce à la création d'un réseau de catalogues de métadonnées dans la Région Méditerranéenne.

Les objectifs de la proposition

Ce document présente un projet pilote qui offre une méthodologie reproductible pour la création d'un réseau de diffusion d'informations environnementales dans le cadre de l'activité d'Info-MAP, et pour la distribution de ces informations (métadonnées) au sein du PNUE-PAM.

Ce cas d'utilisation se basera sur la réutilisation des infrastructures / technologies existantes. Une telle réutilisation, basée sur des outils d'exploitation et sur des normes d'interopérabilité acceptées dans le monde entier, peut permettre l'uniformisation des IT (Informations et Techniques de Communication) entre les nouvelles communautés et celles existantes en surmontant les barrières technologiques dans l'échange des informations environnementales.

Pour atteindre l'objectif ci-dessus, il faut satisfaire les conditions suivantes:

- 1) l'adoption de technologies open source capables d'approuver les normes internationales, tant pour l'interopérabilité des systèmes que pour la compilation des métadonnées;
- 2) l'adoption de technologies open source totalement acceptées par une forte communauté de développeurs (créateur de logiciel) et d'utilisateurs.

Afin de tester l'interopérabilité, les Parties Contractantes (PC) et les Centres d'Activités Régionales (CAR) ont été impliqués. Dans ce projet pilote, INFO/RAC sera le responsable technique, le centre d'information, et le fournisseur de métadonnées. Les pays choisis, un d'Afrique (Maroc) et un d'Europe (Espagne), seront le centre d'information, les fournisseurs de métadonnées, et effectueront les essais techniques.

Le choix des partenaires ci-dessus a été fait selon les conditions suivantes:

- 1) prise de conscience des mécanismes liés à l'interopérabilité;
- 2) capacité de gérer des services d'information environnementale.

Les partenaires seront aussi impliqués dans l'élaboration des meilleures pratiques liées au processus de réplication pour la réalisation de centres nationaux pour le réseau de métadonnées.

Pour être conforme et en accord avec le projet ENPI/SEIS – Sud en cours, des protagonistes locaux ont également été impliqués afin d'être reconnus dans le développement du projet, et dans le but de réaliser un modèle de chaîne d'information partagé capable de mettre en relation les institutions locales et centrales.

Diffusion des informations pilotes pour garantir l'application d'une politique de données

Afin de mieux exploiter un ensemble de données, il est nécessaire de fournir des informations détaillées (métadonnées) capable de décrire au mieux celui-ci.



L'exploitation des données environnementales et la création de réseaux d'information nécessitent aussi des investissements en ressources financières et humaines à long terme. Comme ces ressources sont insuffisantes, en assurer la durabilité pourrait être un vrai défi. Donc pour les utiliser de façon plus efficace et pour éviter un double travail, il est essentiel de tester les modèles existants et, le cas échéant, de répliquer les stratégies et les expériences.

Un autre point important est lié à la motivation des partenaires pour la distribution des données et des informations: cela nécessite une même détermination. Accéder aux informations environnementales nationales et être le principal contact et distributeur pourrait procurer une telle motivation.

Par exemple, au sein du GEOSS, les fournisseurs de données sont encouragés à rendre disponible leurs données et informations environnementales gratuitement ou pas plus cher que les coûts de reproduction et de diffusion. Nous espérons que les utilisateurs fourniront des résultats socialement et économiquement avantageux fondés sur de telles conditions d'accès privilégiées, aussi longtemps que le maximum de profit sera accompagné d'une absence concomitante de restrictions de réutilisation ou de redistribution.

Enfin, la reconnaissance et l'analyse des métadonnées (description du contenu, des niveaux d'accès et des contraintes supplémentaires) permettront d'identifier les différentes typologies de licence de données co-existantes dans la Région Méditerranéenne. Cette activité est une étape essentielle pour s'intéresser à l'application de la politique de partage des données communes du PNUE-MAP.

Application de l'article 13 de la Convention de Barcelone pour le soutien de la recherche scientifique

Il existe de nombreux programmes et projets internationaux qui fournissent gratuitement et sans restriction des informations sur l'environnement. Dans de nombreux cas, la diffusion des données et des informations est favorisée par la politique de recherche officielle (par exemple, grâce aux termes et conditions des subventions de recherche publiques) et par les règles de nombreuses communautés de discipline [Rapport Intermédiaire sur la distribution des données - Document 27. GEO IV, 2007].



Afin d'appliquer l'article 13 de la Convention de Barcelone⁽²⁾, le libre accès et la distribution des données et des métadonnées, à partir d'activités et initiatives bénéficiant de fonds publics, offrent de nombreuses recherches et avantages éducatifs sur un système exclusif fermé qui empêche l'accès et la réutilisation subséquente. En particulier, le libre accès à ces données:

1. renforce la recherche scientifique publique,
2. favorise la diversité d'analyse et d'opinion
3. favorise de nouvelles recherches et typologies de recherche,
4. permet le contrôle des résultats précédents,
5. rend possible le contrôle de nouvelles ou autres hypothèses et méthodes d'analyse,
6. établit une importante collection de base de données que n'importe quel chercheur peut espérer rassembler, offrant ainsi une plus grande base d'informations factuelles pour la communauté de la recherche,
7. soutient les études sur les méthodes et mesures de collection de données,
8. facilite la formation de nouveaux chercheurs,
9. permet l'analyse de sujets non considérés par les premiers chercheurs,
10. permet de créer de nouveaux groupes de données, de nouvelles informations et connaissances lorsque les données, provenant de sources multiples, sont assemblées,

(²) 1. Les Parties contractantes s'engagent, dans la mesure du possible, à coopérer directement ou, s'il y a lieu, par l'entremise d'organisations régionales ou autres organisations internationales qualifiées dans les domaines de la science et de la technologie, ainsi qu'à échanger des données et autres renseignements d'ordre scientifique, aux fins de la réalisation des objectifs de la présente Convention.

2. Les Parties contractantes s'engagent à promouvoir la recherche, l'accès aux technologies écologiquement rationnelles, y compris les technologies de production propre et le transfert de celles-ci, et à coopérer à la formulation, l'instauration et la mise en œuvre de procédés de production propre.

3. Les Parties contractantes s'engagent à coopérer pour fournir une assistance technique et d'autres formes possibles d'assistance dans les domaines en rapport avec la pollution du milieu marin, en accordant la priorité aux besoins spéciaux des pays en voie de développement de la région méditerranéenne.



11. facilite le transfert des informations factuelles et favorise le développement et le renforcement des capacités dans les pays en développement,
12. favorise la recherche interdisciplinaire, intersectorielle, interinstitutionnelle, et internationale,
13. aide, en général, à maximiser le potentiel de recherche de nouvelles technologies numériques et de réseaux, offrant ainsi un meilleur rendement de l'investissement public dans la collecte de données et dans la recherche [GEOSS Plan d'action pour la Diffusion des données - Document 7. GEO VII, 2011].

Le modèle conceptuel

En ce qui concerne la création de réseaux de métadonnées environnementales et leur distribution, il est important de noter les différences existant entre les infrastructures ITC des pays européens (qui en général ont déjà réalisé des centres de connexion) et celles des pays voisins. Afin de comparer les développements des ITC, prenant en compte la durabilité économique, il est important de partager des expériences en améliorant l'accessibilité des utilisateurs à l'information environnementale grâce à des modèles qui n'en pénalisent pas la divulgation.

Le modèle du réseau proposé est basé sur le concept d'un Système des Systèmes distribué (SdS/SoS), qui prévoit la création de la meilleure infrastructure construite sur la technologie du libre accès (logiciels open source) pour découvrir et échanger des informations environnementales dans toute la région méditerranéenne (Fig. 1).

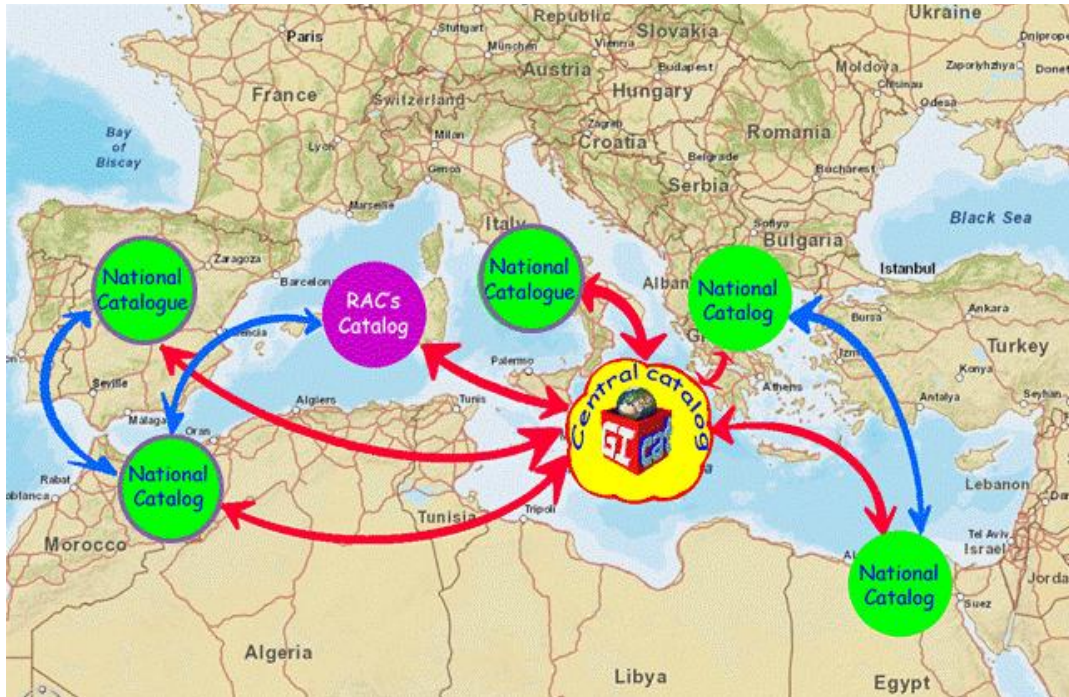


Figure 1 - Le modèle conceptuel du réseau proposé: chaque centre peut interagir avec d'autres centres et avec le catalogue central. Le rond violet, contenant "l'ensemble des Catalogues Nationaux", indique les participants du projet pilote.

Pour réaliser le modèle SoS, il est important d'adopter une technologie capable d'exposer les standards internationaux pour accomplir l'interopérabilité.

Un catalogue central sera fait par le CAR-INFO afin de réaliser le "cœur" de l'information disponible à l'échelle méditerranéenne. Vu que l'origine du SoS est basée sur le concept de *distribution*, le catalogue central joue un rôle secondaire dans la création du réseau. En effet, chaque centre peut indépendamment interagir avec tous les autres centres du réseau. Le principale objectif du catalogue central est d'être l'unique point d'accès afin de fournir des informations environnementales aux utilisateurs les plus externes (les organismes environnementaux, les instituts de recherche et le secteur privé). Le catalogue central n'est pas conçu pour établir des métadonnées mais seulement pour rassembler et distribuer.

Grâce au modèle SoS, il sera possible d'effectuer les actions suivantes:

1. repérer et rassembler toutes les informations obtenues à l'échelle méditerranéenne (essentiellement nationale);



2. repérer et rassembler que les informations environnementales demandées à travers un catalogue spécifique (nationale);
3. rendre disponible la description de l'ensemble des données existantes et leurs conditions d'accès à la communauté;
4. disposer, pour chaque centre, de *services de recherche* au sein du SoS.

Aboutissement à un compromis technique dans la région méditerranéenne: l'outil proposé

GEONETWORK

Pour réaliser le projet pilote, sur la base des quatre points énumérés ci-dessus, il a été identifié un logiciel (Geonetwork: catalogue de métadonnées - <http://geonetwork-opensource.org/>) réunissant toutes les conditions nécessaires pour atteindre les objectifs.

Geonetwork est un logiciel open source recommandé par une large communauté d'utilisateurs et de développeurs (créateurs de logiciel). Il est capable d'interagir avec les différents protocoles standard et de se révéler comme un centre standard pour la diffusion des informations enregistrées dans son infrastructure.

GeoNetwork est une application de catalogue pour gérer les ressources référencées dans l'espace. Il permet l'édition de métadonnées et les fonctions de recherche ainsi que celle d'une visionneuse cartographique web interactive intégrée. Il est actuellement utilisé dans de nombreuses initiatives d'infrastructure de données spatiales à travers le monde.

GeoNetwork a été développé pour connecter les communautés de l'information spatiale et leurs données en utilisant une architecture moderne, qui est à la fois puissante et à bas prix, et basée sur les principes du Logiciel Libre et Open Source (FOSS) et sur les standard internationaux et ouverts pour les services et les protocoles (ISO/TC211 et OGC).

Le logiciel fournit une interface web facile à utiliser pour chercher des données géo spatiales sur plusieurs catalogues, il regroupe des services de carte installés dans la visionneuse cartographique intégrée, il publie des données géo spatiales en utilisant les outils d'édition des métadonnées en ligne et facultativement le serveur cartographique intégré GeoServer. Les administrateurs ont la possibilité de gérer les utilisateurs et les comptes collectifs, de configurer le serveur par le biais d'utilitaires web de base et de bureau, et de planifier la collecte de métadonnées des autres catalogues.

Les principales caractéristiques du logiciel concernent:

- l'accès immédiat à la recherche de catalogues géo spatiales locaux et distribués,



- le téléchargement en amont et en aval des données, des graphiques, des documents, des fichiers pdf, et autres types de contenu
- la visionneuse cartographique web interactive à associer aux services de cartographie en ligne des serveurs répartis à travers le monde,
- l'édition de métadonnées en ligne avec un puissant système modèle,
- la collecte planifiée et la synchronisation des métadonnées entre les catalogues distribués,
- le soutien aux protocoles OGC-CSW 2.0.2 ISO Profile, OAI-PMH, et Z39.50,
- le contrôle d'accès à grain fin avec la gestion des groupes et des utilisateurs,
- l'interface d'utilisateurs multilingue (anglais, français, espagnol et autres).

Un installateur indépendant à plate-forme singulière permet d'installer et de faire fonctionner le logiciel sur un PC ou sur un serveur de Windows, Linux et Mac OS X. L'installateur peut être téléchargé comme un fichier Windows exécutable ou comme un installateur «.jar» indépendant à plate-forme. Il crée un menu de démarrage sur les ordinateurs Windows. Des installations de ligne de commande sont également possibles pour des installations à distance. Consultez, s'il vous plaît, le manuel pour le détail des instructions d'installation.

Les résultats attendus

Les résultats du projet pilote seront utilisés pour la création de réseaux de catalogue conçus pour la distribution de l'information environnementale (métadonnées) dans la région méditerranéenne. Les centres nationaux, établis par les Parties contractantes, interagiront au sein du réseau selon les normes internationales, tant pour l'édition des métadonnées (ISO 19115) que pour les interfaces de catalogue (CSW). L'utilisation de normes communes sera assurée par l'adoption d'outils informatiques tolérés par de grandes communautés de développeurs (créateurs de logiciel) et d'utilisateurs destinées à fournir des logiciels open source. Le modèle de réseau qui en résultera sera basé sur le concept «Système des Systèmes», où les métadonnées seront disponibles. Aussi, grâce à l'infrastructure informative proposée, il sera possible de découvrir et de collecter des informations utiles fournies par d'autres systèmes.



EGIDA, Coordinating Earth and Environmental cross-disciplinary projects to promote GEOSS

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