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Acronym: **EGIDA**
Project title: **Coordinating Earth and Environmental cross-disciplinary projects to promote GEOSS**
Theme: ENV.2010.4.1.1-1
Theme title: Supporting the integration of European and international R&D programmes in GEO

D.3.4. Process for the identification of examples (WP3)

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PART A



The GEO Process for the Identification, Reviewing, Documentation, and Promotion of
Compelling Examples That Show GEOSS at Work for Science and Technology:
Compiling a GEOSS Portfolio for Science and Technology
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PREAMBLE

This document summarizes the process for the development of the GEOSS Portfolio for Science and Technology as developed by the ST-09-02 Task Team with contributions of European project EGIDA. The present draft constitutes Part A of Deliverable D3.4 of this project. Part B describes the application of the process to European national and regional activities. The present draft has not been accepted by the ST-09-02 Task team. The draft is submitted for acceptance to the Task team.

1 INTRODUCTION

The GEOSS Portfolio for Science and Technology features examples of GEO activities, projects, and Work Plan Tasks that demonstrate the benefits of GEOSS for science and technology (S&T) communities. GEOSS provides access to many services, data sets and products of value for scientists, researchers and developers. In many cases, new research is enabled and would not be possible without access to the Earth observation products accessible through the GEO portal. This portfolio shows how the products accessible through the GEOSS Common Infrastructure (GCI) works for S&T communities.

GEOSS has a reciprocal relationship with the S&T communities. GEOSS needs input from these communities, and they can benefit from GEOSS. GEOSS depends on input from science and S&T in order to evolve in response to rapidly expanding user needs. GEOSS is a unique source of Earth observation data and related products essential for research in all nine of the Societal Benefit Areas (SBAs) of Earth observations. The technological challenges posed by the implementation of GEOSS stimulates technology development in many technology communities. The GEOSS Portfolio aims to demonstrate this bidirectional relationship between GEOSS and S&T communities.

The Road Map of the GEO Science and Technology Committee (STC) includes a number of activity focused on engaging relevant S&T communities in GEOSS. One of these activities aims to promote GEOSS Portfolio Process Paper 2 EGIDA D3.4 Part A (June 13, 2011) awareness and benefits of GEOSS in S&T communities with the goal to achieve breakthroughs in the understanding of the Earth's changing environment and the global integrated Earth system. One goal is to encourage the scientific community to collaborate within GEO to address



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interactions between the components of the global integrated Earth system, and to connect natural and socioeconomic sciences.

The GEO Task ST-09-02 is compiling the GEOSS Portfolio for Science and Technology with examples showing how GEOSS serves S&T communities in their work with the goal to stimulate broader involvement of S&T communities in GEOSS, both as users and contributors. This GEOSS portfolio intends to illustrate the broad range of benefits S&T communities might have by relating to GEOSS, be it as credited and valued contributors, users who benefit from the data sharing, or individuals and groups benefiting from stronger links to end users.

Representative examples for the portfolio have been identified in cooperation with GEO Tasks. Proposed examples have been reviewed based on a pre-defined review form and a quantitative rating system. The examples selected for inclusion in the portfolio demonstrate a wide range of benefits of GEOSS for S&T communities, including tools for discovery of data and products, improved accessibility, new data sets and services, and a better link to end users.

Submissions of proposals for additional examples to complement those currently in the portfolio are being sought. Proposals for new examples will be reviewed by the ST-09-02 Task team on a continuous basis. Proposals should be prepared using the template reproduces in Appendix A1. Proposers should consider the Review Criteria given in Appendix A2. These criteria are used by the ST-09-02 team. Successful proposers will be invited to submit as a first contribution a two-page story following the included in Appendix A3.

This process paper describes the process used to identify candidate compelling examples, review these, and include successful candidates in the portfolio.

2 IDENTIFICATION OF CANDIDATE EXAMPLES

Initial identification of examples has been by opportunity. An initial set of six proposals was identified by the ST-09-02 Task team. Additional proposals were solicited from those groups who had submitted proposals for showcases for the Ministerial Summit in 2010. Moreover, the GEOSS Portfolio web page includes and open call for proposals. Proposals should be submitted using a proposal template available on the GEOSS Portfolio web page (see Appendix A1). Submitted proposals are reviewed continuously as they come in.

Soliciting proposals more or less on an ad hoc basis has led to a portfolio that does not cover all SBAs. Therefore, a more systematic procedure for the identification of suitable candidate activities and the solicitation of proposals has been developed.

The process for identification of candidates for compelling examples has four parallel avenues:

(1) Open call on the GEOSS Portfolio web page: The GEOSS Portfolio web page at http://www.geo-tasks.org/geoss_portfolio includes an open call for proposals. Proposals submitted in response to this call are reviewed continuously.

(2) Annual review of task sheets: The ST-09-02 Task team conducts a review of the GEO Task Sheets annually in order to identify tasks that have a focus on S&T issues and that have achieved a level of maturity required for a compelling example. Invitations to submit a proposal are issued to those tasks GEOSS Portfolio Process Paper 3 EGIDA D3.4 Part A (June 13, 2011) identified in the review as candidates.

(3) Review of GEOSS Workshops and GEOSS-related sessions: Annually, the programs of GEOSS Workshops and GEOSS sessions at major S&T conferences is reviewed to identify



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presentations that relate to potential candidates for compelling examples. The authors of these presentations are contacted in order to discuss a proposal.

(4) Analysis of Communities of Practice outputs and specific national and regional GEOSS-related projects: GEO Communities of Practice are contacted annually in order to identify candidates for compelling examples. Regionally, initiatives are promoted that review national and regional GEOSS-related projects in order to identify potential candidates. These initiatives should provide a list of candidates to ST-09-02 or motivate relevant groups to submit proposals to ST-09-02. The EGIDA project has been applying this approach extensively to European projects aiming at the implementation of GEOSS. A list of candidates has been identified, and these candidates will be invited to submit proposals for compelling examples. A similar process should also be applied to other geographical regions.

3 REVIEWING PROPOSALS

Proposals are reviewed by the ST-09-02 Task team. For each proposal, the Editor-in-Chief invites at least three reviews choosing the reviewers according to the topic of the example. The reviewers are asked to complete the review form (see Appendix A2). In this form, for each of seven criteria, the reviewers are asked to assign a rating on a scale from 0 to 5. For each review, a rating is computed using weights of 0.25, 0.15, 0.10, 0.10, 0.10, 0.15, 0.15 for the seven review criteria. The overall rating is computed as the mean of the three or more individual reviews.

Proposals that have a rating of less than 3.5 are rejected. Proposals with a rating of 3.5 or higher are invited to provide input for the documentation of the example.

4 DOCUMENTATION OF ACCEPTED EXAMPLES

The compelling examples accepted after review constitute the basis of the GEOSS Portfolio demonstrating the benefits of GEOSS for S&T communities. As GEOSS is evolving, this portfolio will change and expand, and so will the individual pieces in the portfolio. Publication of the portfolio therefore is adjustable and to a large extent living. The core of the Portfolio is a web page at http://www.geo-tasks.org/geoss_portfolio, which gives access to the individual examples. The entry page provides information on the motivation and goals of the portfolio, and a separate page provides more background on the relevance of a well-developed relation between GEOSS and S&T communities. For each SBA as well as cross-cutting themes, an overview is given on the available examples in the portfolio. For each example, a brief story is included both as a web page and as a two-page leaflet. For most examples, slide shows complete the documentation. For some examples, videos are a valuable addition. Links to the external pages maintained by the teams behind the examples are also provided.

The production of additional videos should be considered for those examples, for which currently no videos are available. Once the portfolio has reached a representative coverage, it is planned to complement this living portfolio with a snapshot in form of a book. GEOSS Portfolio Process Paper 4 EGIDA D3.4 Part A (June 13, 2011) For each accepted proposal, the proposers are asked to provide the two-page story documenting the example. For that, the guidelines reproduced in Appendix A3 are provided to the proposal authors. In order to facilitate the promotion of the Portfolio, the proposer of compelling examples should include a list of existing and/or planned outreach material such as images, videos, graphics, animations etc. The necessary permits for use of such material should be given explicitly. A list of names of experts, senior as well as early career personnel, that are given authority, and are able and willing to present the example in an understandable way, or being interviewed, should be included.



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Once the two-page story is received, the web page is created by ST-09-02 and in most cases, a slide show is also prepared. The proposal authors are asked to comment on the web page and slide show and to edit these pieces, if necessary.

5 PROMOTION OF THE PORTFOLIO

A process for promotion of the portfolio is under development. The outreach plan developed by the EGIDA project will specifically address the promotion of the GEOSS Portfolio for Science and Technology.

The portfolio provides a basis for promotion material that can be distributed at scientific conferences or sent out to science organizations.

Promotion of the GEOSS Portfolio will be along five main avenues:

- (1) Regular updates on the portfolio in GEO and GEO-related newsletters;
- (2) Presentations of the GEOSS Portfolio at major science and technology conference;
- (3) Publications of the GEOSS Portfolio in newsletters or appropriate journals of major scientific enterprises;
- (4) Introduction of the portfolio through contributions to blogs? and other web media;
- (5) Publication of slide shows or videos introducing the portfolio on web media such as YouTube.
- (6) Establish social media pages that allows direct interaction with the audience/readership (Linkedin, Twitter, Facebook, Weibo (CN) and others)

The EGIDA project is expected to contribute to the promotion of the GEOSS Portfolio.



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APPENDIX

A1 TEMPLATE FOR PROPOSAL SUBMISSION

A2 REVIEW FORM

A3 GUIDELINES FOR EXAMPLE DOCUMENTATION



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A1 TEMPLATE FOR PROPOSAL SUBMISSION

GEO Task ST-09-02, Activity 3.3: Showing GEOSS at work
Examples of how GEOSS serves S&T communities in their work
Author:

SBA(s)/Overarching activity:

GEO Work Plan Task(s):

Title of Example:

Contact person for the example (*including e-mail address*):

Description of Example (*max. 200 words*):

Science and Technology communities involved (*max. 100 words*):

Added Value of GEOSS for S&T communities (*max. 200 words*):

Relation to motivation of ST-09-02 (see <http://www.geo-tasks.org/st0902> for more details on ST-09-02):

- ☐ Connect disciplines to address the complex issues of the global integrated Earth system;
- ☐ Improve interoperability between global observing systems, modeling systems, and information systems;
- ☐ Facilitate data sharing, data archiving, data dissemination, and reanalysis;
- ☐ Optimize recording of observations, assimilation of data into models, and generation of data products to improve understanding of the global integrated Earth system for prediction of environmental phenomena;
- ☐ Enhance value of global observations from individual observing systems through their integration in the societal benefit areas; and
- ☐ Harmonize well-calibrated, high-accuracy, stable, sustained in-situ and satellite observations of the same variable recorded by different sensors and different agencies.

Comments (*max. 50 words*):

Relation to the STC Paper * (*max. 200 words*):

*) Reference: GEO Science and Technology Committee, 2007: The Role of Science and Technology in GEOSS. Available at http://www.earthobservations.org/documents/committees/stc/the_role_of_science_and_technology_in_geoss.pdf



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A2 REVIEW FORM

Review Form for Compelling Examples (CEs) Demonstrating the Benefits of GEOSS for Science and Technology Communities

Proposal Title:

Corresponding author:

Rate all questions on a scale from 0 to 5 with 0 corresponding to "not all", and 5 corresponding to "Perfectly."

1. To what extent does the CE relate to S&T issues?

Rating 0__1__2__3__4__5__

Explain:

2. To what extent does the CE demonstrated the added value of GEOSS for S&T communities?

Rating 0__1__2__3__4__5__

Explain:

3. To what extent are S&T communities involved in the activity displayed in the CE?

Rating 0__1__2__3__4__5__

Explain:

4. Do these S&T communities benefit and get added value out of the CE?

Rating 0__1__2__3__4__5__

Explain:

5. To what extent does the CE relate to the goals of ST-09-02? GEOSS Portfolio Process Paper 8 EGIDA D3.4 Part A (June 13, 2011)

Rating 0__1__2__3__4__5__

Explain:

6. To what extent does the CE address issues and perspectives developed in the STC Paper?

Rating 0__1__2__3__4__5__

Explain:

7. Does the proposed example qualify as a CE in the sense of Activity 3.3?

Rating 0__1__2__3__4__5__

Explain:



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A3 GUIDELINES FOR EXAMPLE DOCUMENTATION

Guidelines for the preparation of one to two-page stories for the "Compelling Examples" illustrating how GEOSS works for Science and Technology Communities

The brief stories for handouts to be made available at the STC booth during the exhibition co-located with the Ministerial Summit and the GEO-VII Plenary in Beijing should address and answer a number of questions relevant to the objectives of the STC Road Map, the STC, and GEOSS. We would like to see the follow questions considered:

- ☐ What is the societal problem/issue addressed by the activity?
- ☐ What did the activity do/is the activity doing to address the problem, and what is the societal impact of the activity?
- ☐ Who (organizations, institutions) did/does it?
- ☐ What are the specific Science and Technology (S&T) components of the activity or how does it relate to S&T?
- ☐ What S&T communities were/are involved and how did they and other S&T communities benefit?
- ☐ How does the activity relate to specific S&T issues identified by the STC as summarized in the ST-09-02 Tasks Motivation ¹⁾ and the Science Paper ²⁾ of the STC?
- ☐ What is the added value of GEOSS for the activity and for the S&T communities involved?
- ☐ To what extent is the activity leading to sustained operations that would continue to benefit S&T communities?

The layout details of the stories are left to the authors. However, it would be good to include the GEO logo in the header of pages. It is also recommended to have the title of the activity centered with a letter size of 13 pts. Other (unnumbered) headings derived from the above questions should use a letter size of 12 pts and text bodies of 11 pts. Do not hesitate to include figures illustrating key aspects of the activity. In structuring the text, it is recommended to use headings that clearly point to the questions above. It should also be considered to highlight key features/aspects, for example, through short statements in boxes, with different fonts/colors/backgrounds, or through an offset into the page margins.

The text should either be one full page or two full pages. Do not produce a story that has, for example, 1.2 pages. Please, note that two-page stories will be printed double sided (on one sheet of paper). You should consider to group topics that belong together on one side.

If figures are included, then the captions should be short and make clear what aspect of the text the figure relates to. Please, include information on a contact person for the activity, and, if available, a URL for a web page with more information. The authors are also asked to consider submission of other material useful for the documentation of the compelling example, including but not limited to slides, a slide shows, and video(s). Permits to use copyrighted material should be given where applicable.



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Contact person(s) for the compelling example should be listed. Names of experts who can provide further information and are willing to answer questions should be provided.

If there are questions, please, contact Hans-Peter Plag at hpplag@unr.edu. The pdf files with the final document should also be sent to Hans-Peter Plag.

1) The ST-09-02 Task motivation includes:

- ☐ Connect disciplines to address the complex issues of the global integrated Earth system;
- ☐ Improve interoperability between global observing systems, modeling systems, and information systems;
- ☐ Facilitate data sharing, data archiving, data dissemination, and reanalysis;
- ☐ Optimize recording of observations, assimilation of data into models, and generation of data products to improve understanding of the global integrated Earth system for prediction of environmental phenomena;
- ☐ Enhance value of global observations from individual observing systems through their integration in the societal benefit areas;
- ☐ Harmonize well-calibrated, high-accuracy, stable, sustained in-situ and satellite observations of the same variable recorded by different sensors and different agencies.

2) Reference: GEO Science and Technology Committee, 2007: The Role of Science and Technology in GEOSS. Available at http://www.earthobservations.org/documents/committees/stc/the_role_of_science_and_technology_in_g_eoss.pdf.



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PART B

TABLE OF CONTENTS

WP3 – PART B: Analysis of European national and regional initiative for the collection of practices, commonalities and needs for further replication process.	15
General objectives	15
1. Introduction	16
2. Process for collecting contributions	17
2.1 Collection of the proposals from the invited compelling examples.	18
2.2 Collection of works in the framework of existing national and European networks (e.g. EIONET, FP7, European and National Networks)	27
2.3 Within the EGIDA consortium	28
2.4 GEO national implementation.	28
2.5 GEOSS Benefit Examples	29
3. The EGIDA National Use Case Workshop (Rome, April 2011)	30
4. WORKSHOP OUTCOMES	35
4.2 Collection of practices, commonalities and needs	35
5. Final Considerations	48
6. Summary	49
7. APPENDIX A4	51
Questionnaire delivered to the participants after the workshop.....	51
7.1 Lessons learned in the IDE-UNIVERS project (Joan Masò Pau).....	52
7.2 Italy and the GEO carbon tasks (Antonio Bombelli)	55
7.3 An Italian S&T infrastructure for contributing to the GEOSS (Paolo Mazzetti & Nico Bonora).....	57
7.4 Sinanet (Nico Bonora)	60
7.5 The Global Mercury Observation System (GMOS) contribute to the Health SBA of GEOSS (Sergio Cinnirella).....	63
7.6 Geo-wiki.org: Crowdsourcing to improve Landcover Validation (Steffen Fritz/Ian McCallum).	66



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

FP7 Project nr 265124

7.7	GIIDA (Paolo Mazzetti)	68
7.8	OneGeology Project (Carlo Cipolloni)	71

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WP3 – PART B: Analysis of European national and regional initiative for the collection of practices, commonalities and needs for further replication process.

General objectives

Task 3.4 of the EGIDA Project (*Process for the identification of examples showing GEOSS at work*) is supporting the work done by the ST-09-02 for the development of the process to identify compelling examples, including solicitation and submission of proposals, evaluation criteria and review steps. This document in particular focuses on the identification of candidate examples. EGIDA is proposing a new approach in the identification of examples based on organizing and running workshops on well-defined themes (e.g. national/regional initiatives). This approach was demonstrated in a workshop organised largely with National contributions across a wide range of SBAs (particularly focussed on gaps in the current GEOSS Portfolio, i.e. Energy, Disasters and Weather) that presented more than ten potential compelling examples of GEOSS. These contributions should now be proposed to ST-09-02 as compelling examples and subjected to the process developed by ST-09-02 with support of EGIDA (see deliverable 3.4 PART "A" and Plag, H.-P. and Bye, B. L., 2011: The GEO Process for the Identification, Reviewing, Documentation, and Promotion of Compelling Examples That Show GEOSS at Work for Science and Technology: Compiling a GEOSS Portfolio for Science and Technology. Draft prepared for acceptance by the ST-09-02 Task team, June 2011. Denoted as Plag&Bye2011 below). The process outlined in this document is complementary to that developed thus far by ST-09-02 with input from EGIDA.

The deliverable also foresees to detail the web-based solution for collection and documentation of further examples. Part of this activity (the web-based solution) is already provided by ST-09-02 (http://www.geo-tasks.org/geoss_portfolio), which was developed with input from EGIDA (see Plag&Bye2011). To avoid overlaps, it was decided to address the T3.4 not only to the identification of further examples showcasing GEOSS at work, but also to provide to the European Commission and GEOSS: a) elements to improve the national/regional contribution to GEOSS; b) elements to make the national contribution sustainable (see D4.2 objectives); c) practices, commonalities and needs for further replication processes.

In order to achieve what has been outlined above, a workshop was organized to present and compare different activities related to the bottom-up component contributing to GEOSS. The outcomes of the workshop were presented to the Joint GEOSS/EGIDA stakeholder network workshop (Bonn, 2011, 9-11).



The PART B of the deliverable reports:

- 1) a review and the collection of the proposals to be submitted as proposals for Compelling Examples, showing the contribution to GEOSS by the bottom-up approach;
- 2) the processes adopted to collect further contributions;
- 3) the outcomes of the workshop organized to compare the collected works.

A further analysis of the initiatives presented in this deliverable will be provided in the deliverable D4.1 ("Analysis of initiatives relevant for the GEOSS S&T objectives") as a preliminary step for the definition of the general methodology for a sustainable contribution to GEOSS from national / regional initiatives that will be described in the deliverable D4.2 ("The EGIDA Methodology").

1. Introduction

The GEOSS Portfolio for Science and Technology (http://www.geo-tasks.org/geoss_portfolio/) features examples of GEO activities, projects, and Work Plan Tasks that demonstrate the benefits of GEOSS for science and technology (S&T) communities. GEOSS provides access to many services, data sets and products of value for scientists, researchers and developers. In many cases, new research is enabled and would not be possible without access to the Earth observation products accessible through the GEO portal. This portfolio shows how the products accessible through the GEOSS Common Infrastructure (GCI) work for S&T communities (Plag&Bye2011).

GEOSS has a reciprocal relationship with the S&T communities. GEOSS needs input from them, and they can benefit from GEOSS. GEOSS depends on input from science and S&T in order to evolve in response to rapidly expanding user needs. GEOSS is a unique source of Earth observation data and related products essential for research in all nine of the Societal Benefit Areas (SBAs) of Earth observations. The technological challenges posed by the implementation of GEOSS stimulates technology development in many technology communities. The GEOSS Portfolio aims to demonstrate this bidirectional relationship between GEOSS and S&T communities (Plag&Bye2011).

The description and analysis of the activities related to GEOSS is an important step toward the definition of commonalities that could lead to further replication processes and a best practices definition (e.g. EGIDA methodology implementation).

One of the activities carried out by ST-09-02 is related to the collection of Compelling Examples that should show GEOSS at work. In 2010, ST-09-02 invited a total of 36 proposals,



and 13 proposals were received (see Table 1). After review by the ST-09-02 Task team, 8 proposals were accepted. A preliminary analysis shows how most of the candidate activities relate to international cooperation with a strong top-down contribution, many of them being led by international partnerships, programmes and projects to define global models or products (e.g. WMO, GEOBON, JRC, Year of Tropical Convection, Global Ecosystem Classification, etc.).

Although those activities strongly need the involvement of national components (mainly as data providers), they can only help, in some cases, on the definition of standardised procedures on organizing resources, often oriented to single thematic areas (SBA's approach). However those activities do not provide much information about the effort made at the national level on contributing to such initiatives.

Only a few Compelling Examples candidates accepted by ST 09-02 show a strong national or regional contribution. Current examples do not extensively describe the effective effort on building GEOSS with a bottom-up component (national and regional contribution).

To complement the information on global activities collected in the framework of the current GEOSS portfolio, the Task 3.4 of the EGIDA Project aims to discover and analyse a congruous set of examples showing the national and regional efforts for implementing GEOSS on the basis of the bottom-up approach, in order to identify commonalities, practices and needs for further replication processes.

To compare those activities, it was asked of potential contributors to join a workshop to present and analyze their efforts. The workshop, organized by ISPRA with the support of CNR and IIASA (April 2011, 18-19), collected 17 presentations and about 20 participants.

The workshop also foresaw the analysis of some international activities producing impacts at the national scale in terms of catalyzing/organizing resources and data/information sharing (e.g. EIONET, FP7 - GMES in situ coordination, OneGeology).

2. Process for collecting contributions

Representative examples for the portfolio (http://www.geo-tasks.org/geoss_portfolio/) have been identified in cooperation with GEO Tasks. Proposals for examples have been reviewed based on a pre-defined review form and a quantitative rating system. The examples selected for inclusion in the portfolio demonstrate a wide range of benefits of GEOSS for science and technology communities, including tools for discovery of data and products, improved accessibility, new data sets and services, and a better link to end users. In particular, examples in the areas of energy, disasters and weather are currently lacking and need to be filled (Plag&Bye2011).



To collect contributions for the identification of commonalities, practices and needs from on-going initiatives at different levels (from sub-national to global), different approaches were adopted in order to involve the largest number of heterogeneous examples. *Heterogeneity* was one of the main requirements of the collecting activity, because the analysis results must not be biased by considering a set of almost homogeneous initiatives, with, for example common targets (e.g. specific thematic areas). In fact, this could lead to incorrect identification of replication methodologies that are not valid in general. On the contrary, the analysis must target common procedures that can contribute to general methodologies presenting the potential to be applied in different environmental sectors (thematic areas), governmental levels (national and sub-national) and system architectures (ICT).

The methodological approach for identifying relevant initiatives was made with the following steps:

- A. Collection of the proposals submitted as candidate compelling examples (those already listed on the ST-09-02 web-page - http://www.geo-tasks.org/st0902/ce_invites.php).
- B. Collection of works in the frame of existing national and European networks (e.g. EIONET, FP7, European and National Networks).
- C. Suggestions from the EGIDA Consortium.
- D. Collection of some GEO national implementation.

The following sections detail the previous steps and related results.

2.1 Collection of the proposals from the invited compelling examples.

The first activity for collecting GEOSS related efforts, was dedicated to an overview of all proposals (both accepted and rejected by ST-09-02) that were submitted to be included in the GEOSS portfolio to *show GEOSS at work*. Table 1 lists the first set of proposals invited by ST-09-02 to identify national or regional GEOSS contribution.

Table 1 – list of the Compelling Examples invited by ST-09-02. Extracted from http://www.geo-tasks.org/st0902/ce_invites.php.

Committee	Proposal title	Proposal Contact	Invitation	Status
STC/Biodiversity	The GEO Biodiversity Observation Network (GEO BON)	Gary Geller	August 10, 2010	Original showcase proposal available as doc .



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FP7 Project nr 265124

STC/Ecosystems	Top-level tiers for Global Ecosystem Classification and Mapping Initiative (GEOSS Task EC-06-02)	Rob Jongman	August 10, 2010	Showcase proposal available as doc .
STC/Ecosystems	Digital Observatory for Protected Areas	Massimo Craglia	August 10, 2010	Showcase proposal available as doc .
STC/Climate	The ESA Climate Change Initiative	Einar-Arne Herland	August 10, 2010	Showcase proposal available as pdf .
STC/Climate	The GMES Space Component: Sentinels	Einar-Arne Herland	August 10, 2010	Showcase proposal available as pdf .
STC/Health	AIRNow-International	Phil Dickerson	August 10, 2010	Showcase proposal available as doc .
STC/Water	A prototype observation system for water resources in South-East Asia	Massimo Menenti	August 10, 2010	Showcase proposal available as html .
STC/UIC/Health	From Science to Decisions: Air, Land, and Water	Pai-Yei Whung, Gary Foley	August 10, 2010	CE proposal available as doc . Original showcase proposal available as html .
STC/Crosscutting	Data Sharing Task Force: Working towards reaching a consensus at the GEO 2010 Ministerial Summit on the practical steps to implement the GEOSS Data Sharing Principles	Robert Chen	August 10, 2010	Showcase proposal available as doc .



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FP7 Project nr 265124

STC/Climate	EuroSITES	Kate Larkin	August 10, 2010	CE proposal prepared by Maureen Pagnani available as doc . Original showcase proposal available as doc .
STC/?	DevCoCast	Jacobs Tim	August 10, 2010	Showcase proposal available as html .
STC/UIC/Climate	Global Carbon Monitoring System	Léonard Rivier	August 10, 2010	Showcase proposal available as doc .
STC/Health	Aerosol Impacts on Health and Environment	Slobodan Nickovic	August 10, 2010	Showcase proposal available as doc .
STC/cross-cut.	An Italian S&T infrastructure for contributing to the GEOSS	Paolo Mazzetti	August 10, 2010	CE proposal prepared by Nico Bonora and Paolo Mazzetti available as doc . Original showcase proposal available as html .
STC/Weather	GIFS – A Global Interactive Forecasting System	Jim Caughey	August 10, 2010	Showcase proposal available as doc .
STC/Weather	Tropical convection in weather and climate prediction	Jim Caughey	August 10, 2010	CE proposal submitted by Mitchell W. Moncrieff available as doc . Original showcase proposal available as doc .



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FP7 Project nr 265124

UIC/Weather	Multi-Sensor Usage for Drought Assessment in the Middle East	Shawana Johnson	August 10, 2010	Showcase proposal available as php .
UIC/Health	Collaborative Networking of Air Quality Information Systems	Carol Meyer	August 10, 2010	CE proposal available as doc . Original showcase proposal available as php .
UIC/ADC/?	OneGeology and OneGeology-Europe	Ian Jackson	August 10, 2010	CE proposal prepared by Kathryn Booth available as doc . Original showcase proposal available as html .
UIC/Agriculture	The Geo-wiki land cover validation tool: involving the wider public in Geo related activities	Steffen FRITZ	August 10, 2010	CE proposal available as doc). Original showcase proposal available as doc .
ADC/Agriculture	Towards a global soil information system	Luca Montanarella	August 10, 2010	CE proposal available as doc . Original showcase proposal available as html .
ADC/Agriculture	Forest Carbon Monitoring System	Ryosuke Shibasaki	August 10, 2010	Showcase proposal available as doc .
ADC/Architecture	GEOSS Architecture Implementation	George Percivall	August 10, 2010	CE proposal available as doc . Original showcase proposal available as html .



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ADC/Water	Asia/Africa Water Cycle Initiative	Ryosuke Shibasaki	August 10, 2010	Showcase proposal available as html .
ADC/Climate	Global Monitoring of Greenhouse Gases from Space	Ryosuke Shibasaki	August 10, 2010	Showcase proposal available as html .
STC/Disaster	Supersites	Falk Amelung	August 10, 2010	No proposal available.
Crosscutting	The Role of Science and Technology in the Global Earth Observation System of Systems (GEOSS)	Stuart Minchin , Meghan Radtke	August 10, 2010	No proposal available.
Crosscutting	The ASTER Global Topographic Data Set	Abrams, M	August 11, 2010	No proposal available.
Weather	Real-time Global Flood and Landslide Prediction Using Satellite Observations	Adler, R F	August 11, 2010	No proposal available.
Energy	Enhancing Decision Making in the Energy Sector Using Space-Based Earth Observations: A GEO and CEOS Perspective	Eckman, R S	August 11, 2010	No proposal available.
Climate	How Key GEOSS Datasets Contribute to the Global Monitoring and Assessment of Glaciers	Khalsa, S S	August 11, 2010	No proposal available.
Climate	Satellite Constellation for Ocean Wind and Stress	Liu, W	August 11, 2010	No proposal available.
Biodiversity	The Global Invasive Species Information Network: contributing to	Graham, J	August 11, 2010	No proposal available.



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FP7 Project nr 265124

GEO Task BI-07-01b				
Agriculture	A GEO Global Agricultural Water Productivity Mapping System	Thenkabail, P S	August 11, 2010	No proposal available.
Agriculture	Integrating Socioeconomic Data into GEOSS to Enable Societal Benefits	Chen, R S	August 11, 2010	No proposal available.
Capacity building	Capacity building of operational oceanography and climate adaptation	Jun She	August 11, 2010	Showcase proposal available as doc .

The preliminary analysis of the proposals invited by ST 09-02 (Tab. 1) identified seven contributions potentially useful to the task 3.4 targets. The proposals are listed in table 2.

Table 2 – first sorting of proposals collected by ST 09-02 presenting a) national/regional contribution, b) international activities providing impacts at national scale or c) system of systems contributing to GEOSS.

Author	Title of the proposal	Synthetic comment
Carol Meyer	Collaborative Networking of Air Quality Information Systems	International cooperation contributing to a single information system related to air quality
Jun She	Capacity building of operational oceanography and climate adaptation	International partnership - use case useful for replication in developing countries (EGIDA methodology development)
Kathryn Booth	OneGeology and OneGeology-Europe/ OneGeology-Global – making geological map data available to all	know-how transfer, replication approach and data policy implementation useful for EGIDA methodology



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

FP7 Project nr 265124

Maureen Pagnani	EuroSITES - European Observatory Network	international cooperation – show case on capacity building project related to knowledge transfer and technical equipment supply (EGIDA methodology development).
Nico Bonora & Paolo Mazzetti	An Italian S&T infrastructure for contributing to the GEOSS	national show case built on the implementation of a SoS contributing to GEOSS
Steffen Fritz	The Geo-wiki land cover validation tool: involving the wider public in Geo related activities	international partnership impacting at National Level as methodology replication.
Phil Dickerson	AIRNow-International	Replication at international level of a national case.

Of those seven identified works, only three contributions replied to the call, and the authors were invited to present and discuss the described activities. It follows the list of the first positive response on joining the workshop (Rome, April 2011):

- OneGeology and OneGeology Europe – It was proposed to be presented in its three main component (Data harmonisation, system interoperability and data policy).
- An Italian S&T infrastructure for contributing to the GEOSS – It was proposed and presented by the WP4 leader and the 3.4 task lead.
- Geo-wiki.org - Crowdsourcing to improve Landcover Validation - It was proposed and presented by the WP3 leader.

For information completeness, the abstracts of the proposed contributions to ST 09-02 presenting national activities or international activities presenting/producing impact at national or regional level are listed below.

Author: Carol Meyer

Title: Collaborative Networking of Air Quality Information Systems

An expanding subset of the air quality community has been collaborating on establishing an air quality community information infrastructure to complement the GEOSS Common



Infrastructure (GCI). This showcase will present the evolution and status of the air quality community infrastructure, how multiple air quality projects and systems are networked through it, and examples of its use in supporting GEOSS objectives.

Surface observations, satellite data products, emission inventories and forecast model results are made accessible through an Air Quality Community Catalog that is connected with the GCI Registry. The GCI Clearinghouses are used to find and access data relevant to visualization and analysis tools and decision support systems that provide the connection with end users. The showcase will involve established and evolving collaborations among air quality projects and systems in various collaborative regional and global efforts, including the GEO Architecture Implementation Pilot, Hemispheric Transport of Air Pollutants (HTAP) Network, CEOS Atmospheric Composition Portal, the Community Initiative for Emissions Research and Applications, and others. The showcase is a follow-up to the air quality meeting at GEO-VI where a general commitment was made to interoperability among participating organizations.

Author: Jun She

Title: Capacity building of operational oceanography and climate adaptation This example demonstrates a world-wide capacity building efforts on operational oceanography and its possible application for adaptation measures in developing countries. Through cooperation with China and S. Korea partners under GEOSS, high resolution European weather-ocean-wave forecasting systems have been implemented for NW. Pacific coastal/shelf seas and demonstrated in an operational mode. This has led to several new projects on operational oceanography in China and S. Korea. Similar efforts are expected to be taken for Africa and Latin America by partners from EU, USA and relevant developing countries. The operational ocean monitoring and forecasting capacity enables developing countries a better disaster prevention and to take more efficient climate adaptation measures in coastal engineering and integrated management.

Author: Kathryn Booth

Title: OneGeology-Global – making geological map data available to all

The OneGeology project has capacity building at its heart. Nations which have the capacity to serve digital geology are teaming up with nations which do not, but have geological data that they want to serve. This is reflected in the project's 4 key aims, one of which is to "transfer know-how to those who need it, adopting an approach that recognises that different nations have differing abilities to participate". Training has been provided and is being offered to



others. There is a great deal of documentation and online help available (the cookbooks).

Outreach is central to the project.

The Primary Capacity Building Objectives of OneGeology are to:

Facilitate data and know-how transfer capacity-building activities that support making geological map data available at multiple levels

Build global capacity to collect and make available geological data from around the world through training and knowledge transfer.

Develop a coordinated capacity building strategy for geological knowledge exchange and interoperable data transfer among Participating Organisations and others e.g. GEO Members.

Recommend strategies for resource mobilisation to Members and Participating Organisations (e.g., e-learning approaches).

Author: Maureen Pagnani

Title: EuroSITES : European Observatory Network

EuroSITES demonstrates the benefits of forming a community of scientists and technologists working to maximize the breadth, quality, immediacy and availability of data from European open ocean observatories. The group have supported each other providing both expertise and hardware resources across the observatories. The project has made great strides in making data of consistent quality available in real-time to modelers and direct users. The final harmonized outputs become available to all scientists and will be integrated in many scientific efforts and provide ground-truthing for satellite data and calibration points for ARGO floats and other drifting buoys.

EuroSITES is integrating and enhancing the 9 existing fixed-point open ocean observatories around Europe. The EuroSITES network uses fixed platforms with sensors and samplers attached to continuously monitor the open ocean and seafloor beneath. The data are distributed both in near real-time and also as high quality processed data recovered annually from the observatories. Scientists and technologists across the 13 partner institutions from 8 nations have collaborated to increase the quantity and quality of data collected and available from open ocean observatories. Novel techniques have been developed and trialed in the diverse environments represented by the observatories. The EuroSITES collaboration has ensured a wide breadth of requirements to be defined, and also the intellectual and technical resources, and support system, to deliver globally accessible outputs.

Authors: Nico Bonora, Paolo Mazzetti

Title: An Italian S&T infrastructure for contributing to the GEOSS.



The proposed example builds on the results of a (re-)engineering process applied to some existing Italian national-level infrastructures, in order to build a system of systems (SoS) conceived for a coordinated and sustainable contribution to the GEOSS. Indeed, ISPRA and CNR-DTA, as part of a coordination effort, underwent a re-engineering of their GIIDA and SINAnet systems in order to build a common infrastructure based on the GEOSS principles (SoS approach, interoperability through standardization) and GCI provisions (best practices, standards, components) supporting multi-disciplinary use-scenarios for both research and government applications requiring access to EO resources. The infrastructure is also conceived as an effective and sustainable contribution to the GEOSS.

Authors: Steffen Fritz, Ian McCallum & Partners (FHWN, FELIS ALU-FR) Title: Geo-wiki.org: Crowdsourcing to improve Landcover Validation
The Geo-Wiki Project is a global network of volunteers who wish to help improve the quality of global land cover maps. Since large differences occur between existing global land cover maps, current ecosystem and land-use science lacks crucial accurate data (e.g. to determine the potential of additional agricultural land available to grow crops in Africa). Volunteers are asked to review hotspot maps of global land cover disagreement and determine, based on what they actually see in Google Earth and their local knowledge, if the land cover maps are correct or incorrect. Their input is recorded in a database, along with uploaded photos, to be used in the future for the creation of a new and improved global land cover map.

Author: Phil Dickerson

Title of Example: AIRNow-International

AIRNow-I builds upon the decade-long success of the US AIRNow program. AIRnow distributes realtime air quality data and forecasts to the US public. AIRNow-I was jointly developed by the US EPA and the Shanghai Environmental Monitoring Center (SEMC). AIRNow-I represents a complete redesign of the original AIRNow system, to support its use in other nations.

2.2 Collection of works in the framework of existing national and European networks (e.g. EIONET, FP7, European and National Networks)

Considering only three proposals were collected from the ST 09-02 proposals of Compelling Examples (one of which – Geo-wiki.org is already a compelling example), further processes had to be taken to find more contributions. With ISPRA involved in different National and European activities, institutional channels were used to discover further examples.



Via the Italian National GEO implementation it was possible to access GEOSS related activities carried out by different actors (this activity underlines one of the benefits derived from implementing GEO at the National level: *recovering information*). By this channel it was possible to involve Research Institutes and Academia contributing to different SBA's (*Gianni Tartari, CNR - Interoperability of water and soil data quality. Ideas by the Italian approach, and Antonio Bombelli, La Tuscia University - Italy and the GEO carbon tasks*).

Also, the participation of Italy in different European Projects and programs (FP7, Interreg-III) allowed for involvement of other GEOSS contributors to increase the number of cases to be analysed (*Joan Masò Pau, CREAM - Lessons learned in the IDE-UNIVERS project; Sergio Cinnirella, CNR - The Global Mercury Observation System (GMOS) contribute to the Health SBA of GEOSS; Inese Podgaiska, EEA - Role of Eionet in the global processes of Earth Observation*). In the process selection of in-kind and European examples, it was also decided to involve cases presenting aspects related to both content and system architecture that will contribute to GEOSS in the short term (*Luca Guerrieri, ISPRA - The Earthquake Environmental Effects catalogue: "in situ" validation of seismic hazard assessment*).

2.3 Within the EGIDA consortium

In WP4 it was decided to analyse existing initiatives, which already involve national S/T communities, that are considered of particular importance, such as GIIDA (Integrated and Interoperable Management of Environmental Data), SINAnet (Italian National Environmental System and Monitoring Network), UK-EOF (UK-EOF - Environmental Observation Framework) and DAEM (Data and Applications for Environmental Modelling).

It was communicated that DAEM was not ready to furnish results because the project is still in its inception phase. Maybe further analysis will be carried out latter.

Some of the above initiatives are based on the concept of a System of Systems, and being that the nature of GEOSS is oriented to such architecture, it has been decided to put particular attention on the analysis of those initiatives that foresee a similar architecture to deliver environmental data and information (Italian SoS, GIIDA and SINAnet).

2.4 GEO national implementation.

Furthermore, it was decided to analyse different GEO National Implementation strategies. Presentations were made by Italy and the UK. German GEO implementation (GEO-D) was also willing to contribute, but because of synchronous GEOSS commitment it was not possible to have a German representative at the workshop. The GEO-D presentation is however available for consultation.



2.5 GEOSS Benefit Examples

IIASA, in particular, will revisit the GEOBENE Project (FP6) studies and identify suitable examples which demonstrate the benefit of GEOSS. GEOBENE identified case studies in each of the SBAs demonstrating the benefits of GEOSS, and three highlights from this effort are brought forth here.

In the course of the GEOBENE Project, a conceptual framework for assessing the benefits of GEOSS via the 'benefit chain' concept was developed (Fritz et al., 2008). The basic notion is that an incremental improvement in the observing system (including its data collection, interpretation and information sharing aspects) will result in an improvement in the quality of decisions based on that information. This will lead, in turn, to beneficial societal outcomes, which have a value.

A method that explicitly considers the extent to which decision-makers actually use Global Earth Observation for decision-making is Bayesian decision theory. The approach is particularly attractive as it links the value of information to the perceived accuracy of the information system. Bouma et al., (2009) used Bayesian decision theory to study the added value of Global Earth Observation for preventing potentially harmful algal blooms in the North Sea.

Many VOI problems can be addressed in a real options framework, which takes into account investment irreversibility, uncertainty and the flexibility to react when new information arrives. Such a framework is proposed here, and applied to a satellite mission case study, considered to bring about new scientific information potentially leading to lower damage from natural disasters (Fuss et al., 2008).

Bouma, J.A., van der Woerd, H.J., Kuik, O.J., 2009. Assessing the value of information for water quality management in the North Sea. *Journal of Environmental Management*, 90(2)1280-1288.

Fritz, S., Scholes, R.J., Obersteiner, M., Bouma, J., Reyers, B., 2008. A Conceptual Framework for Assessing the Benefits of a Global Earth Observation System of Systems. *IEEE Systems Journal*, 2(3)338 – 348.



Fuss, S., Szolgayova, J., Obersteiner, M., 2008. A real options approach to satellite mission planning. *Space Policy*, 24(4)199-207.

3. The EGIDA National Use Case Workshop (Rome, April 2011)

The workshop collected 17 presentations and 20 participants from various European Research Institutes, Programmes, Projects and Academia. The given presentations refer mainly to national contributions and international programmes and projects capable to impact at the national/regional scale. Some differences may occur between the contents of the efforts proposed to the ST-09-02 Compelling Examples and the same results presented in the workshop. These differences are due to the alignment of the proposals with the workshop aims (e.g. the OneGeology project description has been divided in its three main components to be better analysed).

The following is an abstracts list of the presentations made during the EGIDA National Use Cases Workshop.

1. Geo-wiki.org: Crowdsourcing to improve Landcover Validation (Steffen Fritz/Ian McCallum). The Geo-Wiki Project is a global Geo-wiki.org: Crowdsourcing to improve Landcover Validation (Steffen Fritz/Ian McCallum). The Geo-Wiki Project is a global network of volunteers who wish to help improve the quality of global land cover maps via available web mapping tools. Inputs are recorded in a database, along with uploaded photos, to be used in the future for the creation of a new and improved global land cover map.

2. An Italian S&T infrastructure for contributing to the GEOSS (Paolo Mazzetti & Nico Bonora). The proposed example builds on the results of a (re-)engineering process applied to some existing Italian national-level infrastructures, in order to build a system of systems (SoS) conceived for a coordinated and sustainable contribution to the GEOSS. Indeed, ISPRA and CNR-DTA, as part of a coordination effort, underwent a re-engineering of their GIIDA and SINAnet systems in order to build a common infrastructure based on the GEOSS principles (SoS approach, interoperability through standardization) and GCI provisions (best practices, standards, components) supporting multi-disciplinary use-scenarios for both research and government applications requiring access to EO resources. The infrastructure is also conceived as an effective and sustainable contribution to the GEOSS.

3. OneGeology Project



a) Harmonization of geological data across Europe (Marco Pantaloni). The OneGeology-Europe project delivered a web accessible, semantically and technically interoperable geological dataset, with “progress towards harmonization”, for the whole of Europe at 1:1 million scale. This project has been based on the individual geological datasets, held by each of the European geological surveys, which considerably differ with respect to their contents, description and geometry. The interoperability of these data was a considerable task and OneGeo-Europe WP3 group delivered the essential basis for that endeavour: the “OneGeology-Europe Data Specification”. This document presents in detail the classifications, definitions, terms and Uniform Resource Names (URN); it is based, as far as possible, on existing standards and explains their use and encoding in GeoSciML. This specification has been the basis for each geological survey participating in OneGeo-Europe to describe the geology of their country. It has been possible to achieve semantic interoperability and harmonization of the data by using this common vocabulary. This specification also form one of the foundations and inputs for the future INSPIRE Geology Data Specification.

b) An interoperable and harmonized architecture to deliver the geological dataset (Carlo Cipolloni). To obtain a web-accessible, interoperable geological spatial dataset for the whole of Europe at 1:1 million scale based on existing data held by the pan-European Geological Surveys, was necessary to insure interoperability among geological data providers across Europe. To deliver geological maps and data to the users, the OneGeology-Europe (1GE) project has to address two main issues:

- to provide a standard access to geological data, regardless of how each provider manages these data,
- to define a common language to exchange geological data. This language has two complementary facets:

the structure (the data model like GeoSciML), and the semantics (related to the content, mainly addressed by defining common vocabularies). At the end to insure the usability of the dataset an harmonized architecture has been build and a Geoportal for displaying the 1:1 million geological dataset collated by the project, but also other dataset, has been developed.

c) Harmonizing data policies: experiences from the OneGeology-Europe project (Katleen Janssen). One of the elements of the eContentPlus project OneGeology-Europe was the development of a Code of Practice on access and licensing for the participating geological surveys. This Code of Practice provided guidelines for implementing an access policy that is adaptable to the circumstances and national requirements of the geological surveys, and at the same time user-friendly for interested data users. The access policy contained practical and organizational measures and model licences.



4 Interoperability of water and soil data quality. Ideas by the Italian approach

(Gianni Tartari). Interoperability between data quality of the soil and waters represents a level of complexity much higher than other sectors of the environment because increasing in complexity when considering environmental components together with social and economic aspects. In this contribute will be presented some ideas and suggestions developed in the GIIDA's case study with the aim to evidentiate the interoperative approach to build an appropriate and integrated database in these issues. The management of interoperability aspects among available water and soil database was achieved by integrated methodology distributed databases, metadating activities and application of Data Mining and Text Data Mining technologies especially related to Open Source software and management services (WMS, WFS, WCS).

5 Lessons learned in the IDE-UNIVERS project (Joan Masò Pau). IDE-UNIVERS was a research project aiming at creating a thematic Spatial Data Infrastructure (SDI) to encourage access, exchange and interoperability of the huge quantity of information with a geographic reference produced by Universities and Research Centers within their projects and activities. The Project, coordinated by the Secretaria de Telecomunicacions i Societat de la Informació (STSI) of the Catalan Regional Government (Generalitat de Catalunya) in Spain was funded with the contribution of the European Commission - Interreg III B MEDOCC Program. IDE-Univers started from September 2006 and ended in 2008.

6 Italy and the GEO carbon tasks (Antonio Bombelli). Italy (particularly University of Tuscia and the Euro-Mediterranean Centre for Climate Change) is actively contributing to the carbon tasks of the GEO Work Plan, mainly through the participation as coordinator or partner, in European projects. Some highlights will be presented.

7 The Earthquake Environmental Effects catalogue: "in situ" validation of seismic hazard assessment (Luca Guerrieri). The Geological Survey of Italy - ISPRA is coordinating a global initiative in the frame of INQUA (International Union for Quaternary Research) aimed at building a global catalogue of Earthquake Environmental Effects, integrating the observations from recent events with descriptions from historical earthquakes and from paleoseismic investigations. Environmental effects frequently enhance the dimension of the disaster at local level and therefore significantly contribute to seismic hazard in addition to seismic shaking. Collected data have been used as "in situ" validations and integrations of seismic risk



assessment from remote sensing (SBA Disasters, Task. DI-09.1a). First tests have been focused on the 1908 Messina and 2009 L'Aquila earthquakes.

8 EGIDA Methodology (Paolo Mazzetti). The EGIDA Methodology is a general methodological approach, structured as a set of good practices, which can be adopted by national/regional S&T communities, for a sustainable contribution to the GEOSS through the mobilization of resources made available from the participation in national, European and international initiatives and projects. It combines the top-down approach from the GEO (in particular the STC Roadmap), with the bottom-up approach from on-going project and initiatives at national/regional and international level that contribute, or might contribute to the GEOSS. The EGIDA Methodology consolidates the achievements of the EGIDA project activities for exploitation beyond the duration of the project. It will be transferred to four use cases characterized by different geographical extent and thematic scope, for evaluation and assessment.

9 UK-EOF: a collaborative UK partnership for coordinating sustained efforts on measuring the environment. What, why, achievements so far and what's next (Beth Greenaway). The UK-Environmental Observation Framework (UK-EOF) strives to change the way the UK perceives, values, archives and uses information from observation activities by working across public departments and agencies, the voluntary sector, industry and academia. The UK-EOF will be a self contained 5 year programme of Living With Environmental Change (LWEC), funded by the major sponsors of environmental observations in the UK and delivered via a series of workstreams.

10 UKGEO (Beth Greenaway). A collaborative partnership for assessing UK GEO activities, strengths, weaknesses and priorities; using this to develop a UK GEO strategy; coordinating existing and new UK GEO inputs; building a UK GEO community; and pursuing opportunities for this community to contribute to and benefit from GEO in the future.

11 GEO Italy (Maria Dalla Costa). The GEO Italy is coordinated by the Italian Ministry of Environment to improve the national coordination between various types of GEO stakeholders (EO providers, users) and R&D institutions (ASI, CNR, DigitPA, ISPRA, ENEA). GEO Italy also acts to improve communication among different scale stakeholders (Central and Regional Administrations) and to links national experiences accrued in European initiatives with GEOSS. GEO Italy contributes to GEOSS GCI by sharing its own EO achievements and federating its



environmental information systems developed by national institutions (CNR-GIDA, ISPRA-SINAnet) in line with SEIS Principles and INSPIRE implementation.

12 The Global Mercury Observation System (GMOS) contribute to the Health SBA of GEOSS (Sergio Cinnirella). GMOS is aimed to establish a Global Observation System for Mercury able to provide ambient concentrations and deposition fluxes of mercury species around the world, by combining observations from permanent ground-based stations, and from oceanographic and tropospheric measurement campaigns. Data will be used to validate regional and global scale atmospheric mercury modeling systems able to predict the temporal variations and spatial distributions of ambient concentrations of atmospheric mercury, and Hg fluxes to and from terrestrial and aquatic receptors. Source-receptor relationships at country scale and their temporal trends for current and projected scenarios of mercury emissions from anthropogenic and natural sources will be evaluated and identified. The developed interoperable tools will allow to share datasets and models output data produced by GMOS, for the purposes of research and policy development and implementation as well as at enabling societal benefits of Earth observations, including advances in scientific understanding in the nine Societal Benefit Areas (SBA) established in GEOSS.

13 Role of Eionet in the global processes of Earth Observation (Inese Podgaiska). Eionet plays a crucial role in providing its expertise, technical know-how and support to the European Environment Agency in its coordination role of the in-situ component and new coordination role of the GIO Land service in the framework of the GMES programme. Together with EIONET, EEA involves stakeholders, users and service providers in the process of assessment of policy demands to build up operational framework for insitu data access needed for the GMES services. By providing an input into the progress of the GMES programme, Eionet and EEA also contribute to the main priorities of the GEOSS.

14 GIIDA (Paolo Mazzetti). GIIDA is a interdepartmental project of the National Research Council of Italy which targets the definition and development of a shared multidisciplinary infrastructure for the management, processing and analysis of environmental data. It is composed of work groups related to air quality, seas and marine resources, natural and anthropic risk, climate change, water and soil quality, biodiversity and combined infrastructures between Research Institutes and Public Administrations.



15 Sinanet (Nico Bonora). Sinanet is the Environmental Information and Monitoring System and represents the EIONet National Focal Point (NFP) of the EEA in Italy. NFP is in charge of cooperation with the EEA and the NRCs (National Reference Centers) and organizes national coordination of activities related to the EEA strategy. Data and information of European relevance are managed to support the business processes of the European Environmental Information System and building on a shared information infrastructure to create national repositories (REPORTNET). Through SINAnet, ISPRA act as Coordination Structure for INSPIRE implementation to support the National Contact Point (Ministry for Environment, Land and Sea).

4. WORKSHOP OUTCOMES

4.2 Collection of practices, commonalities and needs

The results of the workshop have been analysed in terms of practices, commonalities and needs, and after a preliminary investigation, they have been grouped into nine issues:

- a) organising & catalysing resources;*
- b) reuse and replication;*
- c) promote data sharing;*
- d) raise awareness for changing culture;*
- e) ICT supporting activities & knowledge transfer;*
- f) national GEO implementation & also governance;*
- g) quick wins;*
- h) scientific engagement in GEOSS;*
- i) possible improvement of GEOSS at EU level.*

a) Organising & catalysing resources

1) The need to centralise the metadata indexing arose frequently during the workshop, first to discover resources at national level and, secondly, as an intermediate step toward GEOSS to provide the harmonised national contribution. The National INSPIRE Directive implementation can help to supply this need on the basis of the mandatory creation of environmental Metadata across Europe. Once the contents already exist (INSPIRE metadata), the architecture for centralising information would be easy to implement considering the wide array of



standardised and open source tools available to achieve catalogue networking at European scale.

2) National GEOSS Stakeholders stress the coordination of on-going projects and programmes (e.g. GMES, SEIS, INSPIRE) to be aligned with GEOSS or to build GEOSS upon those initiatives. Especially for countries where a National GEO Implementation exists, it would be good practice to report periodically report the different activities conducted within those EU initiatives in order to catalyse resource toward GEOSS.

3) On the matter of a) catalysing resources, b) standardisation of procedures and c) data and information harmonisation, during the workshop it was highlighted by the participants that the most proficient cases are characterised by a combined top-down and bottom-up approach. As well as the bottom-up contribution to GEOSS, national or regional top-down activity can be led by a voluntary approach (e.g. Italian GEO implementation).

4) An interesting and useful practice was furnished by UK-EOF programme, where cataloguing past and current activities at the national level lead to the statement of needs and gap analysis. Through this initiative it has been possible for the UK to optimise both resources and researchers contributions. Furthermore, for long-term sustainability, mainstreaming existing environmental observation/monitoring systems would contribute to avoiding overlaps and would allow the best use of financial and human resources.

5) The majority of GEOSS collectively is involved in national and regional non-related GEOSS projects. In order to involve more actors to contribute to the global phenomena of understanding, promoting synergies between the conducted activities and GEOSS (drag effect) the primary step could be to strengthen the national (and sub-national) participation in GEOSS (Demonstrate by: GIIDA, Italian SoS, IDE-Univers, FP7, GMES, INSPIRE & SEIS implementation) This practice could also boost the collection of the GEOSS Data CORE.

b) Reuse and replication

1) During the workshop some projects have been identified to be replicated in small countries willing to contribute to GEOSS. As the EGIDA Slovenian showcases intends to demonstrate, the involvement in different COPs and projects can provide chances to build or improve ICT



knowledge oriented to the creation of a proper informative infrastructure to contribute to a different SoS. Many activities and projects, both related to the EU and GEOSS, highlight their aptitude to be replicated, such as Twinning Projects (EC) and initiatives that were capable to link different countries within GEO such as BalkanGEOnet (Balkan in Global Earth Observation). For example, the on-going Twinning Project between Italy and Montenegro targets the knowledge transfer to make Montenegro capable to be involved in current European programmes such as EIONET (e.g. Reportnet) and GMES (e.g services and Fast Track). From those projects it will be possible to provide practices to be applied in the EGIDA small country showcases (Slovenia), especially for filling technological gaps.

c) Promote data sharing

1) Many presented works showed the needs to define as simple as possible guidelines for data and information sharing at different national scales. Some European countries (e.g. Spain, Germany, Italy) are characterised by federal subdivision of their territory and different conditions applied to data and information can exist. The implementation of guidelines on data sharing involving the subnational level would effect data integration. Also, since guidelines on data sharing are not provided, most of the non-mandatory activity conducted at subnational levels could remain hidden.

2) During the workshop it was demonstrated that a user friendly guideline on data sharing is the best starting point to implement data/information national policy (SINANet, GIIDA, Italian SoS, OneGeology, IDE-Univers, GEO national implementation). Environmental data and information policy at national level is nowadays led by sectorial condition and strongly depends upon the regulations of the providers, even if the data is produced and collected by Public Institutions. To provide chances on harmonising data and information access at the national level it is necessary to have a strong top-down component for the best alignment of National and subnational procedures. This practice could also be led by sovereign-national institutions (EC) to support national policy makers in the definition of a European standardised procedure on accessing data and information.

d) Raise awareness for changing culture



1) Changing culture is an essential step to achieve data and information sharing and integration. Academic bodies and Research Institutes that collect data and information to perform different investigation activities have to be targeted to be involved in processes that foresee the exchange of knowledge (At European scale, INSPIRE Directive does not involve Research and Academia on collecting and sharing environmental information. More efforts are needed in this direction, both at national and European level). In some cases, agreement has been reached on the matter of specific time delay for data publishing (e.g. GIIDA project foresees 1 year delay from the beginning of the activity and the data availability), to permit researchers to publish results before sharing the background datasets.

2) As highlighted by IDE-Univers project (where the results resulted in a common System of Systems capable to catalyse data and information from Academia and Environmental Agencies), dealing directly with single potential contributors, using the one-on-one approach, would provide scientific engagement for contributing to GEOSS. This practice has to complement the promotion of GEOSS to the general community.

3) The creation of National Portals (asked also by National GEOSS stakeholders), to collect already shared data and information, should support the communication strategy to engage further national contributors by promoting the use of GEOSS data. Discussions during the workshop highlighted that it needs "to offer before ask" to engage new partners. These processes could lead to data-CORE collection at national scale.

e) ICT supporting activities & knowledge transfer.

Some National activities are demonstrating their attitude to transfer knowledge on ICT. As demonstrated during the workshop, national GEO implementation (UK and IT) and partnerships (Italian SoS, IDE Univers, GIIDA, SINAnet) help to overcome possible ICT knowledge gaps of further partners. Lack of technology or ICT knowledge limit the possibility to feed the GCI via national actors willing to contribute to GEOSS. To achieve the best data/metadata sharing and integration, ICT activity have also to be supported at the sub-national level (e.g. by offering access to existing infrastructures for editing and collecting information), where the majority of the environmental information are collected and stored (but sometimes not delivered).



f) National GEO implementation (also governance)

By the analysis of the two cases of GEO national implementation, many common practices and needs have been identified, both related to technological and economic aspects.

1) As well as for the section "organising & catalysing resources", the main need is tied to the effort to align the National GEO implementation with on-going Community programmes and projects (e.g. GMES programme and its related FP7 projects, INSPIRE implementation, EIONET) for the improvement of existing GEOSS datasets. Even if GMES is already contributing to GEOSS, its community could still hide valuable environmental information, especially the ones provided by private sectors. Also, raising awareness on the benefits of GEOSS in the private sector could boost the changing culture process that could lead to proper data sharing across Europe.

2) It was underlined that the implementation of a national GEO portal/web page (as a hub to collect activities and products and for engaging communities) is a necessary step to overview what is readily available and what is missing. By this overview it will be possible to investigate in order to fill the gaps and to approach the statement of the needs at the national level.

3) In the developing process of a national GEO community it has to be taken into account that stakeholder mapping (also considering that the National coordination of GEO is strongly required by stakeholders) is required in order to set-up a proper network to define stakeholder needs. National GEO coordination involves only a little part of the actors having an active role on managing environmental information. For this reason, national mapping activities about people (both from research and government) that could be involved in the use of GEOSS resources should be conducted.

4) Discussions arose from the lack of communication between the European GEOSS community that could provide complementary synergies (UK-EOF, GIIDA, SINAnet, Italian SoS). Different good practices are achieved in different Countries, such as the national metadata catalogue provided by the Italian SoS (based on a voluntary partnership with technologically supported by OS tools) and the catalogue of national initiatives implemented by UK-EOF. European Countries could benefit from different products that already contribute to the implementation of some National GEO, by reusing ideas, methodologies and existing tools.



More analysis of National GEO implementation is required to identify and replicate good practices.

5) Provide evidence to policymakers about the potential benefits to underpin National GEO positions which could improve the National GEO implementation (a strong top-down component is required at the EU scale). To complement the endorsement by Ministers about several GEO proposals, it needs to implement a strategic national plan to put into practice the common decision taken to implement GEOSS (e.g. translation of outcomes of the GEO Plenary session into actions to be conducted at the national level).

6) Considering that many of the resources existing/stored/collected at the subnational level are hidden to GEOSS because of a) not being conducted within institutional activities, b) the lack of ICT knowledge to share environmental data/information, and c) the self-governed condition of subnational authorities that can delineate their own monitoring activities, environmental products and data policy, the establishment of GEO Focal Points at the sub-governmental level could improve the amount of data available for feeding the GCI and to improve national datasets.

8) To improve the national contribution to GEOSS, periodic questionnaires should be proposed in order to monitor the progress in the activities and also to understand to what extent the efforts made are contributing to the SBAs. Nonetheless, questionnaires should identify existing overlaps and, thus, are useful to optimise resources.

g) Quick wins

1) Most of the presented works, both programmes and projects, present the development of resources catalogues. Indexing, (at the national level), information collected within catalogues (maybe by SBAs topic) should be a quick win. Considering the most difficult activity on providing information is related to information compiling (data entry, metadata creation), taking advantage of the INSPIRE Directive on implementing metadata across Europe should lead to environmental metadata collection and sharing by catalogues networking (this point would foresee a broker catalogue as a "clearinghouse").



h) Looking at the scientific engagement in GEOSS

1) By the given presentations that foresee Research Institutes and Academia networking, it emerged that a good way to involve and motivate individual researchers relates, first, to make those actors use GEOSS data and, later, to ask them to provide some content to the GCI. Perhaps the new contributors will need support on generating metadata and publishing some data via web-map-services.

2) Motivating researchers to organize themselves in CoPs is an essential step to contribute to GEOSS. For example, at the national and international level it would be useful to promote the adoption of common vocabularies to generate comparable datasets. This suggests also the possibility of pushing national and subnational environmental agencies (that collect regional data) also to participate in CoPs to align research and monitoring activities.

3) The coordination of the national participation in GEO in a single National Body (GEO-D, UKGEO, GEO Italy), presenting a good balance between scientist and administrative agencies, is welcomed by GEOSS actors. A central coordination overbalanced toward research/monitoring or Administrative Authority may unfocus the real potential of contributing to GEOSS.

Possible improvement of GEOSS at the EU level:

1) Different national contributions to GEOSS can provide different and complementary expertise (e.g. Italian SoS on brokering metadata and UK-EOF on cataloguing national activity for the definition of the statement of needs). More national analysis is needed to catalyse this expertise across Europe and to address a replication process to Countries willing to implement a National GEO.

2) Efforts exist, although at different levels of bottom-up / top-down approaches, of improving interoperability between existing national environment observation/data/information initiatives (UK-EOF; GIIDA-Sinanet Italian partnership; REPORTNET, EIONET, GISC at EEA...). Considering these activities are on-going, a coordination activity at the European central level would be needed to harmonise the efforts.

Table 3 –Schema resuming the identified practices, commonalities and need related to the presentation given during the workshop (note: in table 2 the EGIDA methodology contribution is differently tagged, because its implementation will benefit from all the practices, commonalities and needs identified in the EGIDA National Use Cases Workshop).

10	Promoting the use of GEOSS data	x
3	Periodic questionnaires	
0	Establishment of focal point at sub-national level	
11	Existing international links with relevant initiatives	
5	Links to policy makers	
5	Participation on coordinated national GEO community	x
1	Potentiality to contribute to the national GEO-portal implementation	
7	Catalysing resources from existing project to contribute to GEOSS	
5	Effort on ICT knowledge transfer and support	
9	Efforts on changing culture on data sharing	x
4	Data policy implementation	
11	Presence/promotion of guidelines on data sharing	
15	Alignment of ongoing project to GEOSS	
12	Conveying GEOSS activities in existing networks	x
2	Overview/cataloguing of national activities	
13	Interaction between top-down/bottom-up processes	x
10	Active proposals by GEOSS stakeholder	
8	Cataloguing	
n° commonalities		
Geo-wiki.org: Crowdsourcing to improve Landcover Validation (Steffen Fritz/Ian McCallum). The Geo-Wiki Project is a global network of volunteers who wish to help improve the quality of global land cover maps via available web mapping tools. Inputs are recorded in a database, along with uploaded photos, to be used in the future for the creation of a new and improved global land cover map.		

2. An Italian S&T infrastructure for contributing to the GEOSS (Paolo Mazzetti & Nico Bonora). The proposed example builds on the results of a (re-)engineering process applied to some existing Italian national-level infrastructures, in order to build a system of systems (SoS) conceived for a coordinated and sustainable contribution to the GEOSS.	x	x	x		x	x	x		x	x					x			x
a) Harmonization of geological data across Europe (Marco Pantaloni). The OneGeology-Europe project delivered a web accessible, semantically and technically interoperable geological dataset, with “progress towards harmonisation”, for the whole of Europe at 1:1 million scale. This project has been based on the individual geological datasets, held by each of the European geological surveys, which considerably differ with respect to their contents, description and geometry.		x	x			x				x					x			
b) An interoperable and harmonized architecture to deliver the geological dataset (Carlo Cipolloni). To obtain a web-accessible, interoperable geological spatial dataset for the whole of Europe at 1:1 million scale based on existing data held by the pan-European Geological Surveys, was necessary to insure interoperability among geological data providers across Europe.	x	x	x			x				x	x				x			
c) Harmonizing data policies: experiences from the OneGeology-Europe project (Katleen Janssen). One of the elements of the eContentPlus project OneGeology-Europe was the development of a Code of Practice on access and licensing for the participating geological surveys. This Code of Practice provided guidelines for implementing an access policy that is adaptable to the circumstances and national requirements of the geological surveys, and at the same time user-friendly for interested data users. The access policy contained practical and organizational measures and model licences.		x	x			x	x	x	x		x				x			

4 Interoperability of water and soil data quality. Ideas by the Italian approach (Gianni Tartari). Interoperability between data quality of the soil and waters represents a level of complexity much higher than other sectors of the environment because increasing in complexity when considering environmental components together with social and economic aspects. In this contribute will be presented some ideas and suggestions developed in the GIIDA's case study with the aim to evidentiate the interoperative approach to build an appropriate and integrated database in these issues.	x				x	x												
5 Lessons learned in the IDE-UNIVERS project (Joan Masò Pau). IDE-UNIVERS was a research project aiming at creating a thematic Spatial Data Infrastructure (SDI) to encourage access, exchange and interoperability of the huge quantity of information with a geographic reference produced by Universities and Research Centers within their projects and activities. The Project, coordinated by the Secretaria de Telecomunicacions i Societat de la Informació (STSI) of the Catalan Regional Government (Generalitat de Catalunya) in Spain was funded with the contribution of the European Commission - Interreg III B MEDOCC Program. IDE-Univers started from September 2006 and ended in 2008.	x		x		x	x	x	x	x	x				x				x
6 Italy and the GEO carbon tasks (Antonio Bombelli). Italy (particularly University of Tuscia and the Euro-Mediterranean Centre for Climate Change) is actively contributing to the carbon tasks of the GEOWork Plan, mainly through the participation as coordinator or partner, in European projects. Some highlights will be presented.					x	x	x			x		x		x				x
7 The Earthquake Environmental Effects catalogue: "in situ" validation of seismic hazard assessment (Luca Guerrieri). The Geological Survey of Italy - ISPRA is coordinating a global initiative in the frame of INQUA (International Union for Quaternary Research) aimed at building a global catalogue of Earthquake Environmental Effects, integrating the observations from recent events with descriptions from historical earthquakes and from paleoseismic investigations.	x		x		x	x								x				x

8 EGIDA Methodology (Paolo Mazzetti). The EGIDA Methodology is a general methodological approach, structured as a set of good practices, which can be adopted by national/regional S&T communities, for a sustainable contribution to the GEOSS through the mobilization of resources made available from the participation in national, European and international initiatives and projects. It combines the top-down approach from the GEO (in particular the STC Roadmap), with the bottom-up approach from on-going project and initiatives at national/regional and international level that contribute, or might contribute to the GEOSS. The EGIDA Methodology consolidates the achievements of the EGIDA project activities for exploitation beyond the duration of the project. It will be transferred to four use cases characterized by different geographical extent and thematic scope, for evaluation and assessment.	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
9 UK-EOF: a collaborative UK partnership for coordinating sustained efforts on measuring the environment. What, why, achievements so far and what's next (Beth Greenaway). The UK-Environmental Observation Framework (UK-EOF) strives to change the way the UK perceives, values, archives and uses information from observation activities by working across public departments and agencies, the voluntary sector, industry and academia. The UK-EOF will be a self contained 5 year programme of Living With Environmental Change (LWEC), funded by the major sponsors of environmental observations in the UK and delivered via a series of workstreams.		x	x	x	x	x	x		x						x					x		x		x	x
10 UKGEO (Beth Greenaway). A collaborative partnership for assessing UK GEO activities, strengths, weaknesses and priorities; using this to develop a UK GEO strategy; coordinating existing and new UK GEO inputs; building a UK GEO community; and pursuing opportunities for this community to contribute to and benefit from GEO in the future.		x	x	x	x	x	x		x				x	x		x					x		x		x

11 GEO Italy (Maria Dalla Costa). The GEO Italy is coordinated by the Italian Ministry of Environment to improve the national coordination between various types of GEO stakeholders (EO providers, users) and R&D institutions (ASI, CNR, DigitPA, ISPRA, ENEA). GEO Italy also acts to improve communication among different scale stakeholders (Central and Regional Administrations) and to links national experiences accrued in European initiatives with GEOSS. GEO Italy contributes to GEOSS GCI by sharing its own EO achievements and federating its environmental information systems developed by national institutions (CNR-GIDA, ISPRA-SINANet) in line with SEIS Principles and INSPIRE implementation.	x	x	x		x	x	x		x				x		x			x		x
12 The Global Mercury Observation System (GMOS) contribute to the Health SBA of GEOSS (Sergio Cinnirella). GMOS is aimed to establish a Global Observation System for Mercury able to provide ambient concentrations and deposition fluxes of mercury species around the world, by combining observations from permanent ground-based stations, and from oceanographic and tropospheric measurement campaigns. The developed interoperable tools will allow to share datasets and models output data produced by GMOS, for the purposes of research and policy development and implementation as well as at enabling societal benefits of Earth observations, including advances in scientific understanding in the nine Societal Benefit Areas (SBA) established in GEOSS.			x		x	x	x				x				x					x
13 Role of Eionet in the global processes of Earth Observation (Inese Podgaiska). Eionet plays a crucial role in providing its expertise, technical know-how and support to the European Environment Agency in its coordination role of the in-situ component and new coordination role of the GIO Land service in the framework of the GMES programme. Together with EIONET, EEA involves stakeholders, users and service providers in the process of assessment of policy demands to build up operational framework for in-situ data access needed for the GMES services. By providing an input into the progress of the GMES programme, Eionet and EEA also contribute to		x				x	x				x			x	x					

the main priorities of the GEOSS.																		
14 GIIDA (Paolo Mazzetti). GIIDA is a interdepartmental project of the National Research Council of Italy which targets the definition and development of a shared multidisciplinary infrastructure for the management, processing and analysis of environmental data. It is composed of work groups related to air quality, seas and marine resources, natural and anthropic risk, climate change, water and soil quality, biodiversity and combined infrastructures between Research Institutes and Public Administrations.	x	x	x		x	x	x	x	x	x			x		x			x
15 Sinanet (Nico Bonora). Sinanet is the Environmental Information and Monitoring System and represents the EIONet National Focal Point (NFP) the EEA in Italy. NFP is in charge of cooperation with the EEA and the NRCs (National Reference Centers) and organises national coordination of activities related to the EEA strategy. Data and information of European relevance are managed to support the business processes of the European Environmental Information System and building on a shared information infrastructure to create national repositories (REPORTNET). Through SINAnet, ISPRA act as Coordination Structure for INSPIRE implementation to support the National Contact Point (Ministry for Environment, Land and Sea).	x	x	x		x	x	x	x	x	x				x	x			



5. Final Considerations

The general aim of the task 3.4 refers to a *“Process for the identification of examples showing GEOSS at work”*, whose results have to be delivered as a document. The deliverable also foresees to detail the web-based solution for collection and documentation of further examples. Part of this activity (the web-based solution) is already provided by ST 09-02 (<http://www.geo-tasks.org>). To avoid overlapping, it was decided to address the T3.4 not only to the identification of further examples showcasing GEOSS at work, but also to provide to the European Commission and GEOSS: *a)* elements to improve the national/regional contribution to GEOSS; *b)* elements to make the national contribution sustainable; and *c)* practices, commonalities and needs for further replication processes.

In order to achieve the above goals, a workshop was organized to present and compare different activities related to the bottom-up component contributing to GEOSS. The outcomes of the workshop were presented to the Joint GEOSS/EGIDA stakeholder network workshop (Bonn, 2011, 9-11).

The first analysis of the collected proposals by ST-09-02 demonstrates that the description of the bottom-up component related to national contributions is poorly represented. The chapter 3a of this deliverable shows that it was particularly difficult to identify examples capable to furnish a concrete contribution to the national analysis.

In order to increase the number of cases (and to support ST-09-02 for the development of a process for the identification of compelling examples), different approaches were adopted to involve further contributors. These approaches relate to: *a)* collection of works in the framework of existing national and European networks (e.g. EIONET, FP7, European and National Networks); *b)* from within the EGIDA consortium; and *c)* collection of some GEO national implementation (also for accessing to national cases). It has been demonstrated that the most productive activities on collecting contributors relates to the point “a” (collection of works in the framework of existing national and European networks).

By the analysis of the national cases contributing to the bottom-up processes on implementing GEOSS, it emerged that the most proficient cases are those complemented by a top-down component. This point infers that efforts, to be effective, have to be coordinated: *a)* in kind, to collect and harmonize resources provided at the national and subnational level; *b)* at the European level, to link relevant on-going activities, to identify complementary expertise among Countries and to promote the replication of existing (good) practices.



European countries, especially those still not fully operative toward GEOSS, could benefit from further analysis conducted at the European scale, with particular attention on different National GEO implementations. Although only a couple of National GEO implementations were analyzed, good practices emerged in relation to both funded and non-funded activities, such as brokering environmental information provided by Italy, the statement of needs provided by the UK, the needs to collect data and information into a national Geoportal to promote the use of national GEOSS data, to provide a national stakeholder mapping and to start a process for cultural change on the matter of data and information sharing. This is particularly important for Research and Academia that are not touched by the INSPIRE Directive.

All of the above examples underline a common point: more analysis at the European level is needed for benefiting, by reusable processes, what already exists. This is the central role of the countries that intend to improve their contribution to GEOSS. This kind of analysis should discover other hidden (or not described yet) activities, capable of furnishing further methodological approaches suitable for replication.

The contribution of the European Commission, on the matter of identification of good practices and replication processes, could lead national policy makers to underpin GEO positions. This contribution could produce relevant and positive impacts related to the national and subnational component, especially for data and information delivery harmonization.

Lastly, the involvement of the subnational component seems crucial for GEOSS implementation, considering that most of the data and information is actually collected at the local scale.

6. Summary

- The GEOSS Portfolio has collected an impressive assortment of activities representing compelling examples of GEOSS across the SBAs (http://www.geotasks.org/geoss_portfolio/);
- Several SBAs remain without examples: namely Energy, Disasters and Weather;
- Difficulties have been encountered in obtaining new compelling examples to date i.e. a process is lacking by which to solicit examples;
- The successful workshop in Rome on National Use Cases, identified a wealth of compelling examples (> 10) across the SBAs at the national level – this list will be provided to the ST-09-02;



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FP7 Project nr 265124

- Such workshops could be held in other countries, simultaneously promoting GEOSS and soliciting compelling examples;



7. APPENDIX A4

1. Questionnaire delivered to the participants after the workshop

Questionnaire

In order to provide the European Commission synthetic indications about the given presentations, it was decided to create a questionnaire to be compiled by the workshop participants about their presentations. The question made to the participants after the workshop are listed below:

1. Please, describe the presented initiative in relation to the organizational model (top-down or/and bottom-up).
2. to what extent does the presented activity contribute to a cultural change on data/information sharing?
3. To what extent was your initiative conceived to be included in a System of Systems? If yes, please explain how. If not, please describe if and how you would intend to contribute to European and/or global initiatives/programmes for information sharing (GEO/SS, GMES, SEIS, etc...).
4. Which are the main obstacles and barriers encountered to realize your goals? Have they been solved? If yes, please explain how.
5. Which difficulties did you find in the calculation of the cost of investment (which sectors are most difficult to quantify)?
6. Are the top-down and bottom-up combined approaches contributing to optimize/mobilize in-kind resources (both human and economic)?
7. How do you think your activity contributes to a better knowledge transfer and ability to discover relevant information?
8. Are data resulting from the activity being placed into an open catalogue, registry, WMS-WFS, etc.?



7.1 Lessons learned in the IDE-UNIVERS project (Joan Masò Pau).

1. Please, describe the presented initiative in relation to the organizational model (top-down or/and bottom-up).

IDE-UNIVERS was a research project aimed at creating a thematic Spatial Data Infrastructure (SDI) to encourage access, exchange and interoperability of the huge quantity of information with a geographic reference produced by Universities and Research Centers within their projects and activities. The Project, coordinated by the Secretaria de Telecomunicacions i Societat de la Informació (STSI) of the Catalan Regional Government (Generalitat de Catalunya) in Spain was funded with the contribution of the European Commission - Interreg III B MEDOCC Program. IDE-Univers started in September 2006 and ended in 2008.

Please, describe the presented initiative in relation to the organizational model (top-down or/and bottom-up).

It is a bottom-up initiative oriented to motivate universities and research centers to share their data in the SDI community. The project was applied in 6 regions of 3 European countries.

To what extent does the presented activity contribute to a cultural change on data/information sharing?

It was the aims of the project. 57 universities and research centers shared 10632 metadata records and 6787 WMS layers.

To what extent was your initiative conceived to be included in a System of Systems? If yes, please explain how. If not, please describe if and how you would intend to contribute to European and/or global initiatives/programs for information sharing (GEO/SS, GMES, SEIS, etc...).



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FP7 Project nr 265124

It was conceived as a SoS in the sense that each region work alone with their own catalogue and map services. Finally all regions were integrated in supranational federated catalogue. The standards used in this catalogue allow GEOSS integrations. The data has to be filtered in a way that only the data useful for the GEOSS users will be registered in it.

Which are the main obstacles and barriers encountered to realize your goals? Have they been solved? If yes, please explain how.

Main obstacles and solutions were:

To motivate the actors to contribute in the project. It was solved by showing them that by contributing in the project creating the thematic SDI, their work would gain visibility.

The cost and effort to set up services. It was solved by using open source solutions and supporting people with courses and a helpdesk.

Inclusion of non-cartographic documents. It was solved by integrating them in a point dataset that references them.

Some data was not public. It was solved by providing metadata with access conditions and do not providing WMS access in this cases.

Open source solutions were only satisfactory by the 90% of the cases.

Technical difficulties in integrating catalogues were solved with a broker called Catalogue Connector.

Which difficulties did you find in the calculation of the cost of investment (which sectors are most difficult to quantify)?

It is very difficult to quantify. The finance of the project did not paid the effort invested and only if you take into considerations the indirect benefits like, visibility and network creation you will have a positive balance.

Are the top-down and bottom-up combined approaches contributing to optimise/mobilise in-kind resources (both human and economic)?



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

FP7 Project nr 265124

Yes. The previous existence of the Catalan SDI and the project finance (top-down) stimulated the scientific involvements (bottom-up).

How do you think your activity contributes to a better knowledge transfer and ability to discover relevant information?

It contributes providing a catalogue that is maintained by the Catalan SDI that includes thousands of records describing scientific activities and results that can be reused in other contexts. This catalogue can be federated with the GEOSS Clearinghouse.

Are data resulting from the activity being placed into an open catalogue, registry, WMS-WFS, etc.?

Yes it is placed in WMS services and in 6 regional CSW metadata catalogues that are federated in a single supranational catalogue.



7.2 Italy and the GEO carbon tasks (Antonio Bombelli)

The following answers are related to the GEOCARBON project, that will be funded by EC in the frame of FP7 by the end of the year.

Please, describe the presented initiative in relation to the organizational model (top-down or/and bottom-up).

Top down, responding to a call of the European Commission.

to what extent does the presented activity contribute to a cultural change on data/information sharing?

The project will promote data sharing according to the GEO data sharing policy.

To what extent was your initiative conceived to be included in a System of Systems? If yes, please explain how. If not, please describe if and how you would intend to contribute to European and/or global initiatives/programmes for information sharing (GEO/SS, GMES, SEIS, etc...).

The project is specifically conceived in support to GEO and the building of a Global Integrated Carbon Observing System.

Which are the main obstacles and barriers encountered to realize your goals? Have they been solved? If yes, please explain how.

N.A. The project has still to start.



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

FP7 Project nr 265124

How do you think your activity contributes to a better knowledge transfer and ability to discover relevant information?

One of the project activity is to collect currently available information and dataset that contribute to the global carbon information system and provide an aggregated set of harmonized global carbon information based upon existing observations.

Are data resulting from the activity being placed into an open catalogue, registry, WMS-WFS, etc.?

We should set up a Carbon Portal to be embedded in the frame of the GEO Portal.



7.3 An Italian S&T infrastructure for contributing to the GEOSS (Paolo Mazzetti & Nico Bonora).

The proposed example builds on the results of a (re-)engineering process applied to some existing Italian national-level infrastructures, in order to build a system of systems (SoS) conceived for a coordinated and sustainable contribution to the GEOSS.

Please, describe the presented initiative in relation to the organizational model (top-down or/and bottom-up).

The organizational model foresees the complementary bottom-up and top-down approach. The top-down is jointly led by CNR-IMAA (Prato - Italy) and ISPRA/SINAnet (Rome - Italy), that ensure the functional interoperability at central level and the collection of environmental researches and monitoring data and information. The Bottom-up component is related to the self-management of SW, standards and tools to achieve interoperability within the SoS to share the collected data and information and research results.

to what extent does the presented activity contribute to a cultural change on data/information sharing?

The project foresaw (and still foresees) different meetings with potential partners to promote data sharing by the reuse of existing software. Those meetings were held at subnational level mainly to involve Environmental Agencies to share their monitoring data to be used for research activities.

To what extent was your initiative conceived to be included in a System of Systems? If yes, please explain how. If not, please describe if and how you would intend to contribute to European and/or global initiatives/programmes for information sharing (GEO/SS, GMES, SEIS, etc...).



The system is in itself a SoS contributing to different SoSs.

Which are the main obstacles and barriers encountered to realize your goals? Have they been solved? If yes, please explain how.

The main obstacles encountered and solutions are listed below:

- Reticence by some partners to adopt new tools for data and information sharing (Response: seminars have been held to promote the benefits from data sharing).
- Being a volunteer approach (no funds), the re-engineering process has to be conducted with in-kind resources (Response: full ITC support provided by CNR and Sinanet to the partners involved).
- Even if CNR and Sinanet fully supported the re-engineering process, not all the partners involved were capable to accomplish interoperability. Lack of competences arisen to implement and maintain the system (Response: Meeting has been held for know-how transfer).
- Lacks on communication between different actors, eg. systems analysts and data&information providers (Response: No solution for that!).

Which difficulties did you find in the calculation of the cost of investment (which sectors are most difficult to quantify)?

Calculation of costs is very difficult to achieve, because the contribution is based on institutional funds and in terms on person/month.

Are the top-down and bottom-up combined approaches contributing to optimize/mobilize in-kind resources (both human and economic)?

SINANet took economic advantage from the re-engineering process by the adoption of open source broker catalogue developed by CNR-IMAA. The adoption of the above technology and the technical support of CNR permitted to optimize economic resource (saving money tied to licenses costs and assistance) and to acquire technical knowledge increasing competences.



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

FP7 Project nr 265124

How do you think your activity contributes to a better knowledge transfer and ability to discover relevant information?

The national SoS is based on knowledge transfer, both technical and scientific. Also, Being the SoS based on a distributed architecture, it is possible, by discovery services, to access all the information stored in the SoS.

Are data resulting from the activity being placed into an open catalogue, registry, WMS-WFS, etc.?

The information are stored within a catalogue's networking and relates to metadata (mainly ISO19115 and INSPIRE).



7.4 Sinanet (Nico Bonora)

Sinanet is the Environmental Information and Monitoring System and represents the EIONet National Focal Point (NFP) of the EEA in Italy. NFP is in charge of cooperation with the EEA and the NRCs (National Reference Centers) and organizes national coordination of activities related to the EEA strategy. Data and information of European relevance are managed to support the business processes of the European Environmental Information System and building on a shared information infrastructure to create national repositories (REPORTNET). Through SINanet, ISPRA act as Coordination Structure for INSPIRE implementation to support the National Contact Point (Ministry for Environment, Land and Sea).

Please, describe the presented initiative in relation to the organizational model (top-down or/and bottom-up).

The organizational model foresees the complementary bottom-up and top-down approach. The top-down is led by SINanet, that provide interoperability at central level and the collection of environmental and monitoring data and information. The Bottom-up component is related to the Environmental Agencies, that provide the data flow from subnational to National scale.

to what extent does the presented activity contribute to a cultural change on data/information sharing?

As all the data and information stored within SINanet are delivered for free. It is promoted within the existing networks the benefits related to data sharing (feed-back by end-users and related improvements; data integration).

To what extent was your initiative conceived to be included in a System of Systems? If yes, please explain how. If not, please describe if and how you would intend to contribute to European and/or global initiatives/programmes for information sharing (GEO/SS, GMES, SEIS, etc...).



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

FP7 Project nr 265124

SINAnet already contributes to different SoS, such as Italian SoS, GMES and GEOSS.

Which are the main obstacles and barriers encountered to realize your goals? Have they been solved? If yes, please explain how.

Difficulties to reach interoperability at regional level. Italy is composed by 21 Regions and Autonomous Provinces that present different economic and technical resources.

Seminaries has been held to promote the reuse of free software to accomplish data and information flow and sharing. ICT support is provided by SINAnet to those Regional partners not fully operatives yet.

Which difficulties did you find in the calculation of the cost of investment (which sectors are most difficult to quantify)?

SINAnet is an on-going project started in the 1998. It is difficult to quantify the costs.

Are the top-down and bottom-up combined approaches contributing to optimize/mobilize in-kind resources (both human and economic)?

Economic resources have been optimized within the SINAnet partnership through the reuse of the software, involving the Environmental Agencies for the common development of informatics/informative tools.

How do you think your activity contributes to a better knowledge transfer and ability to discover relevant information?

SINAnet is conceived to discover data and information. The knowledge transfer is carried out by the participation in different European project, such as Twinning and ENPI (SEIS-south) and international programmes as UNEP-MAP.



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

FP7 Project nr 265124

Are data resulting from the activity being placed into an open catalogue, registry, WMS-WFS, etc.?

Data stored within SINAnet are available via view service (OGC-WMS), discovery services (via CSW-ISO) and download.



7.5 The Global Mercury Observation System (GMOS) contribute to the Health SBA of GEOSS (Sergio Cinnirella)

Please, describe the presented initiative in relation to the organizational model (top-down or/and bottom-up).

We presented the Global Mercury Observation System (GMOS) initiative, which was generated both from a bottom-up and top-down approach.

The former approach derives from a consolidated research on mercury pollution in the environment as several national and international projects were aimed to explore biogeochemical cycle and fate and transport of atmospheric mercury. These projects made use of temporary or permanent monitoring stations, which data were published but not collected in central database.

The top-down approach derives from the effort at international levels (i.e. UENP) to establish a global legally binding treaty on mercury. Under this framework, GEO launched a the Task HE-09-02d: Global Monitoring Plan for Atmospheric Mercury aimed to develop a global observation system for mercury by harmonizing standard operating procedures for monitoring mercury and its compounds in air, atmospheric deposition, water, soil, sediments, vegetation and biota. The sharing of data from this network, will access to comparable and long-term data from a wide array of locations, will help understand temporal and spatial patterns of mercury transport and deposition to, and evasion from, terrestrial and aquatic ecosystems. The data produced will support the validation of regional and global atmospheric mercury models for use in evaluations of different policy options for reducing mercury pollution impacts on human health and ecosystems. Build upon the contributions of, among others, the UNEP Mercury Programme, the Hemispheric Transport of Air Pollutants Task Force (TF HTAP), and the European Monitoring and Evaluation Program (EMEP). Moreover build upon the US MercNet initiative and international monitoring and modelling efforts led by Italy, Japan and South Africa.

To what extent does the presented activity contribute to a cultural change on data/information sharing?



The most important cultural change that will involve the scientific community oriented to mercury research is related with:

- adoption of Standard Operating Procedures (SOPs) for measurements
- share of published data
- description of data with metadata

To what extent was your initiative conceived to be included in a System of Systems? If yes, please explain how. If not, please describe if and how you would intend to contribute to European and/or global initiatives/programmes for information sharing (GEO/SS, GMES, SEIS, etc...).

The GMOS initiative was conceived to support the direct implementation of the GEO Task HE-09-02d. As consequence it will develop an SDI aimed to share information on mercury in the environment. The SDI will include a database on past, present and future (i.e. scenarios) mercury measurement/assessment in all media (sediment, water, air, biota), which will support UNEP and UNECE initiatives. Data and services will be included in GEOSS.

Which are the main obstacles and barriers encountered to realize your goals? Have they been solved? If yes, please explain how.

The main obstacles to realize the GMOS initiative are related to:

- Increase advocacy for in-situ QA/QC procedure (adoption of SOPs);
- Issues related to data property rights, data sharing, etc. need to be better framed.

Which difficulties did you find in the calculation of the cost of investment (which sectors are most difficult to quantify)?

No difficulties have been found as the GEO Task was entirely supported by the GMOS project.



Are the top-down and bottom-up combined approaches contributing to optimize/mobilize in-kind resources (both human and economic)?

Yes. See well explained point 1.

How do you think your activity contributes to a better knowledge transfer and ability to discover relevant information?

The activity will contribute to a better knowledge transfer as it is aimed to collect and share mercury related information aimed to support policies on its banning.

Are data resulting from the activity being placed into an open catalogue, registry, WMS-WFS, etc.?

Yes.



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7.6 Geo-wiki.org: Crowdsourcing to improve Landcover Validation (Steffen Fritz/Ian McCallum).

Please, describe the presented initiative in relation to the organizational model (top-down or/and bottom-up).

The Geo-Wiki Project is an initiative which utilizes a global network of volunteers who wish to help improve the quality of global land cover maps. This effort is very much a bottom up effort, in that it relies on volunteers to provide information.

to what extent does the presented activity contribute to a cultural change on data/information sharing?

Geo-wiki.org represents a paradigm shift in scientific data-information sharing. Historically scientists have generated data and the public has seldom had access to this data, let alone an opportunity to become involved in the process. Geo-wiki.org now makes scientific data (in this case global land cover) readily accessible to anyone with an internet connection, and furthermore solicits feedback from volunteers, capturing this information in a format useable for future scientific efforts.

To what extent was your initiative conceived to be included in a System of Systems?

If yes, please explain how. If not, please describe if and how you would intend to contribute to European and/or global initiatives/programmes for information sharing (GEO/SS, GMES, SEIS, etc...).



Geo-wiki.org was from the inception conceived as contributing to GEOSS. The system is an excellent example of the power of data sharing, making scientific data available to the public. Geo-wiki.org is registered in the Geo-Portal.

How do you think your activity contributes to a better knowledge transfer and ability to discover relevant information?

Geo-wiki.org facilitates access and discovery of data that were previously largely restricted to GIS specialists desktops. This data is now accessible to anyone with an internet connection, and allows them to contribute knowledge, as well as receive information.

Are data resulting from the activity being placed into an open catalogue, registry, WMS- WFS, etc.?

These efforts are currently ongoing.



7.7 GIIDA (Paolo Mazzetti)

Please, describe the presented initiative in relation to the organizational model (top-down or/and bottom-up).

The organizational model includes both the bottom-up and top-down actions. The bottom-up actions are carried out by the working groups collected in Thematic Areas. They provide resources (data, models, tools, etc.) and use-cases. The top-down actions are carried out by the central GIIDA coordination group including experts in interoperability, data sharing architectures, and the coordinators of the Thematic Areas. The GIIDA coordination group provides specifications for interoperability (both internal and external to GIIDA), central components, guidance and advice on general issues (e.g. data policy, standards), hierarchical organization of working groups in Thematic Areas, organization of workshops, forums and discussion groups.

To what extent does the presented activity contribute to a cultural change on data/information sharing?

At the beginning of the GIIDA activities, the benefits of data sharing were rather clear, but the participants perceived several barriers in making it possible, such as technological feasibility, user-friendliness, relationships with international initiatives (e.g. INSPIRE and GEOSS), and data ownership issues. The activities carried out in GIIDA helped to overcome most of the technical obstacles, showing the real feasibility of a resource sharing system. Relationships with international initiatives was also analyzed. Moreover GIIDA contributed to an important cultural change in terms of data policy (an open discussion was started on the possible definition of a GIIDA data policy) and the value of multidisciplinary interoperability, through the sharing of resources between different thematic areas.



To what extent was your initiative conceived to be included in a System of Systems?

If yes, please explain how. If not, please describe if and how you would intend to contribute to European and/or global initiatives/programmes for information sharing (GEO/SS, GMES, SEIS, etc...).

GIIDA itself was designed as a SoS connecting existing resource sharing systems managed by different working groups in the CNR Institutes. It was also conceived as a component of a wider National SoS. The joint activities with ISPRA/SINAnet aim to this objective. Finally GIIDA adopts a set of interoperability specifications that make it compliant with the INSPIRE infrastructure and the GEOSS.

Which are the main obstacles and barriers encountered to realize your goals? Have they been solved? If yes, please explain how.

GIIDA has reached its Initial Operating Capacity (IOC) including a central catalog federating multiple thematic catalogs, and a central portal. The main difficulties encountered were the heterogeneous level of IT expertise in the working groups, limited fundings to mobilize resources, and the lack of a internal data policy. The heterogeneous level of IT expertise was solved through the organization of workshops, and the activities of a support team by mailing-lists, and forums. Limited fundings is still a barrier, although the use of open-source/free software and extensive re-use of solutions lowered the need of resources. Finally the discussion about data policy has started.

Which difficulties did you find in the calculation of the cost of investment (which sectors are most difficult to quantify)?

GIIDA is an on-going initiative. The Cost of Investment is difficult to calculate. Direct Funding was provided by the Department of Earth and Environment, in form of post-doc



positions, but the Institutes contribute extensively with the mobilization of resources from on-going projects (personnel, instruments).

Are the top-down and bottom-up combined approaches contributing to optimize/mobilize in-kind resources (both human and economic)?

Yes. The central coordination allowed the reuse of solutions and tools, for example many working groups had the possibility to benefit from solution tested by others. Often the WGs directly provided their expertise in using tools and specifications, helping others to develop similar systems.

How do you think your activity contributes to a better knowledge transfer and ability to discover relevant information?

The participants generally agree that GIIDA was and is an opportunity for a better knowledge transfer, both in terms of data and expertise. Data sharing was often a first step towards a knowledge transfer between working groups working on similar or different themes, for disciplinary and inter-disciplinary activities.

Are data resulting from the activity being placed into an open catalogue, registry, WMS- WFS, etc.?

GIIDA publishes a federated catalog including coverages, features, maps and sensor observations. Although not required in the IOC, some WGs also provide access services to directly access data (mainly maps).



7.8 OneGeology Project (Carlo Cipolloni)

1. *Please, describe the presented initiative in relation to the organisational model (top-down **or/and** bottom-up).*

Organization model: top-down.

2. *to what extent does the presented activity contribute to a cultural change on data/information sharing?*

The OneGeology-Europe project has involved 20 countries of the Europe and has been produced a unique standard policy licence, so a great work has been done to harmonized the different approach to sharing data. Otherwise the OneGeology-global project has involved 119 countries of the world is an important initiative to improve the use and/or share digital data.

3. *To what extent was your initiative conceived to be included in a System of Systems? If yes, please explain how. If not, please describe if and how you would intend to contribute to European and/or global initiatives/programmes for information sharing (GEO/SS, GMES, SEIS, etc...).*

The geological data represent the basic data to produce hazard map that isn't truncated at the administrative boundaries. We think that OneGeology-Europe and Global are representative as best practice example in a System of Systems and also quite important in the GMES programme.

4. *Which are the main obstacles and barriers encountered to realise your goals? Have they been solved? If yes, please explain how.*

The main barrier is represented by the harmonization of geometric objects along the national boundaries where is possible find gap or dialling of the polygons boundaries and harmonization of part of geologic object that are interpreting with different method by the neighbour Geological Survey.



5. *Which difficulties did you find in the calculation of the cost of investment (which sectors are most difficult to quantify)?*

We don't find particular difficulty in the evaluation of the cost, the major problem in the investment analysis has been considered the management of great number of participant (29 partners) and the different method to management the money.

6. *Are the top-down and bottom-up combined approaches contributing to optimise/mobilise in-kind resources (both human and economic)?*

We can't valuate.

7. *How do you think your activity contributes to a better knowledge transfer and ability to discover relevant information?*

As just describe above the OneGeology-Europe project represent a best practice example of harmonization of European SDI, in terms of metadata, data, services and data sharing.

8. *Are data resulting from the activity being placed into an open catalogue, registry, WMS- WFS, etc.?*

Yes, the project has realized a metadata catalogue in OGC standard (CSW 2.0.2 AP ISO) and compliant with the INSPIRE Directive (multilingual catalogue available in 16 languages). All the data are available as WMS (version 1.3.0) and WFS format (Version 1.1.0), in particular the WFS represent the real engine in the portal queries functionality.