

# **GEO Geohazard Community of Practice**

## **Final Report for UNESCO Contract**

With support of the UNESCO-IUGS GARS Programme (Contract n°4500083469), and following the pre-meetings held during the Group on Earth Observations (GEO) Plenary week in Washington DC, USA, from 14<sup>th</sup>-20<sup>th</sup> November 2009, the GEO Geohazard Community of Practice (GHCP) held its 2010 Workshop in Paris from 18<sup>th</sup>-21<sup>st</sup> January. The goal of the workshop was to write a plan for the work to be done by the GHCP over the next five years of the GEO Implementation Plan, with a forward look a further 5 years beyond that. The outcome was the GHCP Roadmap, ready to be put out to consultation in the wider GEO and Geohazard communities via a dedicated, new GHCP website ([www.geohazcop.org](http://www.geohazcop.org)). This website also contains the Workshop agenda and presentations, the GHCP Roadmap and this final report.

### **LIST OF PARTICIPANTS – WASHINGTON PRE-MEETINGS**

- Patrick Bertrand, French Geological Survey
- Craig Dobson, NASA, USA
- Veronica Grasso, GEO Secretariat
- Steven Hosford, CNES (French Space Agency)/CEOS
- Stuart Marsh, British Geological Survey
- Robert Missotten, UNESCO
- Hans-Peter Plag, University of Nevada, USA

### **LIST OF PARTICIPANTS – PARIS WORKSHOP**

- Jose Achache, Group on Earth Observations Secretariat Director
- Beverly Adams, Global Earthquake Model initiative, UK
- Yolanda Berenguer, UNESCO and GEO Capacity Building Committee
- Paul Briand, Canadian Space Agency/CEOS
- Luca Demicheli, EuroGeoSurveys (EGS)
- Sarah Gains, UNESCO
- Bo Galle, Chalmers University, Sweden, NOVAC Project
- Didier Giacobbo, GEO Architecture & Data Committee
- Luca Guerieri, Italian Environment Agency & Geological Survey/EGS
- Steven Hosford, CNES (French Space Agency)/CEOS
- Wolfgang Lengert, European Space Agency
- Stuart Marsh, British Geological Survey (BGS)
- Robert Missotten, UNESCO
- Howard Moore, International Council for Science (ICSU)
- Sandro Moretti, International Consortium on Landslides
- Sospeter Muhongo, ICSU Africa
- Carine Petit, European Cooperation in Science & Technology (COST)
- Hans-Peter Plag, University of Nevada, USA
- Diego Polli, University of Pavia/EUCENTRE, Italy
- Helen Reeves, BGS/EGS
- Steve Tait, Institut de Physique du Globe de Paris, France/ EVOSS project

**Note on Participation:** Participation at the workshop was dynamic in the sense that several participants were only able to be at the Workshop on selected days (see the chart below). However, the participants all represented major international organizations, and thus the discussions were on a high level and throughout the workshop, continuous progress towards the draft roadmap was made. Repeated presentations of the draft roadmap as it evolved gave all participants chance to comment on the draft and impact the final shape of the Roadmap.

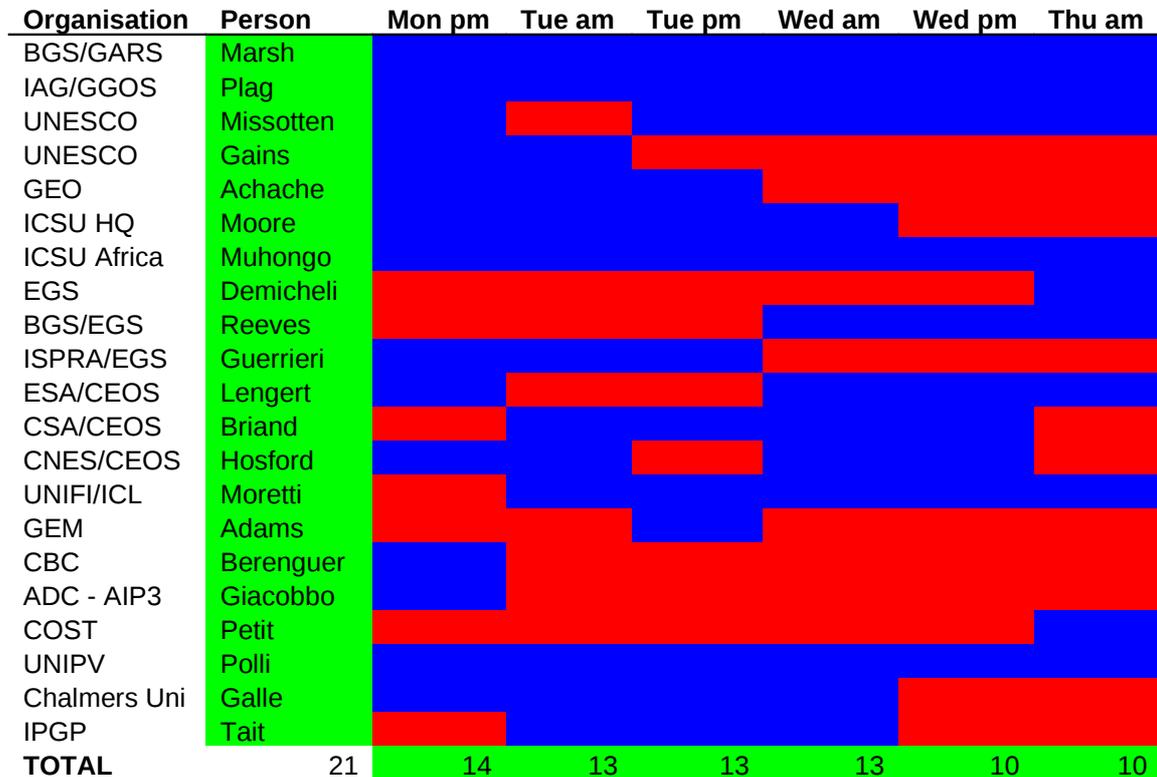


Figure: Evolution of Workshop Participation. Blue: present; red: not available.

## REPORT OF WORKSHOP SESSIONS

**Monday, January 18, 2010**

**1345 - 1415 Opening**

*Missotten, R. and Marsh, R.; Welcome:*. Robert Missotten welcomed everybody on behalf of UNESCO. He thanked Stuart Marsh and Hans-Peter Plag for the Workshop preparation. In a brief review of the background for the Workshop, he mentioned the IGOS-P Geohazards Theme, which was led by Stuart Marsh. He pointed out that UNESCO is related to hazards in various ways, and that UNESCO works closely with IUGS and other UN agencies on hazards. Concerning the outcome of the workshop, he voiced the hope that a document would be available that could be presented to the member states, and that the meeting would lead to a number of activities, also in prep for the Ministerial Summit on Earth Observations in China. He emphasized the importance of having contact to funding agencies. He expressed his regrets that it had not been possible to bring the colleagues from Haiti to the meeting, and he added the hopes that the work of the GHCP will help to reduce such disasters in the future.

Stuart Marsh also thanked those involved in the preparation of the Workshop. He explained that Douglas Cripe of the GEO Secretariat had stepped in and support the preparations. A core group had been working during 2009 to rebuild the GHCP, and one goal was to extent this group. He welcomed the participants to what he considered to be an active working meeting.

*Marsh, S.; Background, Scope, Goals and anticipated Outcome of the Workshop (pdf)*: Stuart Marsh reviewed the origin of the GHCP, which developed out of the IGOS-P Geohazards Theme. The goals of the Theme were to integrate the then disparate, applied Earth observation research into global, operational geohazards systems by building capacity, integrating activities, improving observations, and promoting action. He asked the question of how geohazards fit into the GEO Disasters SBA, and concluded that geohazards are the origin of many of the natural disasters. He remarked that the Theme also stimulated a number of regional activities and communities. A visible activity of the Theme was the organization of a series of international workshops, with the third and last one in November 2007 resulting into the Frascati Declaration. He considered this workshop and its output a high point of the IGOS-P Geohazard Theme phase.

Turning to the integration of the Theme into GEO, he mentioned the GEO Work Plan Task DI-09-01 *Systematic Monitoring for Geohazards Risk Assessment*, and in particular the Sub-Task DI-09-01a *Vulnerability Mapping and Risk Assessment*, which includes the so-called Supersite Initiative. This Initiative is recommended in the Frascati Declaration (see [http://www.earthobservations.org/geoss\\_imp.shtml](http://www.earthobservations.org/geoss_imp.shtml) for the detailed Task description). As examples for research activities enabled through free data access at Supersites, he pointed out integration of GPS and InSAR and showed related results for landslides. The Supersite Initiative is motivated by the fact that different geohazards often have similar requirements in products and observations. As an example of how GEO and GEOSS have an effect on data access, he mentioned the new global seismic data network to which the EC, US, FDSN, and ISC are contributing data with minimum delay.

Concerning the Workshop goals and outcome, Stuart Marsh listed:

- Focus GHCP on GEOSS and end-user needs;
- Welcome new players e.g. SERVIR, GEM;
- Consider the geohazards in context of GEO;
- Examine GEO geohazard Tasks/Sub-Tasks;
- Build on members' initiatives like: SuperSites, ICSU's Integrated Research on Disaster Risk;
- Use all of this input to construct the Roadmap for the future evolution of the GEO GHCP.

**Session 1: Geohazards in the GEO and GEOSS Framework.**

*Co-Chairs: Marsh, S. and Missotten, R.*

*Berenguer, Y.; The CBC and the Geohazards Community of Practice (pdf)*: Yolanda Berenguer pointed out that the membership of the GEO Capacity Building Committee was not yet complete. She explained the principles guiding the CBC and emphasized

that the CBC builds on existing efforts and fosters collaboration. The CBC takes a holistic view described by I<sup>3</sup>: Infrastructure capacity building, individuals capacity building, and institutional capacity building, and it takes an end-to-end approach. The Seville Roadmap details activities.

The GEO Strategy Target for capacity building is: *"Before 2015, GEO aims to: Enhance the coordination of efforts to strengthen individual, institutional and infrastructure capacities, particularly in developing countries, to produce and use Earth observations and derived information products."* The current GEO Work Plan has five overarching CB tasks, with a new task introduced in 2010 focusing on outreach and raising of awareness. The CfP issued in 2009 jointly by the UIC and CBC provides an example of the activities being carried out within GEO. She also mentioned that two projects funded by the European Commission are related to CB, namely GEONETCab and SEOCA. These projects support the implementation of the Seville Roadmap. She also discussed the value added by the CBC and emphasized that the CBC tries to match needs with resources.

Asked how the GHCP should interact with the CBC, Yolanda Berenguer noted that capacity building is of considerable importance for geohazards, particularly the institutional capacity building. The GHCP would best interact with the CBC by having a GHCP member participate in the CBC meetings. Asked about the integration of the Supersite Initiative into the GEO capacity building framework, she confirmed that this would be possible and desirable.

*Marsh, S.; The STC and the Geohazards Community of Practice ([pdf](#)):* A main goal of the STC work is bringing S&T communities into GEOSS and get them fully engaged. GEOSS has to be based on state-of-the-art technology and science, and this requires a well developed contact to the relevant S&T communities. The STC has a Roadmap detailing the activities needed to achieve the goals of the STC. This Roadmap focuses includes three main activity groups, namely those to engage S&T communities, to promote GEO in the S&T communities, and to monitor progress of GEO as related to S&T issues.

As a main activity, the STC looks at S&T issues in the Work Plan for each SBA separately, and individual SBAs are considered at subsequent STC meeting. During the next STC meeting in March 2010, the Disaster SBA will be considered. One important question to discuss at this meeting will be whether the GHCP should be extended to cover all disasters or stay focused on geohazards. Robert Missotten ask how the STC was positioned in respect to the Ministerial Summit. Stuart Marsh informed that the STC members had been invited to submit proposals for showcases, which would be considered by the STC. Only two or three would then be proposed to the Task Force for the preparation of the Ministerial Summit. Hans-Peter Plag added that many proposals had been submitted, which provided a good basis for identifying attractive proposals. Jose Achache explained that during the summit only three or four showcases would be featured.

*Giacobbo, D.; The AIP and the Geohazards Community of Practice ([pdf](#)):* Didier Giacobbo introduced the GEO Work Plan Sub-Task AR-09-01b "Architecture Implementation Pilots," which aims to develop and pilot new processes and elements for the GEOSS Common Infrastructure (GCI). He described the context of this Sub

Task, which relates to the UIC activities focused on User linkage, and the GCI. The AIP development approach is based on CfPs, followed by kick-off meetings, a development phase, and a transition to persistent operation. AIP-2 started to use "cases," and several cases led to augmentation of the GCI. A CFP for AIP-3 is in preparation and will be published in January 2010, and the overall schedule is tailored towards the Ministerial Summit. A goal of AIP-3 will be to engage existing CoPs and to identify new ones. He then considered the AIP from various viewpoints including enterprise, information, computational, engineering, and technology viewpoints (see the presentation for details). From a data provider perspective, the AIP aim to improve the data access services.

Hans-Peter Plag asked what, from a AIP perspective, would be desired interactions with the GHCP. Didier Giacobbo answered that the Supersite Initiative could developed into a service, but for that, it would have to be based on accepted standards.

*Moore, H.; Integrated Research on Disaster Risk (pdf)*: Howard Moore started by introducing ICSU, which has been a long history with more than 75 years under the present name but roots back to 1899. It provides an international umbrella for 29 International Scientific Unions, and it has 114 National members covering a total of 134 countries. With this, ICSU provides unique worldwide access to intellectual resources. ICSU has a strategic plan, which was developed in three years of consultation. This plan identifies natural and human-induced environmental hazards as a key area for ICSU. The key question identified by ICSU is why, despite advances in the natural and social science of hazards and disasters, do losses continue to increase? The responses to this question include population growth, development of new urban settlements in hazardous regions, and concentration of infrastructure in these areas.

In order to understand better how under these new developments, disaster can be reduced, ICSU together with other organizations is initiating the Integrate Research on Disaster Risk (IRDR). The sponsors of IRDR include besides ICSU the International Social Science Council (ISSC), and the UN Integrated Strategy for Disaster Reduction (UNISDR). The research focus of IRDR is on mitigation and preparedness.

The scope of IRDR covers geophysical and hydro-meteorological trigger events, the full suite of geohazards, floods and storms, heat waves, droughts, wild-fires, coastal erosion, space weather and impacts by near-Earth objects, as well as effects of human activities on creating or enhancing disasters, including land-use practices, and climate change. However, IRDR will not include technological disasters and warfare.

Partners in IRDR include national, regional, and international science institutions and organizations; international associations of scientists; and national and international development agencies and funding bodies with interests in hazards. Howard Moore discussed the IRDR objectives in detail (see the presentation). These objectives can be grouped under three themes: (1) Characterization of hazards, vulnerability and risk; (2) Effective decision-making in complex and changing risk contexts; (3) Reducing risk and curbing losses through knowledge-based actions. IRDR addresses a number of cross-cutting themes: capacity building; case studies and demonstration projects; assessment, data management and monitoring. A template for case studies is currently

being developed. IRDR has a strong commitment to development of science and of broadly-based capacity for disaster mitigation. The program has a ten year time horizon, with a legacy of an enhanced capacity around the world to address hazards and make informed decisions on actions to reduce their impacts. Thus, a shift from the current response-oriented approach to a more prevention and mitigation focused approach is a major anticipated outcome of the program.

As the value-added of IRDR Howard Moore listed the integrated approach to disaster risk research and the bringing together of natural, social, medical and engineering sciences. Guidance and oversight will come from a Scientific Committee and a Consultative Forum. A MoU with GEO is under currently under discussion. IRDR Working Groups are in development, and it was emphasized that the GHCP should be involved here. The Head of program will be located in Beijing.

*Achache, J.; GEO, GEOSS and geohazards: Status and Perspective:* Jose Achache started his presentation by stating that GEO so far has not done very much in the area of geohazards, which to a certain level is an embarrassing status. He asked the question of how to present this lack of progress in the geohazard area to the Ministerial Summit? He emphasized that on the side of the policy and decision makers, geohazards had a high priority. The G8 Summit in L'Aquila focused on natural disasters and in this context mentioned support for the ongoing work in building GEOSS, which acknowledges the important role policy makers see for Earth observations in the area of disaster reduction. Jose Achache pointed out that one condition highly relevant to geohazards and disasters in general has been changed due to GEO, i.e., the position of space agencies and governments on data access. SERVIR, which is contributing to disaster reduction, is also acknowledged as GEO achievement. Improved access to imagery with the land surface imaging constellation (CEOS) helps to overcome the problem of differences in images from satellite to satellite. After the recent devastating earthquake in China, many agencies started to give data freely, which was very helpful for response and recovery in China. However, in many other regions, there is little capacity to use the data. Therefore, he identified the need to develop tools and pointed out that there is value-added of GEO in this development of fully interoperable tools.

Jose Achache also mentioned that for Carbon, data sets are eagerly contributed, while getting data in the frame of the Supersite Initiative is far more difficult. He solicited the help of the GHCP in order to improve this situation. He scrolled through the GEO Work Plan and discussed the individual Disaster Tasks. Concerning DI-06-09 ("Use of Satellites for Risk Management"), he pointed out that this task was mainly related to the Disaster Charter. An important achievement would be the identification of a country for each region that would trigger the charter. He also mentioned that for Africa, ESA is providing funding for a contractor to identify the needs, which according to him is keeping the overall process in the Task too slow (ten times too slow).

Jose Achache also stated that we knew that the earthquake in Haiti would happen, and we also know that a similar earthquake is very likely to happen in the Istanbul region. Identifying that economists have been advising governments for a long time on much more uncertain knowledge base. He therefore proposed that the geohazards community maybe should publish maps of disaster-prone areas and start to advice

governments. GEO would be the framework for doing this, and the GHCP could have an important role here. He indicated a sense of urgency and encouraged the participants not to delay this any longer. In the discussion, several participants commented on this and supported Jose Achache's proposal to use the available information for specific advice to policy makers.

In the discussion, Sospeter Muhongo pointed out that there are many programs in Africa aimed at better information for policy and decision makers, but their impact is minimal. Ministers do meet to find solutions, but there is no or little impact after the meetings. He asked whether meetings of experts are needed before the meetings of ministers in order to inform the minister in their decision making. He also asked how we can best inform the decision makers and noted that in Africa, they often do not have even basic information.

Jose Achache commented that Africa is a special case in several aspects which could turn into an opportunity. The cross-cutting approach propagated by GEO and GEOSS could turn out to be very appropriate for Africa. He considered working with the World Bank as an option but remarked that the World Bank currently is focused more national and not so much regional. He mentioned that GEO is working on an approach to have the World Bank accept regional requests.

*Lengert, W.; ESA and the GHCP: Expectations and Interactions (pdf)*: In his presentation, Wolfgang Lengert reported on the Supersite Initiative, which was developed by several researcher together with ESA in response to the respective recommendation in the Frascati Declaration. Important milestones were the announcement of the initiative during the USEReST meeting in Naples, Italy, in November 2008, and the submission of a Cat1 proposal for the Supersites by Jose Achache in May 2009. This proposal was prepared by Falk Amelung, Miami, and is coordinated by a group of researchers under his lead. UNAVCO established a supersite web site at <http://supersites.unavco.org/main.php>.

Concerning the GHCP, Wolfgang Lengert wanted to the programmatic leadership for the Supersite Initiative. He asked the GHCP to define the strategy and develop the roadmap accordingly. Coordination and communication should also come from the GHCP and tasks should be elaborated that would meet the objectives of the contributors. The CEOS Disaster SBA could take leadership in the implementation. He also introduced the terminology in which supersite referred to a site for which all data would be available, while the term natural laboratory was defined as a site where some but not necessarily all data was freely available. He requested that GEO should support increased visibility and encourage intensive use of the supersites.

He also reported on an immediate action for Haiti, in which ESA offered a virtual archive under the condition that UNAVCO would agrees to support the administration. For this site, ESA was willing to provides all historical SAR data.

Steven Hosford ask for a clarification of the difference between Supersites and Natural Laboratory, and Wolfgang Lengert repeated that the difference was free access to complete versus not complete data, where complete means all InSAR, GPS and seismological data.

*Ultré-Guérard, P.; What could a Geohazards COP bring to coordinating access to geohazard data for users? A CNES perspective (pdf, presented by Steven Hosford):* CNES is the state-owned, French space agency which implements mission and projects in bilateral or multilateral cooperation, and which contributes significantly to CEOS. From a CNES perspective, the IGOS-P Geohazards Theme was a community building exercise which brought together diverse actors; had a focus on access to relevant data sets, and changed the mindset by considering all geohazards together, thus introducing a multi-hazards approach. Despite the fact that in 2008 all conditions were met, no joint action did actually emerge. Today, a number of individual activities are going on, including the Disaster Charter, the Supersite Initiative, NASA's Natural laboratories, Europe's GEMS, but no overarching coordination entity is in place. Therefore, international coordination is essential in order to improve the visibility of the on-going work. A unified project needs to emerge. Here, the GHCP could take a coordination role. The GHCP could also provide the Steering Committee while a scientific committee could provide advice. There is also a need for an international, open and transparent call for sites, which could be administrated by the GHCP. A number of specific actions were presented (see presentation). The proposal by CNES to the Charter to bring the Charter into CEOS as a Disasters Virtual Constellation, and a proposal to extend the use of the Charter to other phases of the Disaster management cycle (e.g., Prevention and Mitigation) are mentioned here.

Jose Achache expressed strong support for the proposals concerning the charter and the supersites, but he objected the proposal for organization with the GHCP providing a Steering Committee. In his opinion, no such organizational structure is needed.

**Tuesday, January 19, 2010**

**Session 1: Geohazards in the GEO and GEOSS Framework (continued).**

*Co-Chairs: Marsh, S. and Missotten, R.*

*Briand, P.; CSA and the GHCP: Expectations and Interactions (pdf):* Paul Briand introduced the Canadian Space Agency (CSA), which is a Canadian Government organization responsible to develop and implement the Canadian Space Program. In this program, Earth observations account for more than half of the budget. CSA has cooperation agreement with ESA. CSA has several missions of relevance for geohazards, including, for example, RADARSAT-1 and -2 and the RADARSTA Constellation. Several programs aim to increase the use of data, and CSA contributes to the Supersite Initiative and the Disaster Charter. CSA provides a framework of collaboration, and it supports a coordinated SAR effort, in which the engagement of the science community involved in geohazards is an important activity. Here the GHCP could take a leadership role. CSA also strengthen the work of the science community by supplying SAR resources and capabilities, and it contributes to GEOSS. CSA sees many benefits in these activities for all who are involved.

*Petiteville, I. and Séguin, G.; Disasters and the CEOS Implementation Plan (pdf, presented by Hosford, S.):* The Committee on Earth Observation Satellites (CEOS) exists since 1984 as a major forum for the coordination of international civil Earth observation satellite programs. CEOS has three primary objectives: (1) optimization of the benefits of space-borne Earth observations; (2) being a focal point for

international coordination of space-related Earth observation activities; (3) the exchange of policy and technical information in order to encourage complementarity and compatibility of observation and data exchange systems. As the "space arm" of GEO, CEOS leads or co-leads 16 GEO Work Plan Tasks, including two tasks in the Disaster SBA. There is also strong involvement of CEOS and CEOS support groups in GEO Committees. Many of the CEOS Agencies are actively involved in Disaster activities either directly or through CEOS. Example initiatives include the Charter, specific CEOS Actions such as the Flood Monitoring in Myanmar, the Caribbean, and in Africa, and several activities through so-called Virtual Constellations, such as the Volcanic Ash Alert System and the ocean surface topography constellation. CEOS has a DISASTER SBA Team, which has developed a roadmap that details CEOS activities related to disasters, including the contributions to the relevant GEO Work Plan Tasks.

**Session 4.1: Towards a Roadmap for the Geohazards Community of Practice: Part 1: Initial discussion of the Draft Roadmap.**

*Chair: Marsh, S.H.*

*Plag, H.-P., et al.; The Initial Draft Roadmap: Rationale, Objectives, Goals, Audience, Structure:* Hans-Peter Plag presented the initial draft of the GHCP Roadmap. The starting point for the development of the draft was the GEO Strategic Target for the Disaster SBA:

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**GEOSS STRATEGIC TARGET OF THE DISASTER SBA:**

Enable the global coordination of observing and information systems to support all phases of the risk management cycle associated with hazards (mitigation and preparedness, early warning, response, and recovery).

This will be achieved through:

- more timely dissemination of information from globally-coordinated systems for monitoring, predicting, risk assessment, early warning, mitigating, and responding to hazards at local, national, regional, and global levels;
- development of multi-hazard and/or end-to-end approaches, as appropriate to meet the needs for disaster risk reduction, preparedness and response in relevant hazard environments;
- supporting the implementation of the priorities for action identified in the Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters (HFA).

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The proposed Strategic Target for the GHCP was "*Support all phases of the risk management cycle through comprehensive information about geohazards, including their spatio-temporal characteristics, and through timely and comprehensive monitoring.*"

The main elements of the map consisted of five activities, namely (1) Science Developments; (2) Data access, mapping, assessments, and monitoring; (3) Timely warning and relief/rescue; (4) Capacity Building; and (5) Supporting the GEO Work Plan Tasks.

In the initial discussion of the draft, a number of critical comments requested a stronger connection between the roadmap and the risk management cycle. This resulted in a complete restructuring of the roadmap and a new proposal for the strategic target. The new structure of the map included initially three activities, namely (1) Mitigation and Preparedness; (2) Early Warning; (3) Response and Recovery.

Subsequently, several parts of Session 4 took place alternating with Session 2 and Session 3 parts. In these Session 4 parts, the three activities were discussed and developed in detail and an initial set of the sub-activities were agreed.

In the course of the discussion, a number of cross-cutting issues were identified, which were common to more or less all activities. These included:

- Observation system/sensors/ information system development.
- Capacity Building (CBC) and Outreach (all GEO Committees?).
- Science advances, inc. promotion of evidence based policy-making.
- Reaching/connecting scientists/research and/to end-users/operations.
- Resources - human and financial, for the network and its activities.
- IPR and data access issues.
- EO-In-situ integration and ground truthing.

Moreover, the need to interface with mandated advisory bodies and existing chains of command was emphasized. Resilience was identified as a cross-cutting issue throughout the risk management cycle: before, during and after.

#### **Session 2: Contributions of the Geohazards Community of Practice to GEO**

*Adams, B.; Global Earthquake Model - Opportunities for EO data? ([pdf](#)):* Beverley Adams, representing ImageCat, introduced the Global Earthquake Model ([GEM](#)). Based on a public-private cooperation, involving companies, countries, institutions and organizations, the first global, open source model for seismic risk assessment at a national and regional scale is developed. An aim is to achieve broad scientific participation and to serve as an independent standard for calculating and communicating earthquake risk worldwide. In a multi-faceted way, this is being conducted in three integrated modules: Hazard, Risk, and Socio-Economic Impacts. Earth observations are relevant for the three key aspects of Exposure (where Earth observations are needed for building inventory development and global exposure databases), Vulnerability (for post-event damage information, historic archive), and Socio-economic impacts (population estimation, and casualty estimation).

*Guerrieri, L.: The EEE Catalogue: A global catalogue of earthquake environmental effects ([pdf](#)):* The EEE catalogue is an activity under GEO Task DI-09-01 "Systematic Monitoring for Geohazards Risk Assessment". Earthquake Environmental Effects (EEEs) are any phenomena generated by a seismic event in the natural environment.

The activity develops a catalogue of these effects. The initial portal is available [here](#). Added value of the EEE catalogue include a standardized way of representing EEE, and the comparability of different effect from different times.

**Wednesday, January 20, 2010**

**Session 4.2: Towards a Roadmap for the Geohazards Community of Practice: Part 2: Discussion of the revised Draft Roadmap.**

*Chair: Marsh, S.H.*

The session started with a presentation of a revised draft roadmap. Based on the discussion of the previous day, the roadmap now include four activities, with Response and Recovery each being a separate activity.

There was considerable discussion concerning the wording of the Strategic Target. While some participants wanted the target to be more specific and realistically achievable, others argued for a more general and ambitious wording. After several iterations, the accepted wording for the Strategic Target was:

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#### STRATEGIC TARGET OF THE GHCP

By 2020 put in place all building blocks for comprehensive monitoring of geohazards and the provision of timely information on spatio-temporal characteristics, risks, and occurrence of geohazards, in support of all phases of the risk management cycle (mitigation and preparedness, early warning, response, and recovery), and as a basis for increased resilience and disaster reduction.

This will be achieved by developing a global network of very few carefully selected core sites. These core sites will provide focal points for a large geographical region, where all building blocks of a value chain from observations to end users can be linked together and applied to the phases of the risk management cycle relevant for this region. Thus, these core sites will demonstrate the concept, enable scientific studies and technological developments, provide for capacity building, and inform policy and decision making in the region.

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Based on the discussions on the first and second day, the following set of sub-activities was agreed:

- Activity 1 "Mitigation and Preparedness":

Sub-activities:

- o 1.1 Identifying the stakeholders (identification of the 'right' end users, data providers, value adders; gaps in GHCP membership, who should be in the GHCP?).
- o 1.2 Understanding geohazards and mitigation measures (identification of science and technology challenges, overview of adaptation and

mitigation approaches, inc. mapping, measuring, modelling and monitoring hazards).

- o 1.3 Informing policy and decision makers and society (provide information products about geohazards, inc. but not limited to mapping and assessment of (i) Hazard; (ii) Exposure; (iii) Vulnerability; and hence (iv) Risk).
- o 1.4 Creating awareness (deliver the 'right' information to the 'right' people and the public; ensure education; engage in public education).

Goals and objectives to be kept in mind in detailing the sub-activities:

- o The overarching goal is mitigation and disaster reduction.
- o Activities contribute to building resilience before hazard occurrence
- o A focus of the GHCP is on decision support and information of society
- Activity 2 "Early warning":

Sub-activities:

- o 2.1 Improving models and forecasts/predictions (foster/facilitate model developments and forecasting/prediction algorithms where needed).
- o 2.2 Monitoring and detecting hazards (identify areas to be monitored, understand the requirements, ensure the networks/infrastructure, identify indicators/precursors/thresholds, ...).
- o 2.3 Informing (early) warning systems (consider products for warning systems, link to warning authorities, consider synergies between observing and warning infrastructure, work with ADC on demonstration, e.g., hazard data delivery via GeoNetCast).
- o 2.4 Integrating geohazards into public environmental information systems (consider how information on geohazards can be integrated in public information provision on forecasts, c.f. weather forecasts; discuss role of GEO Portal for dissemination as it matures; clarify information and warning mandates, both at the GHCP level and promote this debate at GEO level).

Goals and Objectives to be kept in mind while detailing the sub-activities:

- o GHCP fosters connections between the data/product providers and the end users; and takes an end to end approach, whilst respecting existing mandates.
  - o The activities contribute to building resilience before and during an event.
  - o The goal is to inform and support decisions on different levels, including decisions made by the public and individuals, through appropriate and timely information; while issuing public warnings is outside the mandate of the GHCP and GEO.
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- Activity 3 "Response":

Sub-activities:

- o 3.1 Characterizing the event/Assessing the disaster (full characterization of the event, including type of event, magnitude, extent, mechanism, ...; damage assessment; secondary hazards).
- o 3.2 Providing an EO clearinghouse for major international disasters (including potential members of (science) response teams, useful EO infrastructure)

Goals and objectives to be kept in mind while detailing the sub-activities:

- o The GHCP can develop links and connections to the Charter.
  - o We should take an end-to-end and multi-hazard approach.
  - o The activities contribute to building resilience during and after events.
  - o The activities provide decision support and contribute to capacity building.
- Activity 4 "Recovery":

Sub-activities:

- o 4.1 Informing the Recovery Phase (assessing the lessons learned; assessing safety of areas, access, infrastructure; provision of revised hazard assessment; feedback to activities 1 and 2).

Goals and objectives to be kept in mind while detailing the sub-activities:

- o We should take an end-to-end and multi-hazard approach.
- o The activities contribute to building resilience after events.
- o The activities provide decision support and contribute to capacity building.

**Session 3.1: Perspectives of the Geohazards Community of Practice; Relevant programs and organizations.**

*Chair: Marsh, S. H..*

*Tait, S.; European Volcano Observatory Space Services (EVOSS) ([pdf](#)):* EVOSS is a European Project funded by the EC, which is focused on higher end of volcano dynamics and on a few selected locations with at least one eruption phase or phase of unrest in the last 20 years. It builds on results of a previous project. The goal is to develop the space-based observation services for the test regions, including sustainable business models.

In the discussion, Stuart Marsh suggested that several of the sites presented could qualify as Supersites.

*Galle, B.; NOVAC A Global Network for Observation of Volcanic Gas Emissions and studies of Atmospheric Change ([pdf](#)):* Bo Galle reported on NOVAC, which is based on the EC-funded project DORSIVA. In NOVAC, SO<sub>2</sub> instruments were installed in

53 sites on about 20 volcanoes. These stations report every 5 minutes in real time, many mirrored to the data centre in Sweden. Main applications of the observations include local geophysical research and risk assessment, improved global gas assessments, validation of satellite measurements, and studies of correlation of gas emission in time and space. The Project is ending in 2010, and there is a need to develop a perspective for the continuation of the network. Currently, no funding available to continue. In the discussion, it was proposed to contact the EC representative to GEO in order to discuss whether the next FP call could include funding opportunities for this network.

*Moretti, S.; Landslide monitoring and mapping in the frame of ICL ([pdf](#)):* Sandro Moretti informed that the International Consortium on Landslides (ICL), which was created at the Kyoto Symposium in January 2002, is an international non-governmental and non-profit scientific organization supported by a number of UN agencies and national governments. The objectives are to promote landslide research, integrate geosciences and technology into the appropriate cultural and social contexts, and provide an organization for international expertise, and promote an global, multi-disciplinary program on landslides. The central activity is the International Programme on Landslides (IPL).

The activities reported are focused on Italy, where landslides cause a damage of about 1 to 2 Billion Euro per year and about 60 victims on average each year. In Italy, focus is on highlighting the contribution of InSAR and the importance of user feedback. Sandro Moretti used many examples to illustrate the methodology, data needs and user interactions. In the process from the definition/validation of the products to the definition/validation of the service, the User comes in first as a 'product co-designer' and impacts site selection requirements, and then as a 'Service observer, tester and validator'. An important output is a comprehensive landslide archive.

*Polli, D. and Dell'Acqua, F.; Building Vulnerability Assessment ([pdf](#)):* In the presentation, Diego Polli reported on activities at the EU Centre in Pavia related to GEO Task DI-09-01. The EU Centre is a multi-University cooperation, and it will host the secretariat of the GEM. This centre proposed to GEO to address seismic vulnerability mapping based on Earth Observation. This proposal, which was endorsed by UN-SPIDER, was included in the WP 2009-2011 as part of the subtask DI-09-01a, "*Vulnerability and Risk Mapping*." The framework for the risk assessment results from a combination of methods, addresses different aspects of vulnerability, utilizes Earth observations and is initially focused on urban areas. Diego Polli explained the methodology and showed examples of the output of a vulnerability analysis. The approach taken is from an engineering point of view. The results for the test case Mesina were presented.

In the discussion, Hans-Peter Plag proposed to use the earthquake in Haiti for calibration and inter-comparison of different software packages. This proposal was supported by Moretti. Robert Missotten remarked that there are networks in Europe for vulnerability assessments, and similar networks are in the Americas and some in Asia. However, they are not interconnected, while agencies get similar proposals. He emphasized the need for better interconnections.

**Session 3.2: Perspectives of the Geohazards Community of Practice; The Supersite Initiative**

*Co-Chairs: Lengert, W.*

Wolfgang Lengert summarized the current state of the Supersite Initiative. A web site has been established by UNAVCO at <http://supersites.unavco.com>. This web site gives access to data from a number of supersites. After the earthquake in Haiti, this area has also been included as a supersite. Wolfgang Lengert emphasized that unfortunately not all data for the supersites was already available. He hoped that in the future more space-borne (in particular, InSAR) data would become available and that seismic data would also be made available. There was considerable discussion to what extent seismic data was site-specific.

**Thursday, January 22, 2010**

**Session 4.4: Towards a Roadmap for the Geohazards Community of Practice: The Semi-Final Draft.**

*Chairs: Missotten, R.*

*Plag, H.-P.; Status of the Roadmap and further procedure (pdf):* The draft final version of the roadmap was presented. In the subsequent discussion, it was emphasized by several participants that information about geohazards need to be integrated in the environmental information available to the public, similar to information on weather, severe weather situations, storms, hurricanes. However, the mandated chains for early warning would have to be respected.

Wolfgang Lengert expressed concerns about potentially violating the mandate of organizations. With respect to the Supersites, he pointed out that many data were not freely available.

In the discussion, questions related to the integration of the GHCP into the GEO Framework were raised. It was concluded that the GHCP would have to link to all four committees. Moreover, the GHCP should establish strong and active links to the relevant Work Plan Task teams.

**Session 4.5: Towards a Roadmap for the Geohazards Community of Practice: Steps towards implementation.**

*Chair: Demicheli, L.*

*Reeves, H.; Geohazards and risks: The U.K. perspective and FP7 (pdf, FP7 Call pdf):* Helen Reeves stated that damage due to geohazards in the U.K. summed up to 4.5 billion Euro since 1970, and that the annual damage was rising. BGS classifies geohazards into primary and secondary hazards, with the primary being more of regional nature. Primary geohazards include earthquakes and flooding, and secondary hazards include shallow geohazards such as landslides, collapsible and compressible soil, swell-shrink clays, dissolution, running sands, etc. BGS has made considerable effort to map the hazards for the whole country. Considerations are on-going for a European Risk Model, which would be a seamless continuous model combining hazard and vulnerability accessible to all stakeholders within the European Union. Questions include at what spatial scale such a model should be developed (1 to 1 million or smaller), what degree of complexity should be the goal (number of

elements, hazards, forcing factors), and whether it should cover natural and anthropogenic hazards. More information is available at a BGS [Land Use and Development](#) web page.

Helen Reeves also mentioned that FP7 has a number of calls relevant to the activities in the roadmap. She provided the information about the relevant calls. For "Environment Sub-activity 6.1.3 Natural Hazards" she mentioned

- Science for better forecasting, prediction and early warning
- Climate-related disaster risks reduction
- Vulnerable communities, capacity building and resilience

and for "Environment Sub-activity 6.5.1 Dissemination & horizontal activities"

- Uptake of research results through knowledge platforms with international collaboration partners

as potentially relevant for the GHCP.

*Petit, C.; COST and the Earth System Sciences and Environmental Management Domain: an opportunity for the GHCP? (pdf):* Carine Petit introduced the *European COoperation in Science and Technology* (COST) program, which was the first and is today the widest European network for the coordination of nationally funded research activities. Its goal is to strengthen Europe in scientific and technical research by means of supporting cooperation and interaction between European researchers. The basis for COST is an intergovernmental framework for cooperation agreed following a Ministerial Conference in 1971. She emphasized that COST does not fund research, but provides support for networking activities.

COST Actions provide coordination for European research and these Actions are open for participation of international organizations based in Europe. There is a focus on young researchers. COST Actions need to include researchers from at least five member countries. She provided an overview of the statistics which demonstrated the importance and impact of COST. She also explained the COST structure and introduced the nine COST scientific and technical domains, of which *Earth System Science & Environmental Management* (ESSEM) is the one most relevant for the GHCP. The ESSEM Domain includes the topical area of "Hazards forecasting and detection."

Carine Petit showed a number of "success stories", including the European Centre for Medium-Range Weather Forecast (ECMWF), which was established as the result of a COST Action, and she illustrated the nature of typical COST Actions by showing a number of examples of on-going actions.

COST accepts about 60 new schemes per year. Proposals are collected in an open call scheme, with two collections of pre-proposals per year. For 2010, the dates for pre-proposals are 26 March and 24 September 2010. Proposals are evaluated in a 3-stage process, which results in a short list recommended for funding. The steps are:

- Domain Committee assessment of pre-proposals (pre-proposals have 4 to 5 pages; success rate is 10-20%);
- Peer-reviewed evaluation of full proposals (full proposals have 20-30 pages; success rate is 50%);
- Domain Committee hearings.

Successful Actions can expect to start 9-12 months after the submission of the pre-proposals.

After the presentation, there was considerable discussion about stakeholders of the GHCP, potential funding sources, and actions. It was agreed to invite comments from all workshop participants on the draft roadmap as soon as a complete draft was made available. After this first iteration, the roadmap would be opened for comments from the broader GEO community. After this second iteration, the roadmap would be presented to the GEO Committees.

Wrapping up and Farewell: Stuart Marsh thanked the participants for the active contributions during the workshop and stated that the resulting roadmap provided a valuable basis for the future work of the GHCP. He also thanked Robert Missotten for the support of the workshop and for the local organization in Paris. In the afternoon, a small group of Workshop participants met with the COST officer, to begin to scope out a proposal for the funding of the GHCP Roadmap's implementation through a dedicated COST action.

## **POST-WORKSHOP ACTIVITIES**

Subsequently to the Workshop, effort was expended on the creation of this report, the Roadmap and associated presentations and expanding the GHCP website. In addition, it was agreed at the workshop that the GHCP should prepare a review of the GEO Disasters Societal Benefit Area (SBA), which contains GEO's hazard-related Tasks. This will form input for the GEO Science and Technology Committee meeting to be held in Ankara, Turkey, from 24-26<sup>th</sup> March 2010, at which this SBA and the GHCP will be reviewed. This review preparation is an additional deliverable of this contract.

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*26<sup>th</sup> February 2010*