

A GEOHAZARDS THEME FOR THE IGOS PARTNERSHIP

John. L. Van GENDEREN
ITC
P.O. BOX 6, 7500 AA Enschede
Tel: (31)-53-4874 254 Fax: (31)-53-4874466
E-mail: genderen@itc.nl
THE NETHERLANDS

Diatou COULIBALY
ITC
P.O. BOX 6, 7500 AA Enschede
Tel: (31)-53 4874 254 Fax: (31)-53 4874466
E-mail: [coulibaly@itc](mailto:coulibaly@itc.nl).
THE NETHERLANDS

KEY WORDS: Geohazards, IGOS, global observing system, data integration

ABSTRACT

IGOS, the Integrated Global Observing Strategy, groups many international organizations such as CEOS, ICSU, UN agencies (e. g. UNEP, UNESCO, FAO, WMO) as well as many other international remote sensing programmes, such as GCOS, GOOS, GTOS, IGBP, WCRP, etc.

In order to focus its activities, IGOS decided on the concept of “themes”. Some of the “themes” being developed by other groups include oceans and carbon cycle. This paper will describe the status of the IGOS Geohazards Theme, which looks at the role of earth observation, in-situ measurements, models and information systems to produce an integrated approach to the study of geological hazards, with particular emphasis on earthquakes, volcanoes, landslides and land subsidence. The paper will also describe the objectives of the Geohazards Theme, the procedure used to produce the Geohazards Theme Proposal, and explain the international cooperation that is occurring to produce it by mid 2002.

The proposal is being prepared by an IGOS Ad Hoc Working Group consisting of international remote sensing and earth sciences experts and end users agencies from around the world. The structure of this IGOS Geohazards Theme Proposal is described in this paper, which also gives an up to date account on the status of this IGOS initiative.

INTRODUCTION

The **Integrated Global Observing Strategy Partnership (IGOS-P)** started in 1999 to establish a thematic approach to the implementation of IGOS. Figure 1 provides a list of the IGOS Partnership members. The span of nations, research organizations, and international programmes with vital interests and capabilities in Earth system sciences are joining forces through the IGOS. This later provides both a strategic framework and a planning process to bring together remotely sensed and in-situ observations, from both research and operational programs, and combines these with the necessary research, computations and modeling. IGOS seeks to enable prediction and assessment of environmental changes and their consequences on the agriculture, industrial and economic development around the world and, ultimately, to understand, observe and predict the Earth system behavior (IGOS, 2001^a).

The next five years must include development of institutional structures committed (1) to managing the total data flow (in-situ as well as satellite); (2) managing the production, distribution and quality assessment of relevant data products; and (3) working with end-users to ensure that the evolving system is responsive to their needs. Observation protocols evolve with time therefore stated observational requirements will need to be reviewed in the future. The four geological hazards included under this IGOS Geohazards Themes are: earthquakes, volcanoes, landslides and land subsidence.

OBJECTIVES

The goal of this IGOS-P Geohazards Theme Proposal is to investigate and develop integrated technologies that will greatly enhance the operational capabilities of end users agencies at national, regional, local government levels for disaster management and decision-making using multiple earth observation systems, in situ-measurements, spatio-temporal databases, geological / geophysical models, and geospatial information analysis.

The specific objectives of this Geohazards Theme are:

- To investigate current status, present and future end users needs and potential of national regional and local government operations related to the geospatial supported disaster management and decision-making.
- To develop a strategy and integrated technologies for utilizing existing, planned, and future geospatial information.
- To develop and integrate earth observation data, in -situ spatial data organization, spatio-temporal data modeling and analysis a GIS for a global, integrated geohazards observing system.
- To make use of crosscutting EO technologies for the various geohazards covered by this theme, such as differential InSAR, thermal IR. etc.



Figure 1: The IGOS Partnership members.

CURRENT STATUS AND PLANNED ACTIVITIES

On 2-3 May, the International Council of Science (ICSU) and the Division of Earth Sciences of UNESCO hosted an IGOS-P Geohazards Theme Meeting in Paris (IGOS 2001 b) to ascertain the interest and support for this initiative. As a result of this meeting, an IGOS Geohazards Theme Ad Hoc Working Group was established, under the chairmanship of Professor van Genderen of ITC, with some 15 experts and end user agencies from a dozen organizations around the world.

This IGOS Geohazards Theme Ad Hoc Working Group was charged with the responsibility of producing the Geohazards Theme Proposal for presentation to the IGOS Plenary Meeting in June 2002.

At time of going to press this paper, the first IGOS Ad Hoc Working Group Meeting has just taken place (IGOS 2001 c). Figure 2 gives a schematic of the overall concept, whilst Figure 3 provides a more detailed example for earthquake hazards. The objective is to produce a much more detailed and integrated methodology for all the four geohazards included in this IGOS Theme, particularly stressing the operational aspects and end users requirements.

DISCUSSION

At present the IGOS Geohazards Theme Ad Hoc Working Group is in the process of involving still more end user agencies' inputs to ensure the relevance of the final Geohazards Theme Proposal. Whilst there is plenty of expertise on the earth observation / remote sensing aspect, more experts and organizations are being sought for the in-situ measurement systems (e.g. GPS, other seismic, geophysical, thermal networks), for modeling the crustal deformations and processes involved in the four geohazards being considered, for GIS aspects (historical databases, spatio-temporal aspects, etc.), and above all for integration aspects of these various technologies into one Integrated Global Geohazards Observing Strategy. At present there are several members from Asia in the Ad Hoc Working Group, from China and Japan. The authors are using this opportunity to invite participants of this Asian Remote Sensing Conference to contribute to the work of this IGOS Geohazards Theme in the following ways:

- Propose suitable end users agencies in the field of earthquakes, volcanoes, landslides or land subsidence, which could be invited to join in the theme preparation or subsequent implementation of this programme.
- Participate in the IGOS Geohazards Theme International Scientific workshop, to be held 21-23 January 2002 in the ESA-ESRIN facility in Frascati, Italy.
- Volunteer to act as a "peer reviewer" of the various draft proposals, or individual aspects of it such as earth observation, GIS modeling, in-situ measurements networks, data integration, etc.

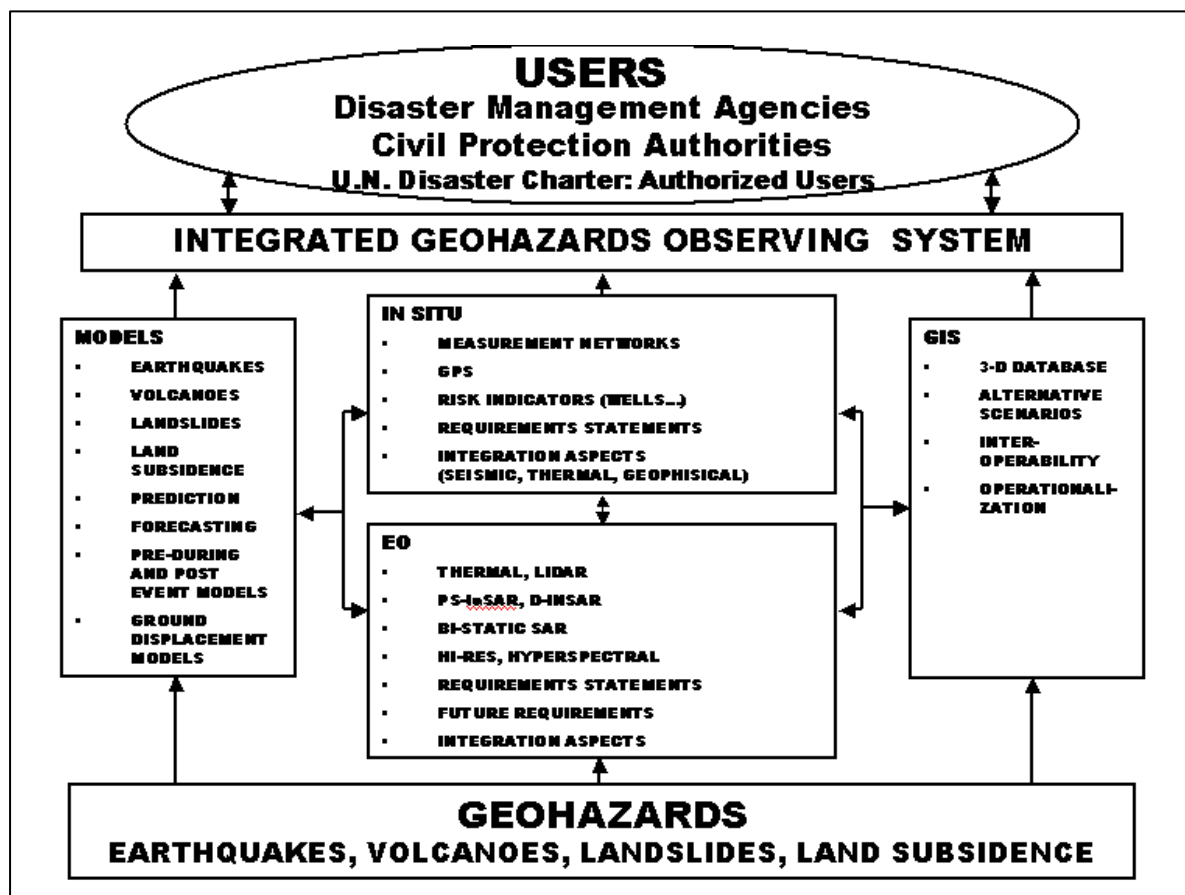


Figure 2: The IGOS-P Geohazards “integrated” concept.

ACKNOWLEDGEMENT

The authors gratefully acknowledge the support of the IGOS Geohazards Theme Team Members, and specially of the Ad Hoc Working Group Members. The financial support of ICSU, UNESCO, ESA and ITC is also greatly appreciated.

FOR FURTHER INFORMATION

- 1- A theme concept for IGOS: <http://ioc.unesco.org/igosthem.htm>
- 2- Professor John van Genderen, Chairman of the Ad Hoc Working Group: ganderen@itc.nl

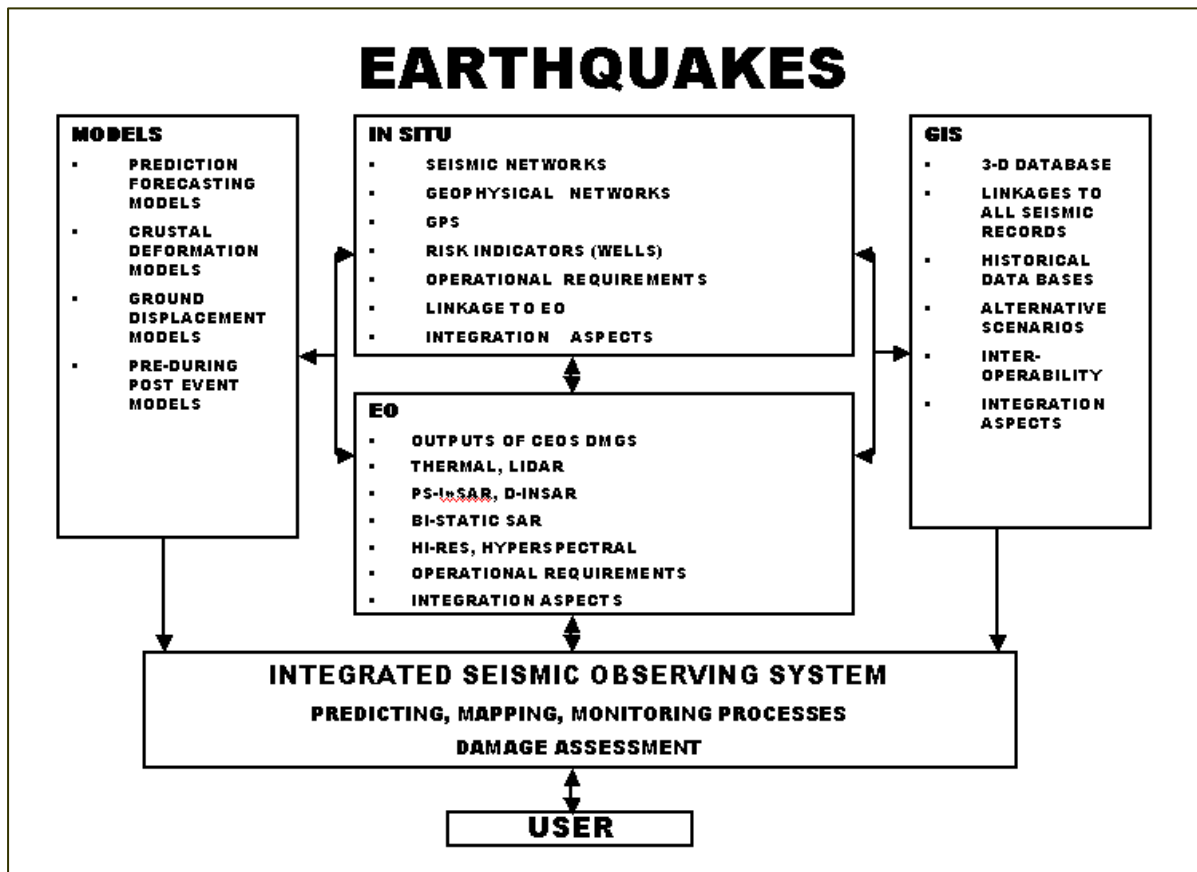


Figure 3: Integrated approach for Earthquake Hazards.

REFERENCES

- 1- IGOS 2001a. An Ocean Theme for the IGOS Partnership, NASA Publication NP-2001-01-261-HQ, Washington D.C., USA.
- 2- IGOS 2001b. IGOS Geohazards Theme. Minutes of IGOS Geohazards Theme Team Meeting, UNESCO Paris, France.
- 3- IGOS 2001c. IGOS Geohazards Theme Proposal. Minutes of First Ad Hoc Working Group Meeting, UNESCO Paris, France.