

CEOS Agencies' Support to Disaster Risk Management (DRM)

Background & Objectives

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ESA Earth Observation Programmes*

CEOS Disaster SBA meeting, Arlington, 13 Feb. 2012



Disaster definitions

What is a disaster ?

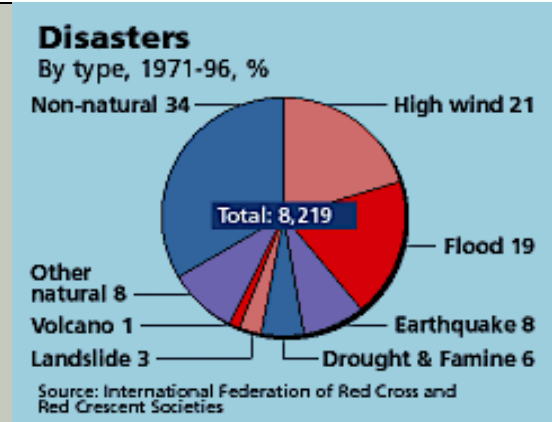
either a natural or man-made hazard resulting in significant physical damage or destruction & loss of life.



Examples of natural disasters:

- geo-hazard such as earthquakes, volcanic eruptions, tsunamis, landslides
- climatic/hydrometeorological origin such as drought, flood, cyclone, wildfires.

Examples of Man-made hazards:
nuclear incidents, fires, oil spills



EO capabilities & Risk Management cycle

- Emergency Response,
 - Rapid Crisis Mapping & Damage Assessment,
 - Situation Mapping.

- Prevention, Preparedness, Recovery, Reconstruction
 - Detailed Damage Mapping,
 - Risks Assessment.
 (Floods, Fires, Geo-Hazards)

- All phases
 - Reference Mapping,
 - Digital Elevation and Digital Terrain models,
 - LU/LC cover Mapping,
 - Asset Mapping.



EO techniques (in red) both in response phases and other phases of risk management (such as prevention)

Increasing Politicians' interest in DRM

DRM gaining more political importance for economic, political and geopolitical reasons

- **2010, 385 natural disasters:** 297 000 people killed worldwide, 217.0 million others affected, \$ 123.9 billion of economic damages.
- **Increase of economic impacts:** growing urbanization (x2 in 2050) + increasing number of extreme events (x3 in 2100).
- Politicians very sensitive to consequences of disasters ; want to show leadership when a crisis strikes.
- Humanitarian aid can be motivated by governments' will to increase their influence in devastated regions.



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Bill Clinton in Haiti



© Skynews

Bush - Katrina



© Deutsche Welle

Schröder – Flood 2002



© United Nations

Aid from Jordan - Haiti

Snow over Rome



Growing international engagement (financial, programmatic, ..) by international organizations e.g. World Bank, UN agencies, EC, G8,..

- **World Bank:** Natural disaster assistance : about 10% of total WB commitments between 1984 and 2005. Since 1980, more than 500 operations (US\$40 billion).
- **UN International Strategy for Disaster Risk Reduction** (UNISDR) created in 2000.
- **WMO Disaster Risk Reduction** started in 2003 (one of 4 GFCS' priorities)
- **European Commission:** 2007: disaster prevention in Lisbon Treaty; 2010: development of integrated approach to disaster management addressing response, preparedness and prevention activities; 2014-2020 €455 million-budget proposed for Civil protection and future European Emergency Response Capacity



© Evan Schneider/AFP/Getty Images

Ban Ki-Moon - Floods in Pakistan (2010)



Humanitarian aid from EC to Cambodian flood victims (2011)

Increasing Politicians' interest in DRM

In last 5 years, increasing political attention on preparedness & mitigation while maintaining past level of efforts on response & reconstruction

Disaster risk considerations in land-use planning and building may be 4 times less expensive than rebuilding or repairing infrastructure damages . **Mortality can be reduced by 40 %.**

World Bank: **return on investments in disaster prevention is between 400% and 700%**

Strong political presence at major recent events related to DRM: growing interest by Politicians

e.g. **Hyogo Framework for Action 2005-2015** (2005), **Global Platform for Disaster Risk Reduction** (conferences in 2007, June 2009, May 2011)

DRM addressed in major 2012 events with strong political presence

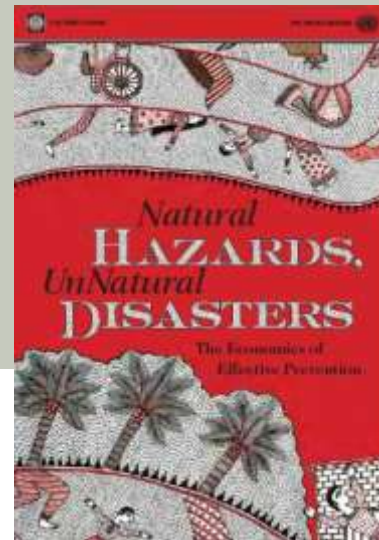
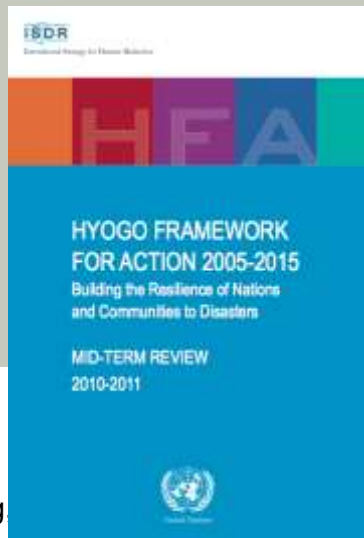
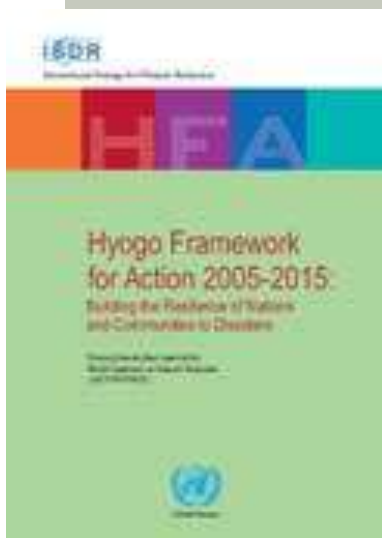
e.g. **Planet Under Pressure; Rio+20 Summit**



An Opportunity for Space Agencies

Growing political interest in DRM: might be an opportunity (and obligation ?) for space agencies to play a major role in near future

- Recent major international conferences, publications and declarations from decision-makers explicitly refer to the necessity to increase the means of observations including from satellites.
- Space agencies' support to post-crisis response can still be improved (e.g. International Charter), but space agencies should be ready to respond to the current increasing political pressure to invest more in preparedness and prevention phases.



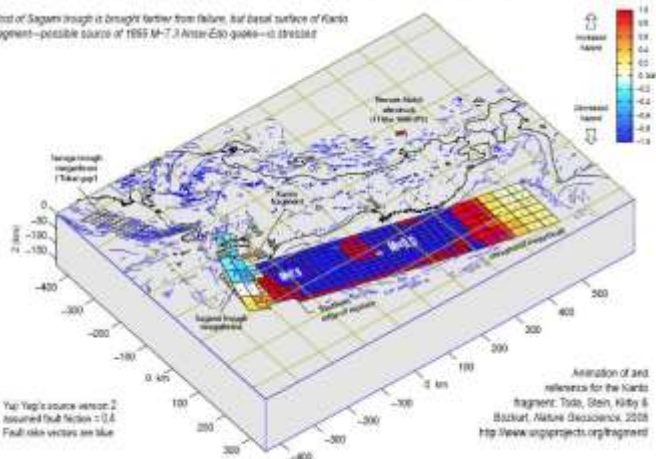
World Bank 2010 report: Recommendations to governments for better spending the funds allocated to DRM.

Many Stakeholders

- **National governments, Local authorities, Civil Protections Agencies** (field teams and decision makers)
- **The International Humanitarian community**
 - UN aid organisations (e.g. UN OCHA) and Red Cross/Red Crescent & NGOs
- **International Development Organisations**
 - World Bank, World Health Org., UN International Strategy for Disaster Reduction (ISDR), etc

Coulomb stress imparted by the M=9.0 Off-Tokoku rupture and its M=7.9 aftershock to Japan Trench, Sagami Trough and Kurile Fragment

Most of Sagami trough is brought farther from failure, but basal surface of Kurile Fragment—possible source of 1955 M=7.7 Anzu-Eso quake—is stressed



Risa Stein & Volker Sevilgen (USGS) and Shiro Toda (DPRI, Kyoto Univ.) 16 Mar 2011 4:15 PM PDT

- **GEO & CEOS**
- **Science community**
- **National agencies incl. Space agencies**
- **Mass media**

Space Agencies Contribution to Risk Management

Several initiatives involving space agencies contribute to disaster management in GEO framework (see next slide)

Multi-lateral agreements outside CEOS with various forms of cooperation:

- International Charter Space & Major Disasters (15 members)
- Sentinel Asia (Asia Pacific region)
- SERVIR (NASA,..)
- GMES Emergency Management Services (SAFER, etc)
- Preparedness through DLR (Tsunamis), Astrium/Meteo Fr (flash flood)



Other international initiatives with significant CEOS involvement (e.g. via CEOS Disaster SBA team, WGs, VCs, SEO)

- Volcanic ash monitoring,
- GEO GeoHazards Supersites
- Regional flood prediction & monitoring over Caribbean and over Namibia

CEOS strong support to GEO GeoHazards Community of Practice (previous IGOS GeoHazards group)

One of 9 GEO Societal Benefit Areas ...

Implemented through (DI-01, GEO Workplan 2012-15): focus on four main areas -

- Support to operational systems
- Enable and inform risk and vulnerability analyses
- Conduct regional end-end pilots
- Conduct gap analyses to identify missing data, system and capacity gaps



Disaster Charter Activations since Jan. 2011

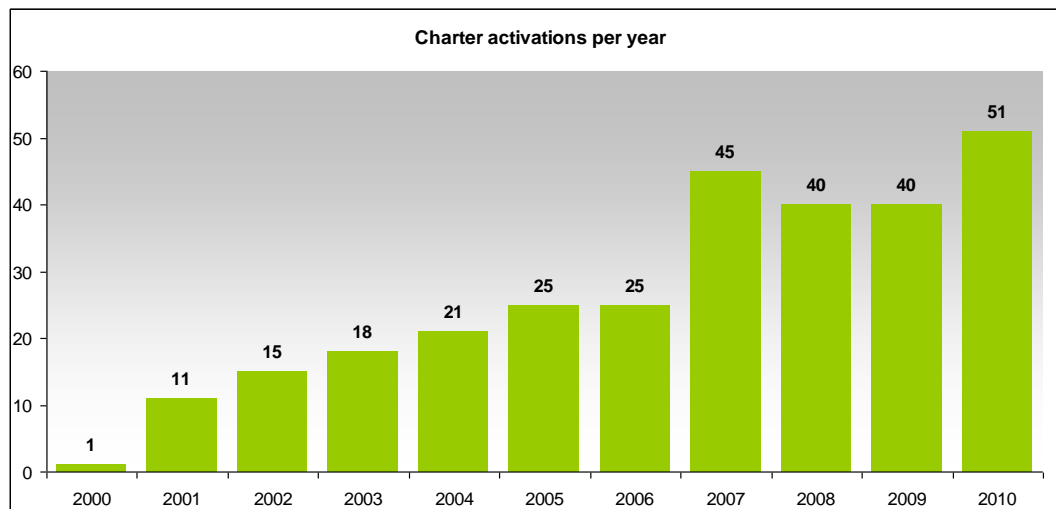
Over 11 years, 320+ activations in 100+ countries

More than 30 satellites from space agencies and commercial providers provide data.

Satellite agencies members of CEOS

Covers immediate disaster response.

Charter activations per year 2000-2010



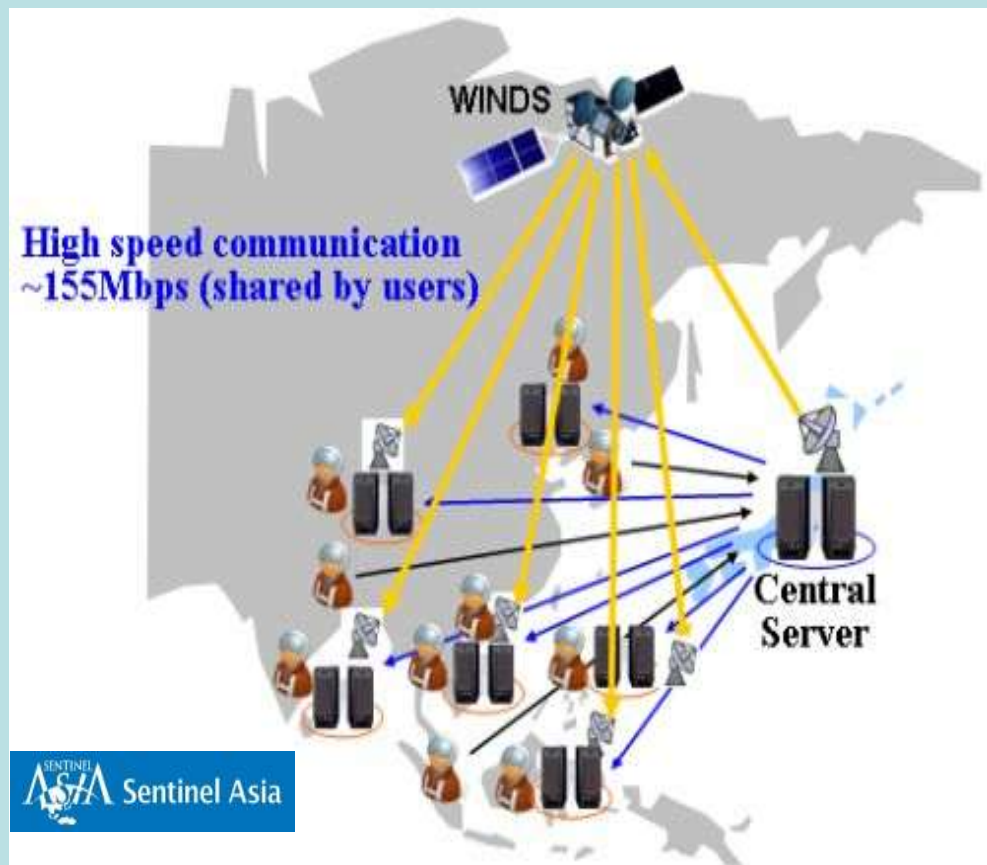
Volcanic Ash Monitoring

(incl. CEOS Atmos. Composition Constellation)

The US (NASA, USGS, and NOAA) and ESA (PROMOTE) support national VAACs (Volcanic Ash Advisory Center) by providing alerts based on satellite data



Sentinel Asia



Sentinel Asia (Disaster management in Asia-Pacific region) (67 organizations from 24 countries/regions and 11 international organizations). JAXA, ISRO, GISTDA, KARI and others

Towards a More Effective CEOS Contribution ...

- CEOS Disaster SBA team, responding to GEO tasks (e.g. *Supersites*) could improve linkage to other disaster-related initiatives run outside CEOS framework (e.g. *Charter, Sentinel Asia, GMES SAFER, SERVIR, etc...*)
- Investigate a more integrated approach bringing together all these initiatives, or at least improving communication between them
- Identify and address any remaining lacunae in the potential of Earth observation to contribute.
- Raising and expanding CEOS support to Disaster Risk Management with the creation of an *Ad hoc Forum on Disaster Management with following objectives:*
 - Proper integration / linkage to other non-CEOS initiatives. Increased synergy and cooperation. Optimize use of resources.
 - Exploiting at the best the competences of the various CEOS groups (WGs, VCs, SEO, ...)
 - Raising the awareness of space agencies capabilities in support to disaster risk management towards, decision makers, media ...
 - **Overall increase in support to Disaster Risk Management through CEOS agencies**

Potential Actions ...

Ad hoc Forum to consider future actions with the aim of:

- **Ensuring coherence across all disaster related actions**
- **Enhancing the use of EO data from space for various DRM phases**
 - Multi-risk approaches for disaster risk management with emphasis on the mitigation and preparedness of GeoHazards.
 - Response phase following “Charter period” (crisis + 10 days)
 - Possible focus on specific types of disaster and/or on selected geographical sites e.g. developing countries.
 - Strengthening international, national and regional coordination efforts building on already existing cooperation mechanisms, initiatives and projects.
 - Improving access by decision-makers to information related to environmental risk and vulnerability
 - Strengthen relationship with scientific institutions and communities
- **Better use of existing CEOS assets (Working Groups, Virtual Constellations, ..) for well defined actions such as:**
 - Perform assessment (incl. gap analysis) of CEOS agencies resources and of CEOS capacity to ensure the sustained provision of data to end-users
 - Improve the access to EO data and information by end-users to foster the use of EO satellite data
 - Improve delivery of services for disaster management from space agencies
 - Support capacity building activities

2011 CEOS Plenary Outcomes

Presentation by ESA proposing an ad'hoc forum among CEOS Agencies to consider future DRM actions

ESA's proposal aiming at delivering greater benefits from CEOS agencies to DRM communities through a more effective CEOS contribution.

- Improve awareness and communication between existing on-going efforts
- Assessment of gaps, overlaps and consideration of balance of efforts.
- **Not a new CEOS activity** e.g.
 - *a CEOS Disaster Management Task Force focused on disaster activities for 3 years during the 1990's;*
 - *current CEOS Disaster SBA team coordinates CEOS support to GEO disaster tasks.*

Plenary decision:

- Topic to be further studied by interested space agencies
- Report to be prepared for 2012 CEOS Plenary. Report content: on-going actions, findings and recommendations incl. any further initiative by CEOS.

Meeting Objectives

Presentation of major relevant activities by each agency

Identification possible scope for enlarged action.

Definition of follow-on necessary steps to prepare the Report for 2012 CEOS Plenary

- Intermediate report versions (content, dates ?)
- Meetings (objectives, dates ?)

Creation of Ad'hoc Team implementing those steps

- Membership, responsibilities (who does what ?)

Some issues raised regularly:

- Several areas in (*DRM phases, types of disaster*) not covered by space agencies
- Currently, more resources & efforts dedicated to *Response phase* than to other DRM phases
- Difficulty to access some historical data (e.g. Charter) for other purposes ; data access limitations due to restrictions imposed by licenses and/or costs.
- Data Sharing between countries not sufficiently developed
- Data provision or further e.g. value-added services ?/..

Some issues raised regularly:

- Insufficient linkage between space agencies and other major international organizations & donors involved in DRM
- Users' needs not always well formulated or unknown by space agencies
- Difficulty to define well coordinated cross-agencies actions (e.g. BRMs) to better respond to Users needs.
- Support to DRM by each individual agency is constrained by its own interests e.g. types of disaster, geographical area, ..
- Capacity Building & Knowledge Transfer to be improved

Follow-on Steps for 2012

1. **Inform CEOS about outcomes of this meeting** (*MoM Feb. 22 and oral report at CEOS SEC telecon (Mar. 1) , summary report to SIT (Mar 27-28)*)
2. **Prepare Table of Content of the Report and Tables Templates** (*Feb. 29*)
3. **Assign tasks to current Team members** (*Mar. 2 – following CEOS SEC telecon*). **Additional members are welcome to join later.**
4. **Prepare draft information for future inclusion in Report** (*2nd CEOS Disaster meeting – Apr. 23-24 AM, 2012*)
 1. Identify current & future major stakeholders and DRM initiatives where EO satellite data can contribute
 2. Summarize major DRM-related activities undertaken by various CEOS space agencies
 3. Identify the most effective partnership with the DRM community (first by each Agency)
 4. Define new areas where enlarged action by CEOS Agencies can have significant impacts

Follow-on Steps for 2012 (*cont'*)

- 5. Prepare Report with findings and recommendations for CEOS**
 - 1st issue at SIT Workshop (*Sep. 2012*)
 - Final issue at CEOS Plenary (*Oct. 2012*)
- 6. Presentation of Report and discussions on recommendations at CEOS Plenary (*Oct. 2012*)**
- 7. Telecons every 3 weeks, 1st one early March.**

Ad'hoc Team Composition

Members from Space Agencies only (at this stage)

- Meeting participants (TBC)
- Open to other Space Agencies to join the team

Team Coordination

- ESA is willing to assume that role with additional contractual support (Chair Ivan Petiteville)
- Coordination includes:
 - overall management for production of report,
 - interface with rest of CEOS e.g. CEOS SEC,
 - link to CEOS SBA Disaster Team (CSA chair)



18 Two young boys look at parts of the city previously devastated by the 2004 Boxing Day earthquake and tsunami on December 23, 2004 in Banda Aceh, Indonesia. (Ulet Ifansasti/Getty Images) #