



Committee on Earth Observation Satellites

Global Partnership on Space Technology Applications for Disaster Risk Reduction (GP-STAR)

Stéphane Chalifoux *et al.*, CSA,
Chair of CEOS WG on Disasters
Expert Meeting on GP-STAR
Bonn, Germany
1st – 2nd December 2016





- Committee on Earth Observation Satellites
- CEOS was established in September, 1984
- Original function of CEOS was to coordinate and harmonize Earth observations to make it easier for the user community to access and use data.
- [CEOS Agencies](#) communicate, collaborate, and exchange information on Earth observation activities, spurring useful partnerships (GEO, GEOSS, IGOS)
- CEOS represents the Space community within GEO



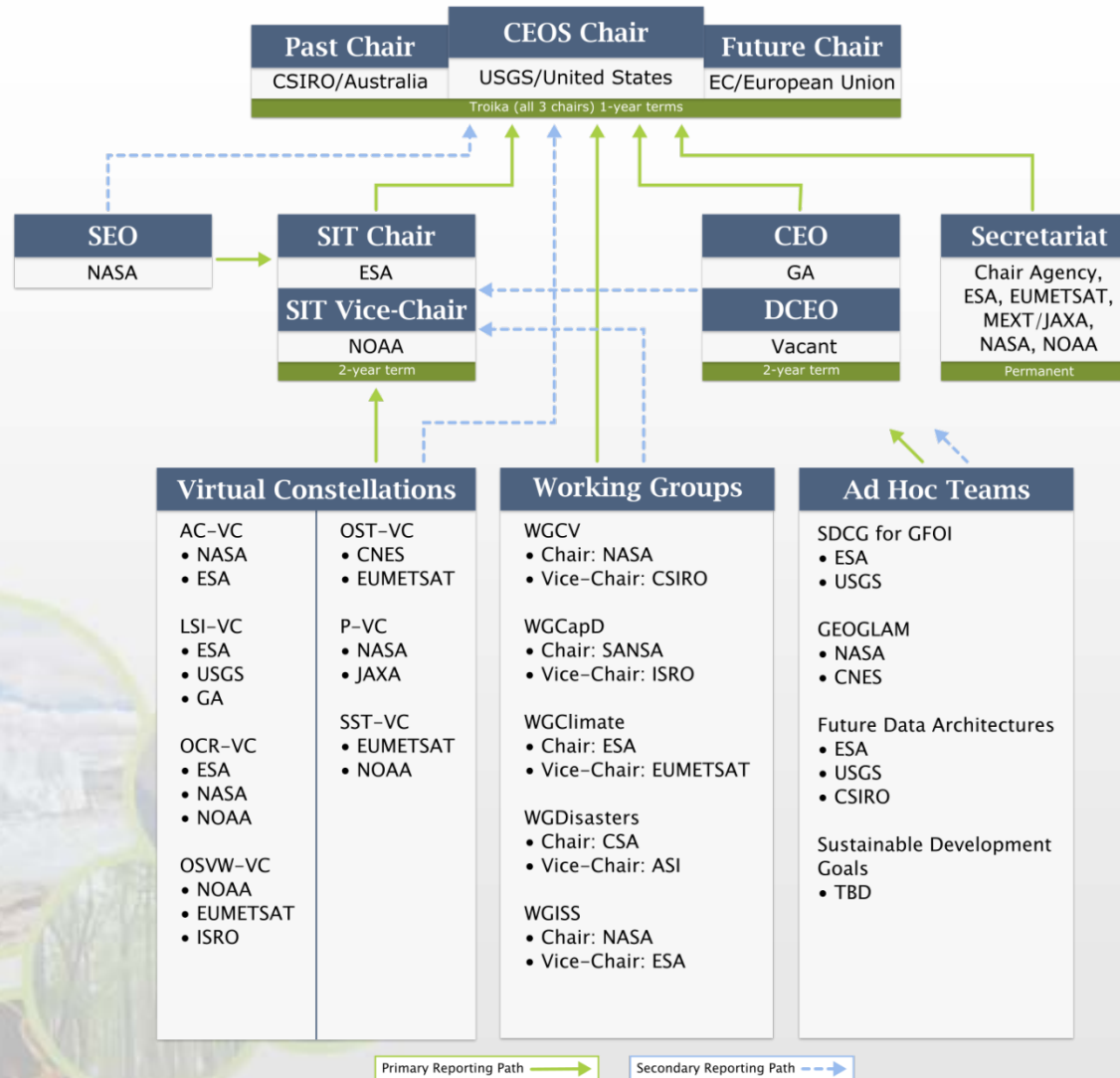
Mission: CEOS ensures international coordination of civil space-based Earth observation programs and promotes exchange of data to optimize societal benefit and inform decision making for securing a prosperous and sustainable future for humankind.

CEOS – Agencies operating 141 satellites!

CEOS Agencies (32 Members & 28 Associates) from all over the world are responsible for:

- Providing leadership within CEOS
- Powering and sustaining CEOS activities
- Generating new and innovative ideas and initiatives

CEOS is the mechanism that brings these organisations together to collaborate on missions, data systems, and global initiatives that benefit society and align with their own Agency missions and priorities.



Primary Reporting Path →

Secondary Reporting Path - - ->



CSA

WG Chair



(single person with secretarial support)

ASI

WG Vice-Chair

(single person)



NOAA

Liaison to GEO Disaster SBA

(single person)



Liaison to User Communities

(one or two persons)

TBD



WGDisasters Experts

(more than 100 members)



NASA & NOAA

FLOODS

Thematic Team
(2 co-leads + experts)



ESA & INGV

SEISMIC RISKS

Thematic Team
(2 co-leads + experts)



USGS & ASI

VOLCANOES

Thematic Team
(2 co-leads + experts)



**NASA, USGS,
GFZ & Unistra**

LANDSLIDES

Thematic Team
(4 co-leads
+ experts)



In Implementation

Recovery Observatory Team (1 Lead + experts)

CNES



INGV

GEO Geohazard Supersites and Natural Laboratories (1 Lead + experts)

GEO-DARMA (Data Access for Risk Management) (1 Chair + experts)

ESA




Data Coordination Team (1 Chair + 1 Representative per Space Agency .
Includes the former Supersite Coordination Team)

USGS



Sendai Framework (SF) – adopted for 2015-2030 period; explicit references to satellite EO and several articles relying on the use of remote sensing data:

- to produce regular up-to-date risk maps;
- strong emphasis on monitoring risk reduction progress;
- to outreach disaster risk information to decision maker, the general public and communities.



UNISDR
The United Nations Office for Disaster Risk Reduction

WHO WE ARE ▾ WHAT WE DO ▾ WHERE WE WORK ▾ WHO WE WORK WITH ▾

HOME WHAT WE DO WE COORDINATE SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION

Sendai Framework for Disaster Risk Reduction

MAKING THE DIFFERENCE FOR POVERTY, HEALTH AND RESILIENCE

The Sendai Framework for Disaster Risk Reduction 2015-2030 (Sendai Framework) is the first major agreement of the post-2015 development agenda, with seven targets and four priorities for action. It was endorsed by the UN General Assembly following the 2015 Third UN World Conference on Disaster Risk Reduction (WCDRR).

Download the full text of the Sendai Framework: [\[AR\]](#) [\[CH\]](#) [\[EN\]](#) [\[FR\]](#) [\[RU\]](#) [\[SP\]](#)

Third UN World Conference on Disaster Risk Reduction
The Sendai Framework was adopted by UN Member States on 18 March 2015 at the Third UN World Conference on Disaster Risk Reduction in Sendai City, Miyagi Prefecture, Japan. [Learn more →](#)

The Sendai Framework is a 15-year, voluntary, non-binding agreement which recognizes that the State has the primary role to reduce disaster risk but that responsibility should be shared with other stakeholders including local government, the private sector and other stakeholders. It aims for the following outcome:

The substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries.

The Sendai Framework is the successor instrument to the Hyogo Framework for Action (HFA) 2005-2015: Building the Resilience of Nations and Communities to Disasters. It is the outcome of stakeholder consultations initiated in March 2012 and inter-governmental negotiations held from July 2014 to March 2015, which were supported by the UNISDR upon the request of the UN General Assembly.

UNISDR has been tasked to support the implementation, follow-up and review of the Sendai Framework.



Priority 1: Understanding disaster risk

National and local levels

Paragraph 24. To achieve this, it is important:

(c) To **develop, periodically update and disseminate**, as appropriate, location-based **disaster risk information**, including risk maps, to **decision makers, the general public and communities** at risk of exposure to disaster in an appropriate format by using, as applicable, **geospatial information** technology;

Global and regional levels

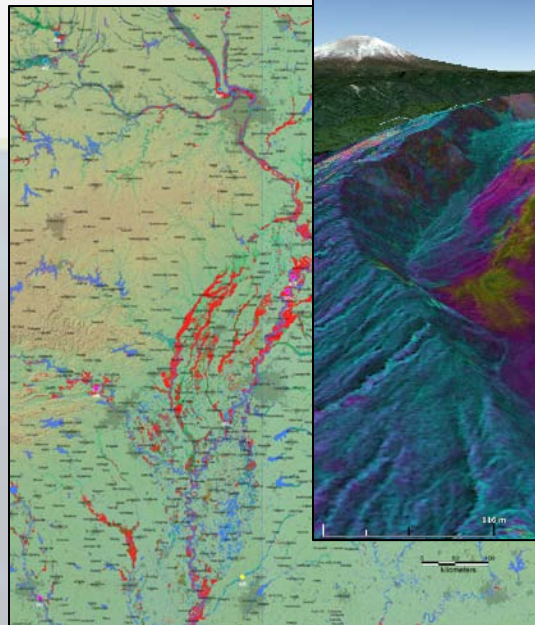
Paragraph 25. To achieve this, it is important:

(c) To **promote and enhance**, through international cooperation, including technology transfer, access to and the sharing and use of non-sensitive data and information, as appropriate, communications and **geospatial and space-based technologies and related services**; maintain and strengthen in situ and **remotely-sensed earth** and climate **observations**; and strengthen the utilization of media, including social media, traditional media, big data and mobile phone networks, to support national measures for successful disaster risk communication, as appropriate and in accordance with national laws;

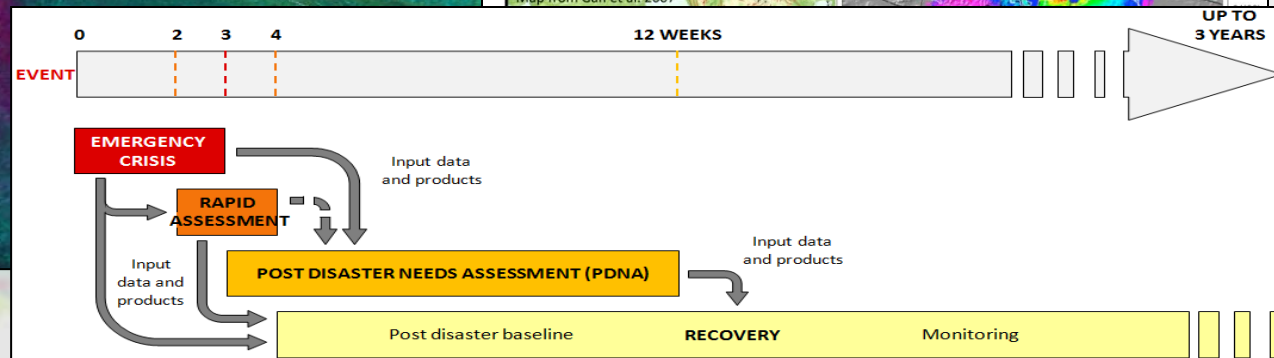
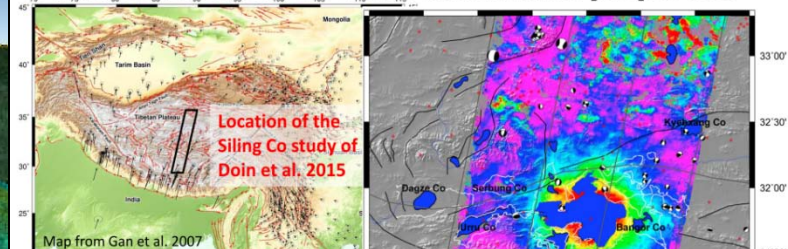
(g) To **enhance the scientific and technical work** on disaster risk reduction and its mobilization through the coordination of existing networks and scientific research institutions at all levels and in all regions, with the support of the United Nations Office for Disaster Risk Reduction Scientific and Technical Advisory Group, in order to strengthen the evidence-base in support of the implementation of the present Framework [...]; disseminate risk information with the **best use** of **geospatial information** technology; provide guidance on methodologies and standards for risk assessments, disaster risk modelling and the use of data; identify research and technology gaps and set recommendations for research priority areas in disaster risk reduction; promote and support the availability and application of science and technology to decision-making [...]



- Three thematic pilots (floods, seismic hazards, volcanoes) approved April 2014 to run until end 2017.
- Recovery Observatory approved November 2014 – demonstrator with World Bank/GFDRR and Government of Malawi began March 2016.
- Fourth thematic pilot on landslides approved November 2015.
- Pilots and RO meaningfully demonstrate how satellite EO contributes to all DRM phases, with strong user involvement.



Visco-elastic rebound around Tibetan lake gives new constraints on crust and mantle properties



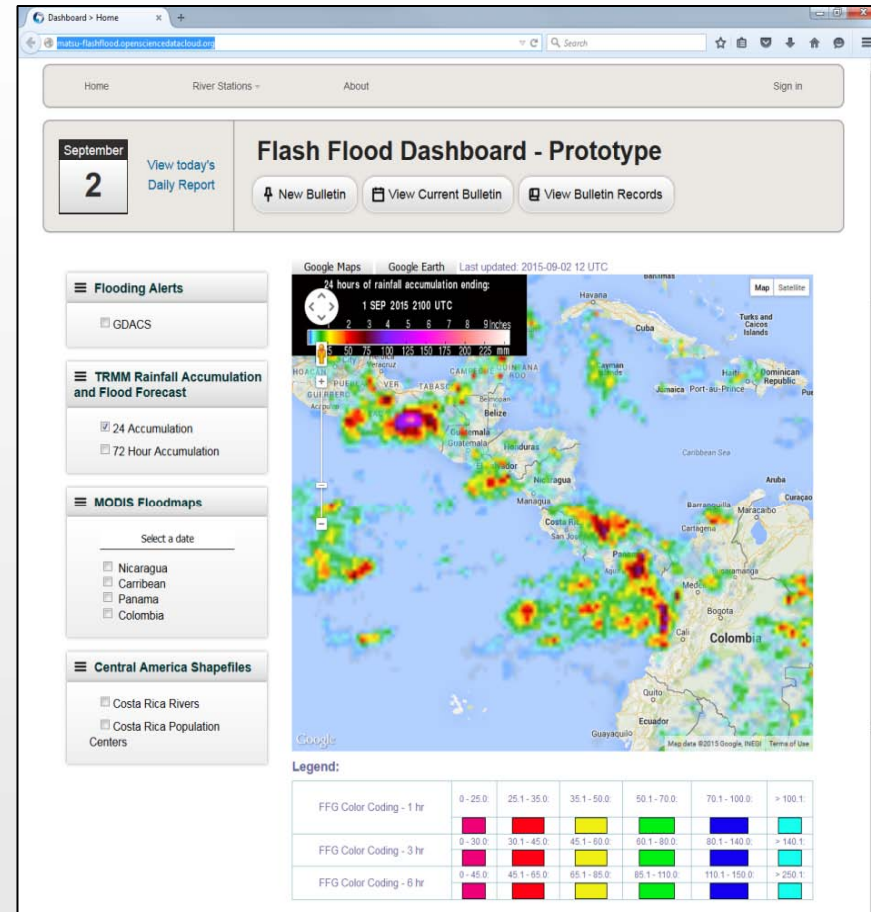


Leads: NASA, NOAA

Key users/stakeholders: National disaster management agencies, hydrological departments, river commissions, regional and national met organisations.

Achievements: Regional flood “dashboards” in Caribbean, Southern Africa and Mekong; capacity development in Southern Africa.

SF linkage: Floods most prevalent disaster globally; Demonstrates effective application of EO to the full cycle of flood management at all scale; flood products converted to GIS layers and distributed via application programming interface (API); Several outreach activities.



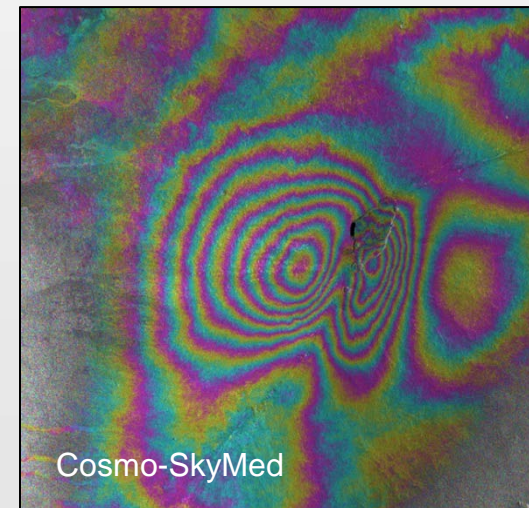


Improve coordination of satellite data acquisition over volcanoes, demonstrate efficiency of EO-based monitoring methodologies as a complement to in-situ measurements, and support and continue the GSNL initiative

Demonstrate feasibility of systematic **global monitoring in regional arc (Latin America)**

Develop new EO-based monitoring products at **supersites**

Real-time in-depth monitoring of one '100-year' category **major eruption**



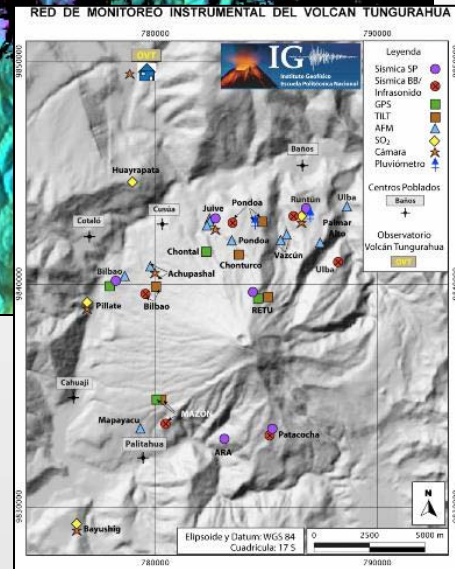
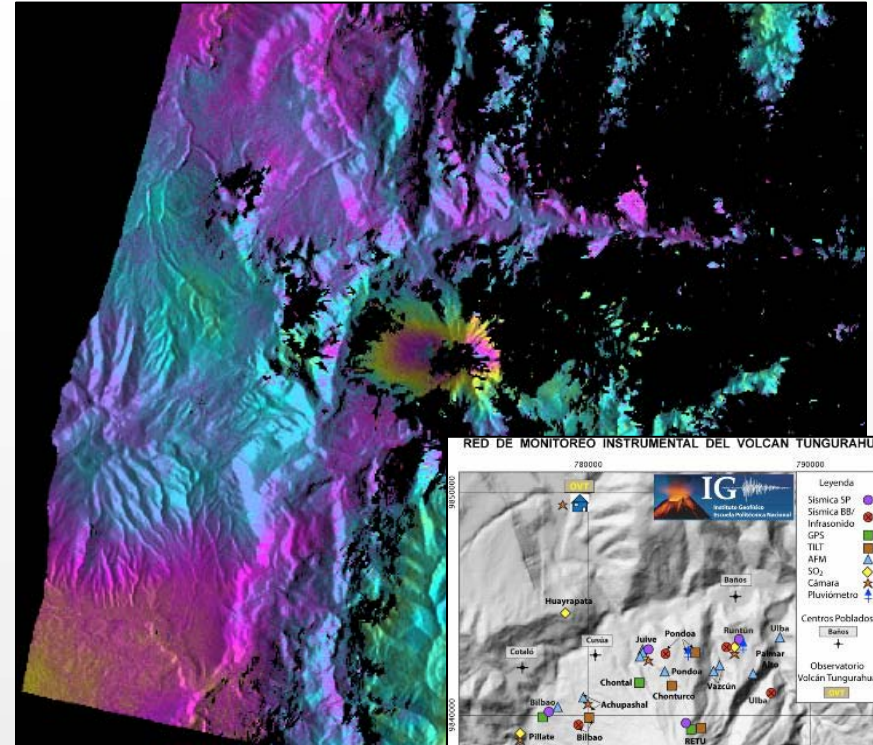


Leads: USGS, ASI

Key users/stakeholders: National volcano observatories, national civil protection agencies, Washington and Buenos Aires VAACs.

Achievements: Demonstrated value of ongoing SAR monitoring and integration of various satellite observations to achieve a complete integrated picture.

SF linkage: Pilot demonstrates clear, measurable ability to reduce risk; Demonstrates efficiency of EO-based monitoring methodologies as a complement to in situ measurements; Capacity building for use of EO data in volcanic observatories in Latin America.



RADARSAT-2 observations lead to new monitoring stations being installed

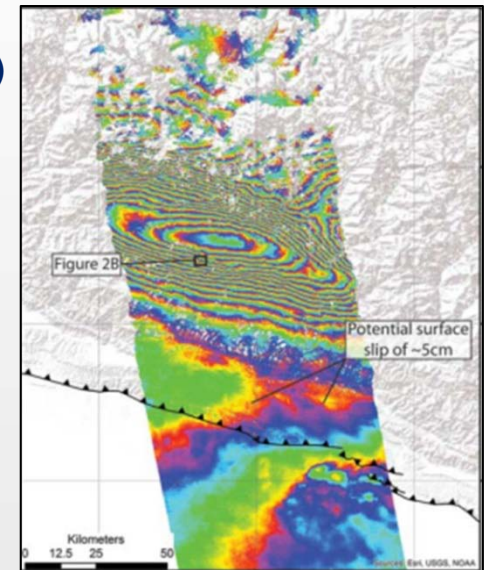
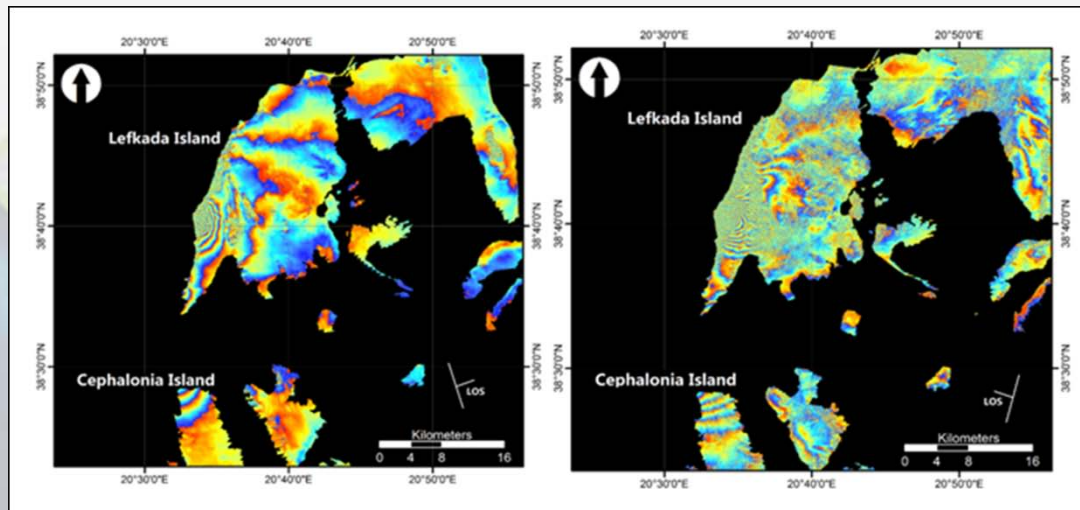


Demonstrate how satellite EO can be used to improve seismic monitoring and response to seismic events

Demonstrator for EO-based **global** strain map (main focus on Turkey, Himalayas and Andes)

Exploitation platform for large data set analysis (strain map, **supersites**)

Rapid scientific products for 4 to 6 earthquakes per year (>M5.8)



Lefkada earthquake : Study of the surface deformation caused by the November 2015 seismic event.
Sentinel-1A differential interferograms of the ascending pair (left) and descending (right)

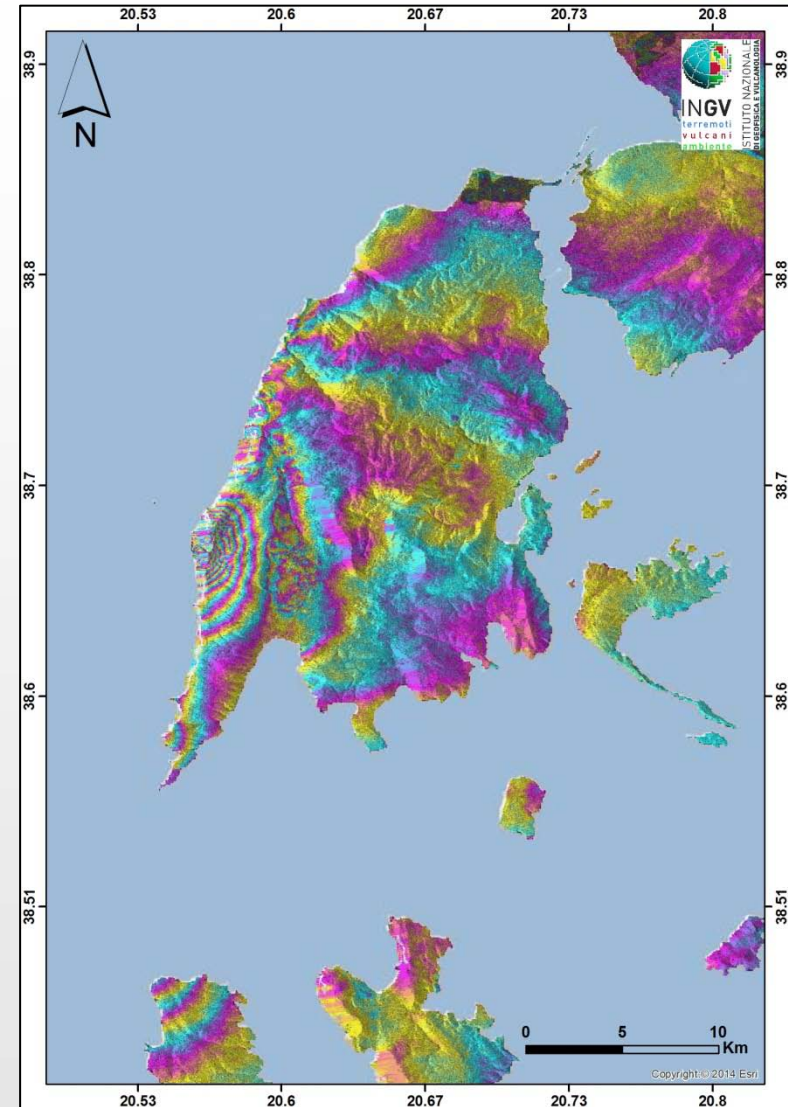


Leads: ESA, INGV (Italy)

Key users/stakeholders: National civil protection agencies, science/geohazard agencies in affected countries.

Achievements: Global EO-based strain map; demonstrated value of rapid satellite-based science products after events for improved fault mapping and hazard understanding; integrated CEOS satellite data in Geohazards Exploitation Platform (GEP).

SF linkage: Pilot shows science products can improve hazard understanding, monitoring and support response; GEP is a tool for the geohazards community for accessing and sharing EO data and products including product generation through Cloud based hosted processing.





CEOS Agencies continue to ensure readiness to activate the Disaster Recovery Observatory (RO) for a one-time demonstration in the 2016–2017 period.

- Working with GFDRR/World Bank and the Government of Malawi, a **Malawi Demonstrator** is being implemented in order to validate applications relevant to recovery needs, including development of specific tools tailored to provide easy access to data over affected areas (pre-event data, response data and coordinated post event acquisitions).
- Other **demonstration activities** being pursued in Nepal (housing reconstruction) and possibly Syria (agricultural monitoring to determine ability to support livelihoods)
- A sub-group is working on an overarching Data Licensing document for Disasters.
- Triggering the RO in evaluation: Summary Event Report: Hurricane Matthew

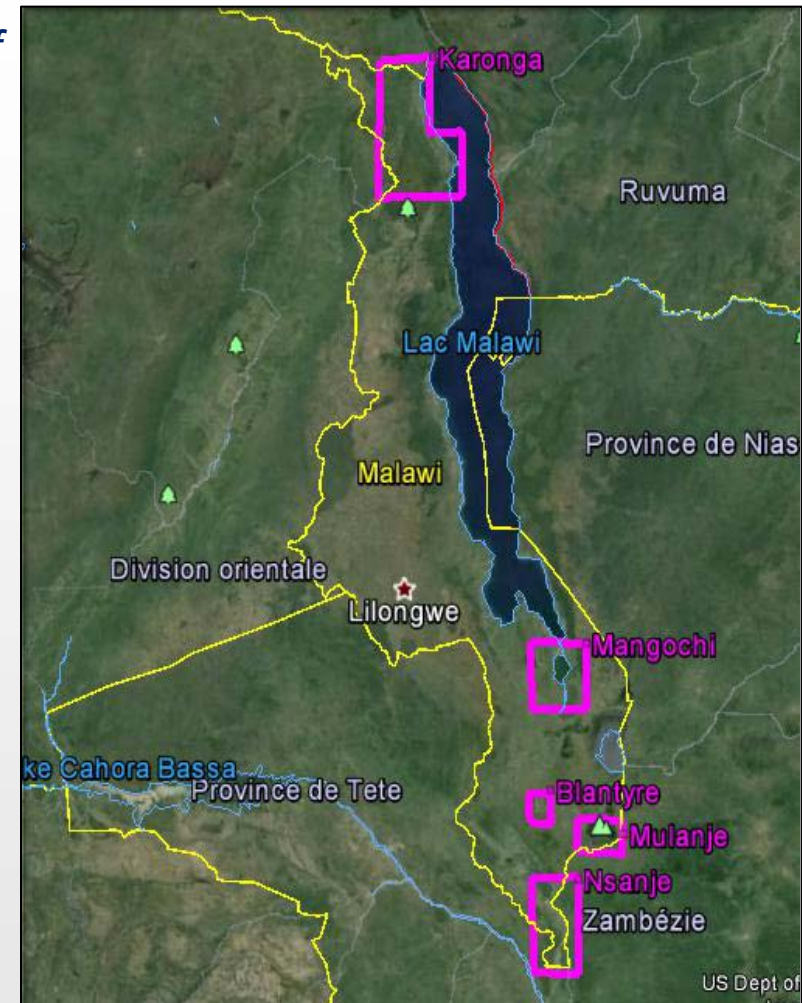


Leads: CNES, GFDRR

Key users/stakeholders: National government of recovery area (demonstrator – Malawi); World Bank, GFDRR, UNDP, UNOSAT.

Achievements: Working partnership developed with GFDRR to deliver framework for satellite-based recovery planning and assessment; demonstrator Malawi 2016.

SF linkage: RO strong tool to promote resilient recovery; Validate applications, including development of specific tools tailored to provide easy access to data over affected areas; Work with the recovery community to define a sustainable vision for increased use of satellite Earth observations in support of recovery.

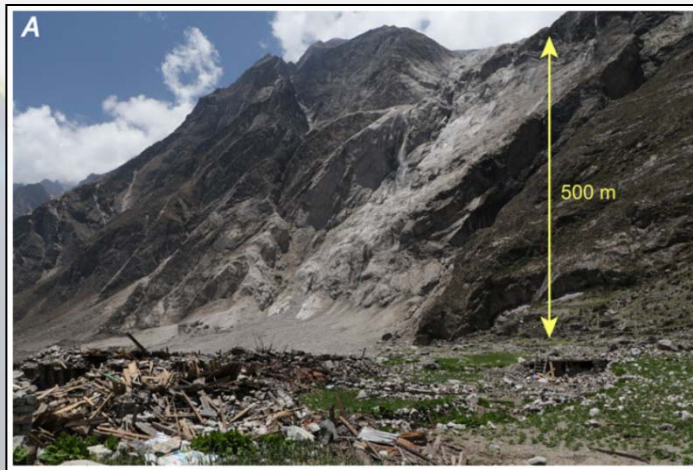




Plenary endorsed creation of multi-hazard landslide pilot team at the 29th CEOS Plenary in 2015

Main Goals of the landslide pilot:

- To demonstrate the **effective exploitation** of Earth observations (EO) data and technologies to **detect, map and monitor landslides**, in different physiographic and climatic regions.
- To apply satellite EO across the **cycle of landslide disaster risk management**, including preparedness, situational awareness, response and recovery with a distinct multi-hazard focus on cascading impacts and risks.



View from the ground (Photo credit USGS)



Damage Proxy Map (DPM) from ALOS-2 Data



GEO-DARMA Concept still to be consolidated

Goal:

Enhance use of EO data for better-informed Disaster Risk Reduction and Resilience decision making

How:

- Series of end-to-end projects addressing priorities of the “Sendai Framework for Disaster Risk Reduction 2015-2030”.
- International Cooperation. Engagement of all stakeholders (end users, data & risk information providers, internat./national agencies, donor institutions,...)

Note: GEO-DARMA (Data Access for Risk Management)

“Sendai Framework for Disaster Risk Reduction 2015-2030”:

- **Explicit references to satellite EO.**
- **UN ISDR requested concrete follow-on actions to both CEOS & GEO.**

Ongoing space agencies’ disaster-related activities (CEOS or non-CEOS) address several recommendations from the Sendai Framework.

CEOS & GEO SEC developed a new GEO initiative *GEO-DARMA*, endorsed with whole GEO 2016 WP (GEO Plenary, end 2015).

- GEO-DARMA based on cooperation between international organizations incl. UN agencies
- **Participation of international / regional organisations during GEO-DARMA Concept Phase is absolutely necessary.**
- **Past experience shows the importance to discuss the participation of stakeholders via individual / personal contacts.**

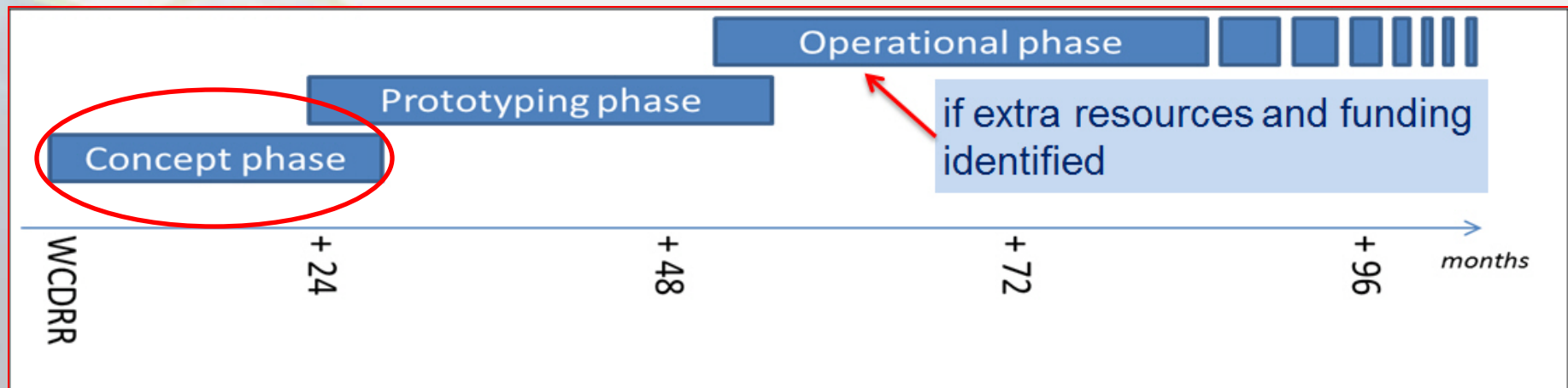


WG members expressed interest to join the GEO-DARMA Sub-Group: Ivan Petiteville Chair-ESA, NASA, NOAA, DLR, CNES and JAXA. (Sep. 2016).

GEO Programme Board has recommended GEO-DARMA as a **GEO Flagship initiative** for the GEO 2017-2019 Work Programme (Sep. 2016).

Contractual support to GEO-DARMA PoC (ESA) kicked-off (mid-Oct. 2016).

Intention: Build an international [partnership with key stakeholders](#) to define a strategy addressing high priorities of [Sendai framework](#) with **resources available, on a best effort basis, adopting a phased approach**





Data providers not fully aware of DRR priorities & user needs

→ **Support from knowledgeable bodies needed for**

.. independent assessment of DRR priorities for 2015-2030:

- 1. At regional level, 2 or 3 independent and authoritative regional institutions such as World Bank, GFDRR, UNESCAP, UNISDR, UNDP, UNOOSA, others, ... (start with few regions e.g. South-East Asia, South America, Latin America & Caribbean, Southern Africa)**
- 2. Identification of hazards affecting most of the countries in the region (e.g. highest human and economic losses) or of transboundary risks that require regional and multi-country involvement.**
- 3. Identification of 1st set of countries within the region that are ready to actively participate in projects at the very beginning.**



What is the mission of GP-STAR in your view?

"Forum to:

- 1) exchange ideas and information, and
- 2) to stimulate the cooperation between Partners on various projects and initiatives."

- Best support the implementation of the Sendai Framework
- Minimize duplication efforts and optimize resources
- Better serve the DRM community
- Enhance collaboration among the Earth Observation community
- Be sensitive of a user-pull approach
- Showcase Earth Observation satellites applications
- If funding raised, must be an opportunity for the Earth Observation value-added industry



What activities, projects, programs can you affiliate/contribute to GP-STAR?

Partnership for Sendai implementation: In Sendai 2015 several partners launched the “Global Partnership on Earth observation” to support implementation of the Sendai framework. GEO-DARMA would be an essential building block of this partnership (Dec. 2016).

Global Platform for Disaster Risk Reduction (May 2017, México): Possible contribution to a special session (May 2017).

CEOS Disaster Risk Management Pilots: Follow-on activities.



What outcomes (procedures, products, information, knowledge, know-how) can you contribute?

Recommended effective practices for innovating application of satellite data to full-cycle disaster risk management (DRM), with a strong focus on Disaster Risk Reduction (DRR) actions to better monitor and map floods, seismic hazards, volcanoes activities, and landslides monitoring and mapping over time and space.

The CEOS Pilots have developed strong relationships with user communities which can be transferred to the GP-STAR activities as they mature.



What role and working field in GP-STAR do you foresee for your organization?

- Earth Observation data access
- Contribute to science and demonstration activities (such as GEO-DARMA)
- Provision of technical advisory
- Link with key users/stakeholders





Any questions?



The bridge collapse in Petit Goave, Haiti, after hurricane Matthew cut responders off from road access, October 7, 2016. CNN/Ryan Browne, Elizabeth Roberts, Ray Sanchez, Deborah Bloom and Nick Thompson

<http://www.cnn.com/2016/10/07/americas/haiti-hurricane-matthew/>