**CEOS WGDisasters Meeting 15 MoM**

Cisco WebEx Remote Teleconference

9 - 11 March 2021

1100 – 1400 UTC

*Attendance [47]*:

David Green (NASA), Pierric Ferrier (CNES), Dave Borges (NASA), Adrian Guzman (AEM), Amy Parker (CSIRO), Andrew Eddy (Athena Global), Arijit Roy (IIRS, ISRO), Brian Killough (CEOS SEO, NASA), Marie-Claire Greening (CEOS CEO), Christian Fischer (DLR), Dan Thompson (NRCan), David Hodgson (UKSA), Deodato Tapete (ASI), Antonio Montuori (ASI), Dorella Papadopoulou (ARGANS), Everett Hinkley (USFS, USDA), Fernando Echavarria (USDOS), Gwendoline Blanchet, (CNES), Helene de Boissezon (CNES), G S Rao (ISRO), Ivan Petiteville (ESA), Jean-Paul Vernier (NASA), Jens Danzeglocke (DLR), John Hall (POLSA), Josh Johnston (NRCan), Lauren Childs-Gleason (CEOS WGCapD, NASA), Marcelo Uriburu Quirno (CONAE), Marta Balcer (POLSA), Norman Mueller (GA), Peter Kettig (CNES), Peter Moore (UN FAO), Rui Kotani (GEO Sec), Simona Zoffoli (ASI), Stefania Amici (INGV), Susanna Ebmeier (Leeds), Weiyuan Yao (CAS), Ziyang Li (CAS), Nancy Searby (CEOS WGCapD, NASA), Mike Pavolonis (NOAA), Ricardo Quiroga Vanegas (AmeriGEO Disasters, NASA), Agnes Lane (AU BOM), Anna Stanczyk, (POLSA), Didier Davignon (ECCC), Ivan Csiszar (NOAA), Helena van Mierlo (CSA), Wilfrid Schroeder (NOAA), Clement Michoud (Terranum), Marta Yebra (ANU).

**DAY 1 (Tuesday, 09 March)**

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| 1100 | Attendance / Adoption of Agenda | Dave Borges, NASA |

The WGDisasters-15 Agenda was successfully adopted with no changes requested.

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| 1105 | Introductory Remarks   * CEOS Chair 2021 Theme / Implementation Plan * WGDisasters 2021-2023 Vice-Chair Vacancy | David Green, NASA  Pierric Ferrier, CNES |

David Green welcomed working group members to the 15th CEOS WGDisasters virtual meeting, and provided an overview of the CEOS Chair 2021 (NASA) Theme and Implementation Plan, noting the inclusion of the ‘Open Science and Decision Support for Floods’ Measure of Success item.

Pierric Ferrier and David Green also highlighted the current WGDisasters Vice-Chair Vacancy and requested that all member agencies consider their ability to volunteer to serve in this important role.

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| 1120 | Telecon #28 MoM: Open Actions Review | Dave Borges, NASA |

WGDisasters Action Tracker spreadsheet updated to reflect WGDisasters-15 outcomes included with MoM.

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| 1140 | CEOS Work Plan: WGD Deliverables Review | David Green, NASA  Pierric Ferrier, CNES |

Dr. Marie-Claire Greening, new CEOS Executive Officer (CEO) was introduced to WGDisasters and provided an update on the development of the new *CEOS Work Plan 2021-2023*.

Existing and new WGDisasters Deliverables were discussed, and will be reflected in the latest version of the Work Plan.

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| 1200 | Data Coordination Team (DCT) Report   * Pilot / Demo / GEO Quota Status * DCT Lead Role Vacancy | Pierric Ferrier, CNES |

Reports due before the end of 2020 (Updated since last meeting):

* Hawaii Volcanoes (distributed December 2020)
* Greek (Enceladus) Corinth Gulf/Ionian Islands (distributed December 2020)
* Campi Flegrei/Vesuvius Volcanoes (distributed July 2020)
* Marmara Western North Anatolian Fault (distributed July 2020)
* Etna Volcanoes (distributed July 2020)

Reports due in 2021:

* San Andreas Fault NL (2nd)
* Virunga Volcanoes (1st)
* Icelandic Volcanoes (4th)
* Southern Andes Volcanoes (2nd)

New Nicaragua Supersite: requests expressed for Pléiades, COSMO-SkyMed, TerraSAR-X images. Acceptance letter to be sent soon.

WGDisasters DCT Lead vacancy was highlighted and discussed. The need for a DCT Lead at all was discussed. Consensus was reached that the DCT Lead is a critical position and needs to be filled soonest. Pierric Ferrier noted that a lead is required to manage data quotas to ensure that those dependent on these data sources have multi-year assurances in the form of DCT letters managed and distributed by the DCT Lead.

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| 1225 | International Charter / WGDisasters Observer Status | David Green, NASA  Pierric Ferrier, CNES |

WGDisaster’s ‘observer status’ within the International Charter has been confirmed. Pierric Ferrier noted that the next step is writing an official procedures document in partnership with the Charter Executive Secretariat. First, WGDisasters activity capabilities in terms of providing value added products to the Charter needs to be catalogued, with specific examples collected.

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| 1245 | The CEOS Database: Missions, Instruments, Measurements and Datasets (MIM)   * Potential addition of Disasters applications | Ivan Petiteville, ESA |

The CEOS Missions, Instruments, Measurements (MIM) service is used across the CEOS community, and specifically mostly used only by people familiar with EO from space. Some user communities (DRR/M) are interested only by receiving timely and accurate information associated with a specific hazard. Often feared of/not interested by underpinning technology.

New Target: community of users that are less familiar with satellite missions and instruments, but that have a good knowledge of specific phenomena and/or measurements.

Objective:

* Increase the awareness of non-EO specialists.
* Show that remote sensing is a valuable and reliable additional source of information that can benefit multiple domains.

Currently, CEOS MIM has no dedicated “Applications” tab due to insufficient information attached to individual missions and instruments.

Proposed way forward: WGDisasters to work with CEOS MOM Team (ESA, Symbios) to define the improvements to be brought to the CEOS MIM to better serve the DRM community. In operations, WGDisasters would be responsible for filling the CEOS MIM database with the relevant information, and keep it up to date.

Nancy Searby, CEOS WGCapD Chair, expressed support for this concept. Once concern is if the non-EO DRM community would be able to navigate the current MIM website. This concept needs to be discussed further and a path forward determined.

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| 1315 | Wildfire Pilot   * Overview * Implementation Plan [*For CEOS SIT-36 Endorsement]* | Joshua Johnston, NRCan  Helena van Mierlo, CSA |

Wildfire Pilot aims to provide a fundamental basis for defining global priorities for active-fire monitoring and characterization, with four specific objectives:

* Conduct a detailed inventory and gap analysis of existing and proposed EO systems suitable for global active-fire monitoring (considering climate change driven fire regime changes and projected mission life spans).
* Conduct a detailed analysis of global stakeholders and end-users of active-fire EO data.
* Define targeted user requirements for active-fire remote sensing systems for the disaster mitigation applications.
* Propose a way forward in coordinating global wildfire monitoring activities.

Several scoping and leadership planning meetings have already occurred in 2020, with a three phase implementation planned.

2021-2022 Implementation:

Objective 1

* Assemble datasets to form a spatial and temporal global fire regime dataset with climate change projections on 5 years intervals.
* Identify existing and future active fire EO capabilities and coverage areas.
* Map existing EO coverage and future projections on 5 year intervals.
* Develop metrics for analysing fire regime and EO capability change correlations.

Objective 2

* Outreach to regional networks and partners to identify stakeholders and end-user communities.
* Engage end-users (directly or through regional partners).

2022-2023 Implementation:

Objective 1

* Finalize scientific analysis, peer-reviewed publications.

Objective 2

* Document regional end-user capacity and requirements for EO and HQP development.
* Develop a global knowledge exchange strategy to advance end-user up take of active wildfire EO data.

Objective 3

* Identify mission profiles (GEO, LEO, HEO) required to address gaps in Objective 1
* Link the mission profiles to the primary end-user group and their respective priorities, based on the spatial temporal location of identified gaps.
* Draft User and Mission Requirements for the mission profiles.

2023-2024 Implementation:

Objective 1

* Merge outputs of Objectives 1-3 into a strategic plan for adapting wildfire EO to mitigate the evolving risk of disasters under climate change.

Next Steps

* Seeking IP endorsement at CEOS SIT-36.
* General meeting to discuss member contributions (April 2021).
* Initiation of Objectives 1 and 2 to begin April, 2021 (staffing underway).
* Outreach activities were planned for WFC-2021, but delayed due to COVID (other options considered).

Dalia Kirschbaum (Landslide Pilot co-lead) noted that moving forward collaboration would be beneficial, as they are improving their inventories of post-fire debris flows. Josh Johnston welcomed future collaboration and noted his team just hired a water dynamics expert that could potentially support this collaboration.

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| 1335 | Landslide Pilot   * Transition to Demonstrator * Implementation Plan [*For CEOS SIT-36 Endorsement*] | Dalia Kirschbaum, NASA  Jean- Philippe Malet, UNISTRA  Corey Froese, BGC Engineering  Clément Michoud, Terranum  Weiyuan Yao, CAS |

Achievements in the Landslide Pilot; Case studies that demonstrated the following:

* EO satellite data can effectively support the estimation of relevant landslide parameters (location, size, velocity, triggers) over large spatial domains
* Combination of SAR, multispectral and microwave satellite data can improve classical landslide modelling approaches
* EOO satellite data can provide first order estimates of landslide hazard where local ground-based observation capacity is limited, making it highly suitable for applications in developing countries.

Goals for the Landslide Demonstrator; demonstrate the usefulness of satellite data for operational applications of landslide disaster risk management with the ultimate goal to increase resilience against landslide disasters:

* Use EO data to engage the railway, transportation and pipeline sector on monitoring of hazards that may affect their operations and planning
* Develop an operational platform to conduct and evaluate landslide risk financing products
* Coordinate and expand the use of EO data for landslide inventory generation, particularly after major triggering events, create a repository for data and code sharing on this topic.

Dan Thompson commented that Canadian Forest Service has both debris flows as well as slower slope stability issues after wildfires and that the Landslide Demonstrator would certainly be a helpful follow up to wildfire Charter events (as a standard follow up). Dalia Kirschbaum responded that the team looks forward to following up on this, that post-fire debris flow inventories are quite limited and the team is seeking to expand these data.

**DAY 2 (Wednesday, 10 March)**

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| 1105 | Seismic Demonstrator   * Activities / Deliverables Updates * Seismic Hazard under Cities – Pleiades Stereo Data * Almaty and Dushanbe Fault Study | Philippe Bally, ESA  Dorella Papadopoulou, ARGANS  John Elliot, University of Leeds  Roberta Wilkinson, Oxford University |

Status of Activities

Advanced research products for earthquake response:

* Thessaly (Greece) earthquake, March 2021. Identify the seismic source and assess the stress changes in the area and the increase of the stress on nearby active faults (INGV, NOA), work with CSK and CSG products (request awaiting approval). Ground motion products leveraging Sentinel-1.
* Samos island (Greece) earthquake, October 2020. Ground motion products using Sentinel-1.
* Philippines, August 2020 (CRL/NOA), products using Sentinel-1.

Ongoing studies on active fault mapping with SAR and VHR optical imagery:

* Support the GSRF Hubs, aiming to derive models of multi-hazard risk to inform urban development planning for four major capital cities (Quito, Ecuador, Istanbul, Turkey, Nairobi, Kenya, Kathmandu, Nepal) by the University of Leeds.
* Active faulting in Dushanbe, Tajikistan and Almaty, Kazakhstan by the University of Oxford.
* Mapping the effects of the Samos earthquake on both the physical and the building environment by NOA, AUTH, DUTH.
* Mapping interseismic strain accumulation over the urban area of Tehran, Iran by the University of Tehran (request awaiting approval).

Demonstrator Needs

Based on the team’s experience in the Demonstrator since 2018, the activity (as well as a potential follow-on activity) needs:

* To continue VHR data provision. Since 2018, the most used data are VHR data (Pleiades imagery).
* L-band SAR alternative solutions. A few requests have been received (and finally rejected) for ALOS-2 (L-band) data.
* To define a semi-automated data request procedure (e.g. online data request form submission, notification to each WGD lead and evaluation by each CEOS agency concerned)
* To have a link on the CEOS WGD webpages explaining the procedure and allowing online access to the necessary data request forms for submission (at first it can be done separately for each Pilot activity and then once semi-automated it can be centralized)
* To promote that CEOS WGD data can be requested from the broader EO seismic community. The Demonstrator supports EO studies focusing on regions spread worldwide, although requests come from a small group of partners.

Considering the Demonstrator activity shall be concluded at the end of 2021, important next steps include:

* Make sure there is no interruption in data provision for on-going projects.
* Understand how user needs have changed and how EO data requirements have evolved (do they still need data? What data are missing? Should we provide more than data?). Review Process of the Santorini Report could help in this.
* Depending on the needs, re-shape the Demonstrator activity to better address the user/community needs.

Prof Richard Walker also presented an update on his Seismic Demonstrator activities leveraging remote sensing of past earthquake ruptures for better hazard assessment. Results from analysis the Earthquake Ruptures of Iran and Central Asia (EROICA), the 1949 Khait earthquake and the 1948 Ashgabat earthquake were shared. The project combines geophysical data (remote sensing, seismology) with historic, prehistoric and geologic data. Many of these earthquakes are in regions undergoing rapid urban growth and results help in estimating hazards.

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| 1130 | GeoHazards Lab   * Activities / Deliverables Updates | Phillipe Bally, ESA  Dorella Papadopoulou, ARGANS |

Update on GeoHazards Lab Activities:

* Interview of GEP users (IGME, INGV, ASI) concerning experience and utilization comments
* Demo processing of 9 cities using P-SBAS service for WB CRP project
* Demo processing of Dakar (Senegal) (entire Sentinel-1 archive); Contribution to the WACA report
* Completion of the integration and bug fixing of SNAPPING service (based on SNAP-StaMPS chain); Check performance both in terms of scientific results and processing time; Improve parallelization of the service; Run demo jobs
* SNAPPING processing over Suez (Egypt) for University of Suez; Palu (Indonesia) for AIT (Asian Institute of Technology)
* GEP processing (several jobs using different services) as early response to geohazards events (e.g. Samos earthquake)
* Release of new services from CNRS EOST (MPIC-OPT-EQ, MPIC-OPT-ICE, MPIC-OPT-SLIDE, DSM-OPT and ALADIM-HR)
* Scientific publications in top-ranked journals by ASI’s researchers on how big data processing in GEP can be effectively used to assess risk and address sustainability challenges (e.g. land subsidence in Mexico City, coastal subsidence and landslides in southern Italy)

Santorini Report – Review Process

The Memorandum of the “International Forum on Satellite EO for Geohazard Risk Management”

* Manifesto of the Disaster Risk Reduction community looking at geohazards
* Produced in 2012
* Open review process with users and practitioners
* 5-10 year objectives and requirements concerning how satellite EO can contribute to hazard and risk mapping
* Focusing on members of the geohazards community that use satellite EO.

In the framework of the CEOS Working Group Disasters, the GLab proposed to review these objectives and requirements and capture major milestones achieved over the last years against these objectives.

Feedback is needed by WGDisasters and the broader geohazards community working with EO (feedback received only for volcanic hazards and landslides). Discussions started and are ongoing with thematic leads to identify changes in achievements or in community objectives with regard to the 2012 Santorini report.

International Charter has decided to develop a processing environment based on the GEP.

GeoHazards Lab Next Steps

* Collocating data and processing is still challenging (including archiving cost)
* Make services resilient to data access issues
* Build chains that utilize other missions (apart from Copernicus Sentinel)
* Well-defined platform governance (including service providers)

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| 1150 | GEO/LEO/SAR Flood Pilot   * Activities / Deliverables Updates | Mitch Goldberg, NOAA  Dave Borges, NASA  Guy Schumann, RSS Hydro  Andrew Molthan, NASA |

Flood Pilot currently has six active Subgroups with specific in country AOIs (Red River of the North, Canada, U.S.; Bermejo and Picomayo basins, Argentina; Brahmaputra River and Mahanadi Delta, India; Pear River basin, China; Balkans basins; Myanmar)

Endorsed during CEOS Plenary 2020, the Pilot Implementation Plan includes the following key milestones:

* 2020-2021: Begin regional studies, collect data, establish relationships
* 2021-2022: Provide derived products to users for feedback and explore refinement of monitoring strategies. Initial evaluation of pilot results to GFP and international conferences.
* 2022+: Develop reports from users on derived products, good practices, and evaluate results from study sites. Explore whether broader EO strategies can be developed.

Flood Pilot team aligned with CEOS Chair 2021 Theme and the following deliverable:

* Space-based EO Data for Open Science and Decision Support: Develop a demonstration of a repository of data, methodologies and capacity building resources for open science and decision support for flood research and applications, ensuring relevance of outputs that can inform choices, support decisions, and guide actions using open science principles for disaster risk reduction through partnership efforts with CEOS WGCapD and stakeholder engagement. (DIS-20-06)

Monthly meetings are ongoing and a Flood Pilot Data Call Form has been developed and distributed to the Pilot subgroup leads. This is catalogue data, methodologies and algorithms to be collected and integrated in to the CEOS Earth Analytics Interoperability Lab (EAIL) environment.

CONAE and CSA have offered to share licensed SAOCOM and RSAT-2 data for use across the Pilot subgroup teams and AOIs. Details are being determined in coordination with the CEOS WGDisasters DCT.

Upcoming activities:

* Finalize Pilot Data Call Form to include data formats and temporal/scene details.
* Address outstanding licensed data sharing opportunities with CSA and CONAE.
* Continue collaboration with CEOS WGISS and SEO to roll out new Flood Pilot EAIL.
* Continue close collaboration with CEOS COAST Ad Hoc Team, and their ‘Sea to Land’ subgroup which includes a focus on coastal inundation.
* Document methodologies, successes, challenges to inform Pilot deliverables on GEO/LEO/SAR data fusion towards improved flood mapping.

Antonio Montuori (ASI) asked if all types of SAR data would be included in the Pilot efforts. Guy Schumann confirmed that all available SAR data would be relevant and useful. Antonio requested follow up on the potential of ASI contributing additional data to the Pilot efforts.

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| 1215 | Volcano Demonstrator   * Activities / Deliverables Updates | Mike Poland, USGS  Susi Ebmeier, University of Leeds |

Demonstrator is an extension of the Latin American Pilot project to African and SE Asian volcanoes, filling gaps in current monitoring. Long term goal is to demonstrate the necessity and viability of international coordination of satellite tasking for volcano monitoring (after polar science community).

* Expand use of satellite remote sensing for volcano monitoring.
* Research link between volcanic unrest and eruption from satellite observables.
* International coordination of satellite tasking to maximise usefulness to volcano observatories.
* Supporting capacity building initiatives to increase the uptake of satellite imagery.

Workshop on Volcano Monitoring Infrastructure on the Ground and in Space hosted by Matt Prichard virtually included sessions on Demonstrator InSAR activities (254 registrants, >20 volcano observatories).

Discussion points raised:

* High resolution backscatter. CSK and TSX spotlight/staring modes provide unique data for eruption response and are the only instruments with high enough resolution to detect local changes important for hazard monitoring.
* Topographic data. Accurate, recent DEMs are critical for hazard assessment during an eruption in terms of estimation of effusion rate, flow modelling and hazard assessment. Critical for interpretation of high resolution SAR imagery (e.g., CSK, TSX, especially spotlight modes).
* L-Band imagery is critical for InSAR measurements at densely vegetated volcanoes, and where deformation is high magnitude.
* Constellation imagery. Volcanic unrest and eruption can progress very quickly – within hours or days – the sooner images can be acquired the better. Access to imagery from multiple platforms greatly increases the likelihood of capturing rapid deformation during unrest or rapid topographic change. Denser time series also provide information about processes that might otherwise have been missed during retrospective analysis.

Detailed requests have been sent to CSA regarding RSAT-2 imagery. Specific quota details would be helpful to inform prioritization efforts.

Demonstrator Conclusions

* Volcano Demonstrator is active in tasking TSX, as well as providing CSK and Pleiades to volcano observatory scientists and researchers.
* High resolution SAR (especially CSK and TSX) has been critical in recent responses – volcano observatories are very appreciative of the data.
* Access to Tandem-X co-SSCs and WorldDEM is incredibly useful for hazard response for many volcanoes – if we could find a way to do this, it would have a significant impact.
* L-Band imagery remains the best tool for densely vegetated volcanoes and high magnitude deformation events.

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| 1240 | GEO-DARMA   * Activities / Deliverables Updates | Ivan Petiteville, ESA  Andrew Eddy, Athena Global |

GEO Programme Board review team made the following assessment (24 August 2020):

* Review team congratulated GEO-DARMA on strong relationships with regional institutions.
* Projects have been slow to start due to funding problems and now COVID.
* Prospects for better results in 2021 in Africa (PRIDE) and Asia (UN-GGIM).
* Recommends selecting priorities and pushing for faster implementations for those projects.

GEO-DARMA has focused on developing interest for new projects, especially in Africa and LAC:

* PRIDE-Botswana: RCMRD and Uni Bochum will partner for a proposal to develop a PRIDE pilot in Botswana.
* Colombian University risk reduction effort: project to showcase local risk reduction projects using high resolution imagery (suspended due to COVID but could start again mid 2021).
* Long-term collaboration with CEPREDENAC building on RO Demo activation work to provide satellite data for long-term recovery monitoring and risk reduction efforts (CEPREDENAC GIS Team).

Other collaboration and next steps:

* APDC: SERVIR-Mekong up and running but unable to identify RADARSAT data in archives relevant to flood library of interest; no further collaboration planned at this time.
* ESCAP: waiting on requirements from UN-GGIM project on integrated geospatial monitoring for land accounting and SDGs.
* PRIDE-Botswana: proposal to ESA by 26 March.
* CEPREDENAC GIS Team to work on RO Demo activation #1 – Iota, and define longer term DRR needs for GEO-DARMA request mid-2021.

Nancy Searby, CEOS WGCapD Chair, noted a shared partner with SERVIR and that the PRIDE/Botswana deliverables would fit with WGCapD’s flood and Open Science CEOS Chair deliverable. Andrew Eddy agreed, but noted that it is unknown if the effort will be financed. A decision is expected in June 2021.

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| 1315 | Geohazard Supersites and Natural Laboratories (GSNL)   * Results/Requests from Supersites * Activities / Deliverables Updates | Stefano Salvi, INGV |

Stefano Salvi shared latest biennial report schedule for all Supersites as well as a summary of level of use of CEOS data in 2019.

Hawaii and Enceladus (Greek) Supersite reports were submitted on 9 December 2020:

* Following the 2018 Kilauea, Hawaii eruption and caldera collapse, there has been an increased interest in the CEOS Supersite data, with several published papers using SAR and optical data for topographic changes, deformation, geomorphological analyses, volcano-tectonic analyses, etc. Very good use of the data to support local users.
* Regarding the Enceladus Supersite, following recent seismicity in the western area (Ionian islands), a number of studies have been carried out. A few projects have been started in the Supersite area. CEOS data quotas have not been used in the last two years. Only Sentinel-1 SAR data are used for ground deformation.

GSNL was featured in the DRR portion of the GEO Highlights Report 2020. <https://www.geohighlightsreport2020.org/>

GSNL was also included as a Case Study in the UN GAR 2022 Contributing Paper led by GEO DRR WG.

A revised version of the Nicaragua Supersite proposal has been submitted for approval, with the following proposal objectives:

* Access satellite EO data to complement the in-situ ground networks.
* Learn how to use them for volcano monitoring and surveillance.
* Improve knowledge of key geological processes and assess volcanic hazard.
* Establish wider international scientific collaboration.
* Progress on ground data sharing on a global scale.

WGDisasters DCT members confirmed that a decision regarding Nicaragua Supersite acceptance would be shared by the end of the month.

Jens Danzeglocke confirmed that the Enceladus Supersite has not ordered any TerraSAR-X data, and suggested the Enceladus renewal not be issued considering the lack of data use over multiple years. Stefano Salvi agreed and confirmed a renewal letter would not be issued.

Dalia Kirschbaum, Landslide Pilot co-lead, commented that the Landslide Pilot would be interested in the Nicaragua supersite from the perspective of Hurricanes Eta/Iota. They have asked for Alos-2 and additional SAR data already and would like to explore collaborative opportunities assuming the new Supersite is accepted.

**DAY 3 (Thursday, 11 March)**

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| 1105 | CEOS WGISS Presentation   * WGs Collaboration Discussion | Robert Woodcock, WGISS Chair, CSIRO |

WGISS promotes collaboration in the development of systems and services that manage and supply CEOS Earth observation data, creates and demonstrates prototypes supporting CEOS and GEO requirements and addresses the international management of EO data, the creation of information systems and delivery of interoperable services.

Rob Woodcock noted that EO Discovery is becoming more complex as CEOS agencies migrate to Cloud environments and entire datasets now reside in different cloud-based locations (ex: three different versions of Sentinel-2 available now on AWS).

WGISS wants to learn what is working well in their discovery mechanisms and what is not working well so they can develop better practices in terms of make use of EO. WGDisasters is invited to provide feedback along these lines from a thematic disasters perspective.

The WGISS Earth Analytics Interoperability Lab (EAIL) was highlighted, and Rob Woodcock noted that a Jupyter Notebooks Best Practice is in development.

Andrew Eddy asked who makes up the EAIL Team. Rob Woodcock responded that the EAIL ‘Team’ is made up of CEOS WGISS members, CEOS Systems Engineering Office, CSIRO and CSIRO Chile.

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| 1125 | Group on Earth Observations (GEO) Updates   * GEO DRR WG / UNDRR Updates | Dave Borges, NASA |

The GEO DRR WG was created by GEO Secretariat to develop and implement a coherent and crosscutting approach within GEO to advance the use of EO in support of countries’ disaster risk reduction and resilience efforts.

Dave Borges highlighted the ongoing development of a UN Global Assessment Report 2022 Contributing Paper, *Earth Observations into Action: Systemic Integration of Earth Observation Applications into National Risk Reduction Decision Structures*. CEOS WGDisasters Recovery Observatory, Landslide Pilot and GEO GSNL contributed content for case studies along with multiple other GEO Work Programme activities. The paper is currently in the UN peer review process.

The DRR WG is developing in partnerships with the Climate Change and Capacity Building WGs that will target GEO Work Programme activity leads. Results will be compiled in an interactive Esri dashboard, with DRR activities searchable by theme and geography, globally.

An EO Risk Toolkit Concept Paper is also being development, and will serve as a consolidated knowledge resource for UNDRR and GEO member countries to advance integration of EO into national risk reduction strategies.

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| 1140 | UN-GGIM WG on Geospatial Information & Services for Disasters (WG-Disasters) Updates | Simone Lloyd, UN-GGIM WG-Disasters |

Simone Lloyd provided background on the Strategic Framework on Geospatial Information and Services for Disasters.

UN-GGIM WG-Disasters is drafting a new two year workplan and input from CEOS WGDisasters and GEO DRR WG have been received and incorporated:

* Share existing thematically focused WG activities where EO are being integrated, as well as geographic focus areas and relevant stakeholder agencies and organizations.
* Share and promote details and developments regarding regional GEO data sharing and relevant platforms facilitating data and product exchange related to disasters.

UN-GGIM WG-Disasters also collaborated with GEO DRR WG and CEOS WGDisasters to provide content to the UN GAR 2022 Contributing Paper highlighting the Strategic Framework Regional Assessment results and relevant new partnership opportunities created by the Aguascalientes Declaration.

WG-Disasters Future Plans:

* Execute new workplan activities
* Forging partnerships with DRR bodies for collaboration and coordination efforts.
* Conduct analysis of results for other regions (Africa, Asia, Pacific, Europe) towards preparing a global assessment and resulting report for presentation at the 11th Session of the UN-GGIM in August 2021.

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| 1335 | Haiti Recovery Observatory Pilot   * Final Report | Helene de Boissezon, CNES  Andrew Eddy, Athena Global |

RO Pilot Principles:

* Satellite images not only for emergency response, but for post-crisis and recovery/reconstruction too.
* Collaborative effort to increase ease of access to satellite imagery and derived information products for all post crisis steps.
* Concrete actions bringing together national actors and international stakeholders, answering concrete needs along recovery timeline.

Haiti Pilot Lessons Learned:

* Demonstrated the value of satellite EO to support post major disaster activities:

Satellites can be a very useful tool to fill data gap where no other information are available and to get synoptic, regularly updated information over large areas.

Satellite can provide information (together with other data set) in a wide range of thematic products relevant for recovery (short and long term)

* First CEOS project focused on Recovery phase with large participation and interest from space agencies, as well as from international stakeholders
* Worthy model of collaboration with Haitian partners that could be reproduced:

Users had critical role in the definition and in the management of the project

Methodologies based on free and open data and software to ensure sustainability

Consequent capacity building (and academic conferences program)

* Demonstrated the importance of ground-truth validation of space-based products (technical mission in Haiti by CNES, SERTIT and ASI personnel jointly with CNIGS and Haitian partners), capacity building and user engagement (Capacity Development Activities 2017-2020)
* Worthy model of collaboration with international stakeholders (PDNA tripartite agreement partners), that gave rise to Demonstrator proposal.
* Recovery satellite EO needs are thoroughly different from those of other phases of disasters
* Imaging & value adding resources present challenges (e.g. scope vs resolution, cost benefit of value adding)
* Specific approaches and adapted strategies are required to address them, before events occur
* A coordinated approach, from Event to National Recovery Plan (including Charter/Copernicus and PDNA) is required
* Strong involvement of local users (and providers when applicable) is necessary to success, however international stakeholder community is a critical corollary
* Local capacity building should be a standard component
* Lessons learned to date (in Haiti and elsewhere) offer valuable input but can be challenging to scale up: Demonstrator will showcase value achieved through investment

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| 1155 | Recovery Observatory Demonstrator   * Activities / Deliverables Updates | Helene de Boissezon, CNES  Andrew Eddy, Athena Global |

RO Demonstrator will be based on lessons from the RO Pilot (2017-2020):

* Deliver a use and utility report reviewing and evaluating the timely contribution of EO data/products at several scales
* Complete one RO test then 3-5 ROs over the next three years
  + Activation by PDNA Tripartite Agreement among partners (UNDP, WB/GFDRR, EU)

Recent Progress:

* “Use of Satellites for Recovery Assessments” Case Study: recent assessments and survey of past rapid assessment leaders
* First draft of Concept Paper circulated to RO Demonstrator Team (February 2021)
* RO Test conducted on Beirut fires
* First RO Demonstrator activation triggered on 5 March 2021 for Hurricane Iota in Honduras and Guatemala (Nicaragua TBC), with four main activities being considered:
  + Repository and continuation of Copernicus EMS Grading maps in Honduras, Guatemala and Nicaragua, useful for the Recovery phase; covering a greater area than ‘small pockets’ of damage assessment conducted by Copernicus EMS
  + Sectoral impact analysis – use of EO in flood damage assessment and agriculture sector impacts in Honduras; could be extended to infrastructure sector as well.
  + Develop a framework and decision tree on post disaster activation, choice and use of EO in post disaster analysis for Central America.
  + Capacity building of interpretation and processing/integration of EO data at CA regional entities such as CEPREDENAC and coordination with CEOS WGCapD (this could be linked to development of a land use map for CA at a higher resolution).

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| 1215 | CEOS WGCapD Presentation   * WGs Collaboration Discussion | Nancy Searby, WGCapD Chair, NASA |

Relevant Trainings, Resources and Deliverables were shared and are available in the WGCapD presentation on the WGDisasters-15 meeting website.

Initial takeaways from WGCapD-10 Meeting (Theme- Building a Vision for the Next Decade):

* The EO community has grown tremendously, largely because of access to open data: “You no longer need to have a PhD to engage on EO”
* Need strategic thinking about how to leverage increasing private sector engagement
* True inclusion involves: 1) advocacy on costs of EO application and 2) use of languages other than English
* Strong support for EOTEC DevNet; interest in learning more about how it aligns with other activities
* Consensus that a flood dashboard would be useful

WGCapD is developing an Earth Observation Training, Education, and Capacity Development Network (EOTEC DevNET) with a primary focus on network to network leaderships and coordination, providing a community of practice for capacity building and ongoing needs and capacity gap assessments.

Initial EOTEC DevNET Pilot activity will focus on the nexus of sustainability frameworks: disaster risk reduction plans, climate adaptation and mitigation plans, associated vulnerability assessments and a thematic focus of flooding.

Additional coordination opportunities with WGDisatsers include existing deliverables, EOTEC DevNET, flood gaps overlaps and resource collection as well as Recovery Observatory activities.

Helena van Mierlo, CSA, asked if these efforts will cover the range of disasters or focus only on flooding. Nancy Searby responded that flooding was chosen as an initial use case and others will likely follow.

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| 1235 | Individual Agency Updates / Priorities | All Agencies / WG Members |

CNES:

Pierric Ferrier shared CNES status updates. Pleiades Neo (2021) expected launch this year (first of constellation of four satellites). Made and operated by Airbus Defense. Commercial agreement expected with CNES (TBC) to access the images at preferred conditions for institutional players. Optical 30cm native resolution. Surface Water Ocean Topography (SWOT) Mission 2022. Cooperation with NASA, CSA and UKSA. The SWOT mission will map variations in the levels of inland and ocean waters.

Simona Zoffoli shared ASI status updates. First satellite of COSMO Second Generation (CSG) ended the commissioning and is now available: a new Open Call on the use of CSK and CSG data will be available soon on the ASI website. PRISMA is operating nominally. Continuous support to CEOS WGDisasters initiatives.

Marcelo Quirno provided a brief CONAE update, noting CONAE’s offer of SAOCOM 1A/B data for WGDisasters activities.

Jens Danzeglocke provided a brief DLR update, noting agency interest in more systemic background missions to cover more disasters than available today.

Josh Johnston provided a CSA/NRCan update, noting they are leading a whole of government mission to produce WildfireSat, have closed out Phase A and are moving into Phase B, with a launch date of 2025/26, and intending to provide operational wildfire monitoring globally.

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| 1330 | WGDisasters Future Meetings Planning   * Telecon #29 * WGDisasters-16 | Dave Borges, NASA |

Upcoming WGDisasters telecons will be scheduled May and June 2021.

WGDisasters-16 will be scheduled during September 2021, dates TBC and dependent on final dates chosen for CEOS SIT Technical Workshop 2021.

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| 1345 | Conclusions / AOB | David Green, NASA  Pierric Ferrier, CNES |

David Green noted that the WGDisasters Vice-Chair and Data Coordination Team Lead roles are still vacant. He encouraged all WGDisaster member agencies to consider volunteering to fill either of these critical roles.

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| 1400 | End WGDisasters-15 Meeting |  |

**CEOS WGDisasters Website Statistics**

Most recent year’s data are highlighted in yellow. The previous year’s numbers are listed second and left as plain text.

The WGDisasters main page received 1376 (1110) page views since from March 20, 2020-2021.

When I ignore CEOS meetings pages, WGDisasters has the 10th (11th) most viewed page on the CEOS site.

In order from most visited to least visited WGDisasters pages:

WGDisasters Home (1376) (1110)

WGDisasters Meetings (462) (219)

WGDisasters-15 (276) (hadn’t happened yet in previous year)

GEO-DARMA (235) (177)

Floods (224) (456)

Geohazards Lab (216) (284)

GSNL (206) (152)

Volcanoes (202) (281)

WGDisasters-14 (192) (hadn’t happened yet in previous year)

Landslide Pilot (187) (161)

Recovery Observatory (154) (121)

Background (116) (191)

WGDisasters-13 (110) (229)

Members/Contacts (105) (71)

Earthquakes (102) (154)

Note that some percentage of these visits are people who get there and just leave immediately. On average, folks spend about 1:33 (1:18) on the WGDisasters main page before leaving.

Across the whole CEOS site (information for individual pages unavailable) there were 29,061 (28160) site visitors who made nearly 92,642 (96,557) page views. 87.8% (86.1) of those visitors were first-time visitors.