



Committee on Earth Observation Satellites

# CEOS – Working Group on Disasters

## GEO/LEO/SAR Flood Pilot Projects

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Mitch Goldberg (NOAA)

WG Disasters 17 (virtual)  
15, 16, and 17 March 2022





## Initial Objective

Flood Pilot Projects would explore and demonstrate best practices for combining diverse optical and SAR data to map floods

Report on best practices developed through integration of LEO-GEO and SAR.

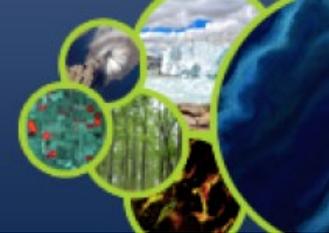
Although this objective is still **relevant** and the motivations behind, fully **valid**, the plan for the Flood Pilot Projects is to **gradually** transition into exploring the use of satellite EO for **other aspects** of Flood Risk Assessment and Management





Since December 2021

- 3 monthly meetings with members of the “Sub-groups”
- 2 coordination meetings
- Permanent e-mail exchange among the co-leads, for project coordination
- Interactions with other initiatives and WGs



- Subgroup #1: Red River of the North, NRCan/NOAA
- Subgroup #2: Bermejo/Pilcomayo River Basins, CONAE
- Subgroup #3: Mahanadi & Brahmaputra Rivers, ISRO
- Subgroup #4: Pearl River, CAS
- Subgroup #5: Balkans, HUA
- Subgroup #6: Myanmar, LIST



A broad variety of aspects have been covered, including:

- ML techniques for merging water fraction products,
- Downscaling DEMs to a finer detail,
- Merging GEO-LEO and SAR sources,
- Monitoring antecedent basin conditions with satellite rainfall estimates prior to the formation of a flood wave,
- The infusion of satellite data to flood monitoring and warning systems, automated flood extent mapping systems.



- Probabilistic inundation maps, combining the results of hydrologic modelling with the inundation statistics based on a library of SAR imagery of events.
- SAR-based flood mapping methodology for flood extent, flood frequency, evolution, etc.
- Other effects that share the same forcing as floods have been covered: erosion and soil loss, landslide risks, etc.



1- DIS - 20 - 06: Deliverable for March 2022: Flood Pilot with GEO-LEO-SAR for areas of intensive flood risk (postponed from March 2021)

2- DIS - 21 – 01: Deliverable for Q4 2024: “Understanding Flood Risk from Space”





## Flood Pilot with GEO-LEO-SAR for areas of intensive flood risk (DIS - 20 - 06)

- A structure for the deliverable has been discussed and agreed with Sub-groups
- All Sub-groups have already submitted their contributions (which included their developed products, identified good practices, support to decision making, lessons learnt, etc.)
- Compilation of Sub-groups' contributions is progressing well
- Addition of overall conclusions and summary of identified best practices is now starting
- Planned Submission date: 31 March 2022



## “Understanding Flood Risk from Space” (DIS - 22 - 01)

- As part of the CEOS Work Plan 2022 – 2024, this deliverable was proposed
- Given the maturity of Sub-groups in applying flood mapping techniques with optical, SAR or their combination, it was felt that the following step should be addressing different aspects of flood risk assessment to support flood risk management
- Assessment of impacts, exposure, vulnerability (e.g., depth-damage functions, damage to buildings and infrastructure, vulnerability indicators & indices, etc.)



## “Understanding Flood Risk from Space” (DIS - 22 - 01)

- Alignment with Priority 1 CEOS Work Plan: Disaster Risk Reduction and Response & Capacity Building to ensure long-term sustainability of CEOS strategies
- Alignment with the International agenda (Sendai Framework for Disaster Risk Reduction, SDGs, UN DRR, GEO DRR WG)



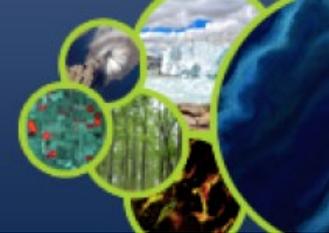
- CEOS WGISS & SEO: EAIL Focal points: Jonathan Hodge, Robert Woodcock, Dave Borges and Brian Killough.
- CEOS COAST Ad-hoc team: training on EAIL. Focal point: Merrie Beth Neely
- CEOS WGCapD & EOTEC DevNet, Flood tracker. Focal point: Nancy D. Searby
  
- WGDisasters website. Focal point: Patricia Berthele
- CEOS website. Focal point: Kim Holloway, SEO





- GEOGloWS. Focal points: Angélica Gutiérrez, Jim Nelson
- WMO Space Systems and Utilization Division: Kenneth Holmlund
- CNES FloodDAM. Focal point: Gwendoline Blanchet
- Group on Earth Observations (GEO) Global Flood Risk Monitoring (GFRM). Focal points: Dave Borges, Guy Schumann
- JRC, Global Flood Partnership GFP Focal point: TBD Peter Salamon (JRC), Albert Kettner (Dartmouth Flood Observatory), Sagy Cohen (Univ. of Alabama)??





- Most sub-group work is unfunded/voluntary contributions → relatively slow to complete workload
- Nevertheless, overall very good engagement and progress
- Increased interaction and synergies among sub-groups needed
- Flood Pilot represents a wide international span of sub-groups (US/CA, CONAE, CAS, India, Europe)
- Pilot AOIs are diverse and have their own particular data/analysis challenges
- Flood Pilot is making linkages to a number of other initiatives (e.g., EAIL, COAST) as well as other types of disasters (one sub-group is linking flood risk to burnt areas)

**Strengths****Weaknesses**



- Continue the consolidation of flood mapping techniques with LEO-GEO-SAR integrated sources
- Gradually incorporate other risk aspects into the analyses, in line with the DIS-22-01 deliverable
- Increase the impact of the Oilots on the decision making of disaster managers
- Increase interaction and synergies among sub-groups





Special thanks to those who initiated this project and moved it forward:

**Dave Borges, David Green, Andrew Molthan, Maggi Glasscoe.**

**(and, of course, Mitch Goldberg and Guy Schumann (note by Marcelo))**

Also particularly acknowledged are the other initiatives we link to (shown on a previous slide)



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|-------|---|--|-------|------|
| M14/2 | <p>Flood Pilot Co-Leads to coordinate with DCT and CONAE Flood Pilot Team members to understand and capture SAOCOM data sharing requirements.</p> <p>Flood Pilot Co-Leads to develop Pilot Data Availability spreadsheet. Pilot Data Call developed and distributed. CONAE and CSA data sharing procedures under development.</p> | <p>Guy Schumann,<br/>Andrew Molthan, Mitch Goldberg,<br/>Pierric Ferrier,<br/>Marcelo Quirno,<br/>Alvaro Soldano,<br/>Ana Medico</p> | WGD17 | Open |
|-------|---|--|-------|------|

Still to remain open until the Pilot Data Availability Spreadsheet is updated.  
SAOCOM data sharing steps: see next slide.

# Steps to request SAOCOM Data for CEOS Initiatives (based on Dr Frulla's presentation)



In general:

- SAOCOM Catalogue can be navigated freely to identify already existing data. Upon registration, quick looks can be seen:  
<https://catalogos.conae.gov.ar/catalogo/catalogoSat.html>

Steps to request SAOCOM data (both archived and new acquisitions):

- A letter directed to CONAE's CEOS Principal (Eng. Raul Kulichevsky) describing the overall project, its objectives, duration, participants, the area of interest (including, if possible, files in KML or Shapefile formats).  
Send letter to: [u\\_inter@conae.gov.ar](mailto:u_inter@conae.gov.ar) (there is an underscore between "u" and "inter")
- Signing of the License of Use by the project participants who will work with the images.
- Data will be transferred via FTP.



Thank you for your attention