



Committee on Earth Observation Satellites

CEOS – Working Group on Disasters

GEO/LEO/SAR Flood Pilot Projects

Marcelo Uriburu Quirno (CONAE) - Presenter

Guy Schumann (RSS Hydro)

Sean Helfrich (NOAA)

WGDisasters-20 Meeting – Agenda item 15

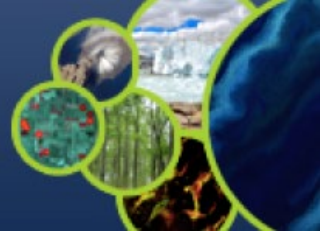
Yellowstone Park, USA

5 – 7 September 2023





FP leadership



Mitch Goldberg (NOAA) retired last July and Sean Helfrich (NOAA) took over as FP co-lead.

Welcome on-board Sean and our appreciation to Mitch for his great leadership.



The main Objective is to explore and demonstrate best practices for combining LEO, GEO and SAR data to map floods.

The focus is on how their combination can render better results than individual sources.

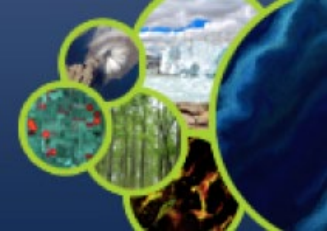
Different spatial and temporal resolutions, latencies, swaths, ability to tackle frequent cloudiness, presence of canopy, time of the day are included.

In addition, the FP are **gradually** broadening their scope to include exploring the use of satellite EO for **other aspects** of Flood Risk (e.g. exposure and vulnerability).



Since April 2023 (WGD-19)

- 3 monthly meetings with members of the “Sub-groups”
- Permanent e-mail exchange among the co-leads, for project coordination



“Understanding Flood Risk from Space” (DIS - 22 - 01): Deliverable for Q4 2024

- Given the maturity achieved in applying flood mapping techniques with optical, SAR or their combination, the deliverable will also include aspects of flood risk like exposure and vulnerability, to support flood risk management
- Report on best practices developed through integration of LEO-GEO and SAR
- Lessons learnt from organizations that use satellites for flood response/management
- Format TBD



SG1: Red River of the North

Vince Decker, Natural Resources Canada

SG2: Bermejo and Pilcomayo Basins

Álvaro Soldano & Marcelo Uriburu Quirno, CONAE

SG3: Brahmaputra River and Mahanadi Delta

G S Rao, ISRO

SG4: Pearl River Basin

Weiyuan Yao, CAS

(No longer active)

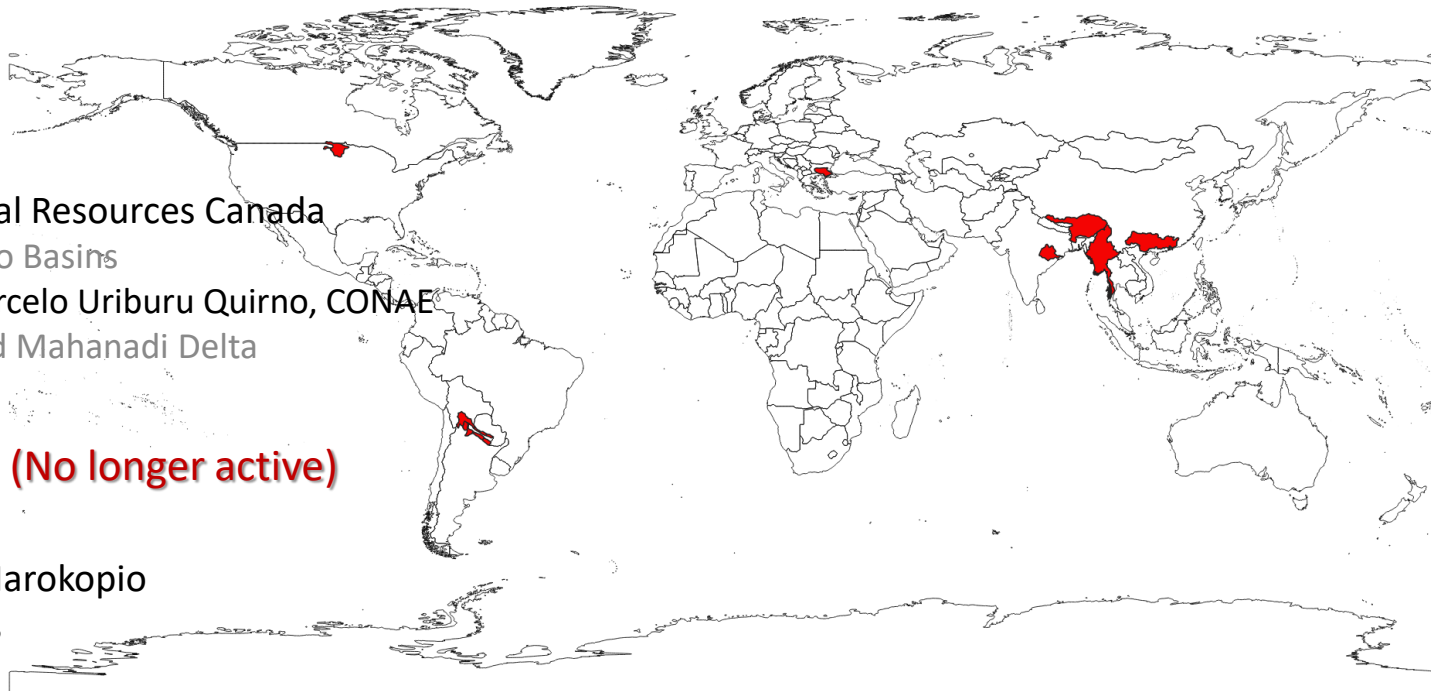
SG5: Balkans

Issaak Parcharidis, Harokopio

University of Athens

SG6: Myanmar

Patrick Matgen, LIST





A broad variety of aspects have been covered, including:

- Merging GEO-LEO and SAR sources,
- ML techniques for merging water fraction products,
- Downscaling flood mapping to a finer detail with the use of DEMs ,
- Monitoring antecedent moisture conditions at basin level with satellite rainfall estimates,
- 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.



Recent Pakistan Floods

Many major floods have occurred in Pakistan. Flooding in 2020 killed 410 people and caused US\$1.5 billion worth of damage. In 2021, 187 deaths occurred in Karachi, and **1,739 killed across the country in 2022**. In 2023, monsoon rain-driven floods caused that at least 159 people were killed, including many children.

Extreme flood in 2022

Since mid-June 2022, extreme monsoon rains have led to the country's worst flooding in a decade. According to Pakistan's NDMA, the floods have affected more than 33 million people and destroyed or damaged more than 1 million houses.

A seminar on the use of EO in Pakistan floods will be held (end of September, tentatively) for Flood Pilot Subgroup members and other invited people.

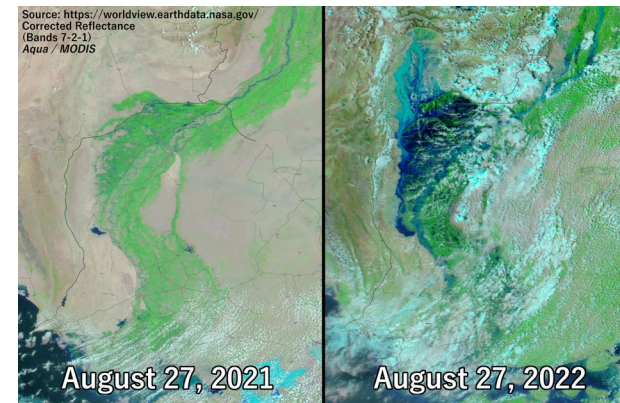


Confirmed speakers are:

Lara Prades, UN WFP Pakistan Office

Marco Chini, LIST

Paolo Campanella, WASDI



Other speakers to be invited (Dominique Blariaux, PDNA, Mathias Studer, SERTIT)

Agenda, yet to be arranged. Topics:

- the use of EO from satellites in Pakistan floods: monitoring flood extent, assessing flood duration and impacts. Lessons learnt
- the use of the WASDI platform: introductory talk, with a short tutorial and use cases



Other possible topics to consider for future seminars:

- Explore the use of existing discovery tools. Compare usability, and features. E.g. WASDI, CEOS Analytics Lab (former EAIL) and others currently being tested in many organizations
- Flood Severity Index: how to categorize floods and their magnitude, based on sat EO
- Use of EO to assess Exposure and Vulnerability to Floods

As co-leads, we need to foster the subgroup members' participation in the workshops and the application of the acquired knowledge to their projects



CEOS Earth Analytics Interoperability Lab

Working Group on Information Systems and Services and Systems Engineering Office

20 April 2020

Robert Woodcock, CSIRO, WGISS Chair

Brian Killough, NASA, SEO Director

upgrade

CEOS Analytics Lab

- better functionalities
- better visualization tools
- easier incorporation of EO data
- training, to be provided



some of the new-version improvements

SubGroup members, invited to express their interest in having an account



CEOS Analytics Lab

A small group of CEOS Analytics Lab 'beta users' from Flood Pilot is being established: FP co-leads and some conspicuous subgroup members.

An initial introductory meeting will be held with Dave Borges (SEO), CSIRO Chile and team, including Q&A and recommendations from the beta users.



- Continue the consolidation of flood mapping techniques with LEO-GEO-SAR integrated sources
- Adopt / increase the use of data discovery and analytics labs (e.g. CEOS Analytics Lab)
- Gradually incorporate all aspects of flood risk into the analyses, in line with the DIS-22-01 deliverable
- Increase interaction and synergies among sub-groups and other CEOS WGs
- Increase the knowledge of the use of satellite data for flood response/management made by disaster managers and the impact of the FP on their decision making process



Pakistan
Floods
Seminar

CEOS
Analytics
Lab
meeting

CEOS
Analytics
Lab
training

2nd
Seminar

3rd
Seminar

4th
Seminar

Deliverable
submission

Sep 2023

Oct 2023

Nov 2023

Dec 2023

Jan 2024

Feb 2024

Mar 2024

Apr 2024

May 2024

Jun 2024

Jul 2024

Aug 2024

Sep 2024

Oct 2024

Nov 2024

Dec 2024

Monthly meetings, not indicated, will still be held.



Some linkages to be developed or strengthened, particularly with JRC and the Global Flood Partnership, UN-SPIDER and Copernicus, mostly as speakers in our workshops/seminars.

Take advantage of freely-available operational models as GEOGloWS (GEO, ECMWF, etc.) and GloFAS (Global Flood Awareness System, Copernicus EMS). These models run hydrologic /hydraulic simulations and produce deterministic and ensemble hydrologic forecasts.

Different uses by flood pilot projects to be explored: for validation of EO-based flood extent delineation, in conjunction with a DEM? To support spatial/temporal interpolations and/or extrapolations?



Linkages with other CEOS and non-CEOS WGs (Ongoing)



- CEOS WGISS, CSIRO Chile & SEO: EAIL Focal points: Jonathan Hodge and Dave Borges.
- CEOS WGCapD & EOTEC DevNet, Flood tracker. Focal point: Nancy D. Searby (NASA)
- GEOGloWS. Focal point: Angélica Gutiérrez (NOAA)



EOTEC DevNet Community of Practice Americas Region - Floods Working Group Meeting



This is the quarterly meeting of EOTEC DevNet's community of practice floods working group for the Americas region.

SHARE THIS INVITE WITH A COLLEAGUE! New participants should register [here](#).

Our spotlight will feature a presentation from the **Copernicus Early Management System** on a **major update (version 4.0) of the Global Flood Awareness System (GloFAS)**, which is now available on the [GloFAS Map Viewer](#)

What is EOTEC DevNet? We are a network of networks bringing the power of satellite-derived Earth information to more users around the globe. Our aims are to 1) make Earth observation capacity building more accessible and relevant, and 2) increase the use of Earth information in decision-making. We seek to improve collaboration among training providers, foster knowledge-sharing, and promote best practices. Our leadership represents United Nations agencies and other partners committed to sustainable development.

NEW WEBSITE! <https://eotecdev.net/>

Twitter: @EOTECDevNet

LinkedIn: @EOTEC DevNet

When

Wednesday Oct 18, 2023 · 4pm – 5:15pm (Coordinated Universal Time)

Location

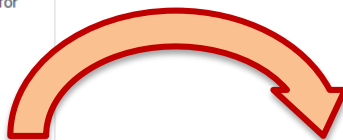
Connection: <https://zoom.us/j/93114791929>

[View map](#)

Guests

eotecdevnet@gmail.com - organizer

Guy Schumann

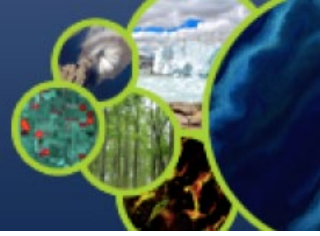


Update of GloFAS by the Copernicus EMS

When

Wednesday Oct 18, 2023 · 4pm – 5:15pm (Coordinated Universal Time)

Guy Schumann, Marcelo Uriburu Quirno and William Straka are members of this Community of Practice



Thank you for your attention