Recovery Observatory Demonstrator – recent updates and long-term sustainability approach

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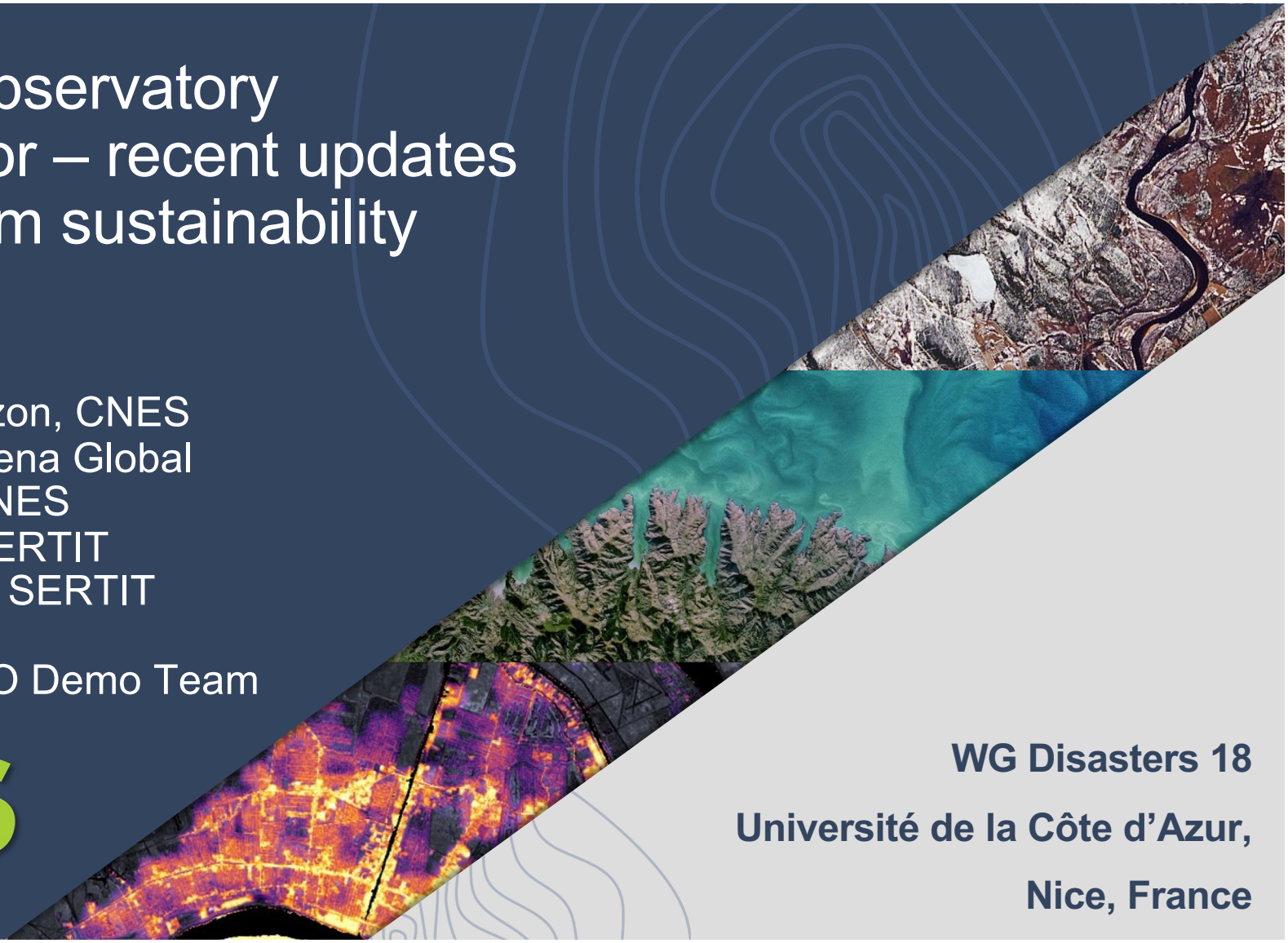
on behalf of the RO Demo Team



CEOS
Committee on Earth Observation Satellites

WG Disasters 18

Université de la Côte d'Azur,

Nice, France

Overview

Pakistan Floods (20 September)

- ***Situation***
- ***Needs***
- ***Current Response (from satellites)***
- ***RO added value***

Sustainability Sub-team

- ***Overview of work to date***
- ***Partners and roles***
- ***Activation process***
- ***Sustainability challenges***
- ***Means***

Pakistan Activation

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RO Liaison Officers for RO Pakistan 2022

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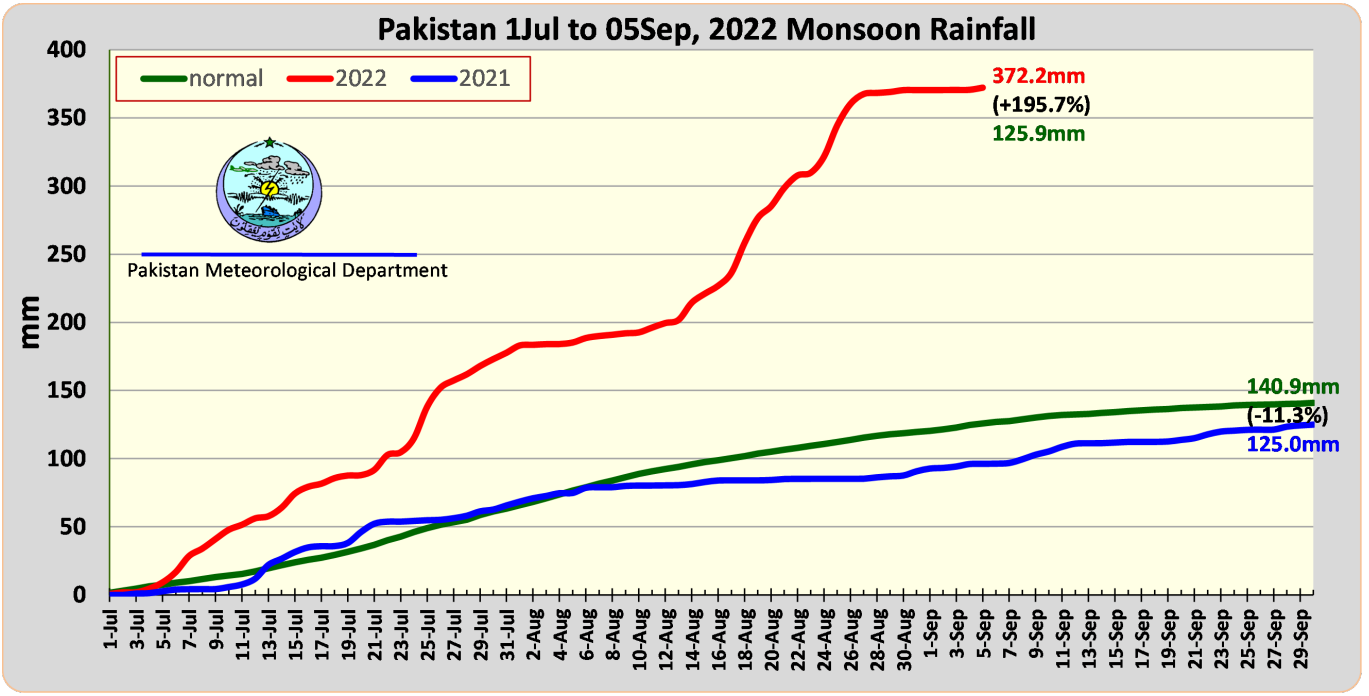
Context

- Since mid-June 2022, severe heat waves caused stronger monsoon rains and melting glaciers
- Worst recorded flood event in Pakistan - submerged one-third of country, impacting 4,2 million people and killing more than 1,500 people



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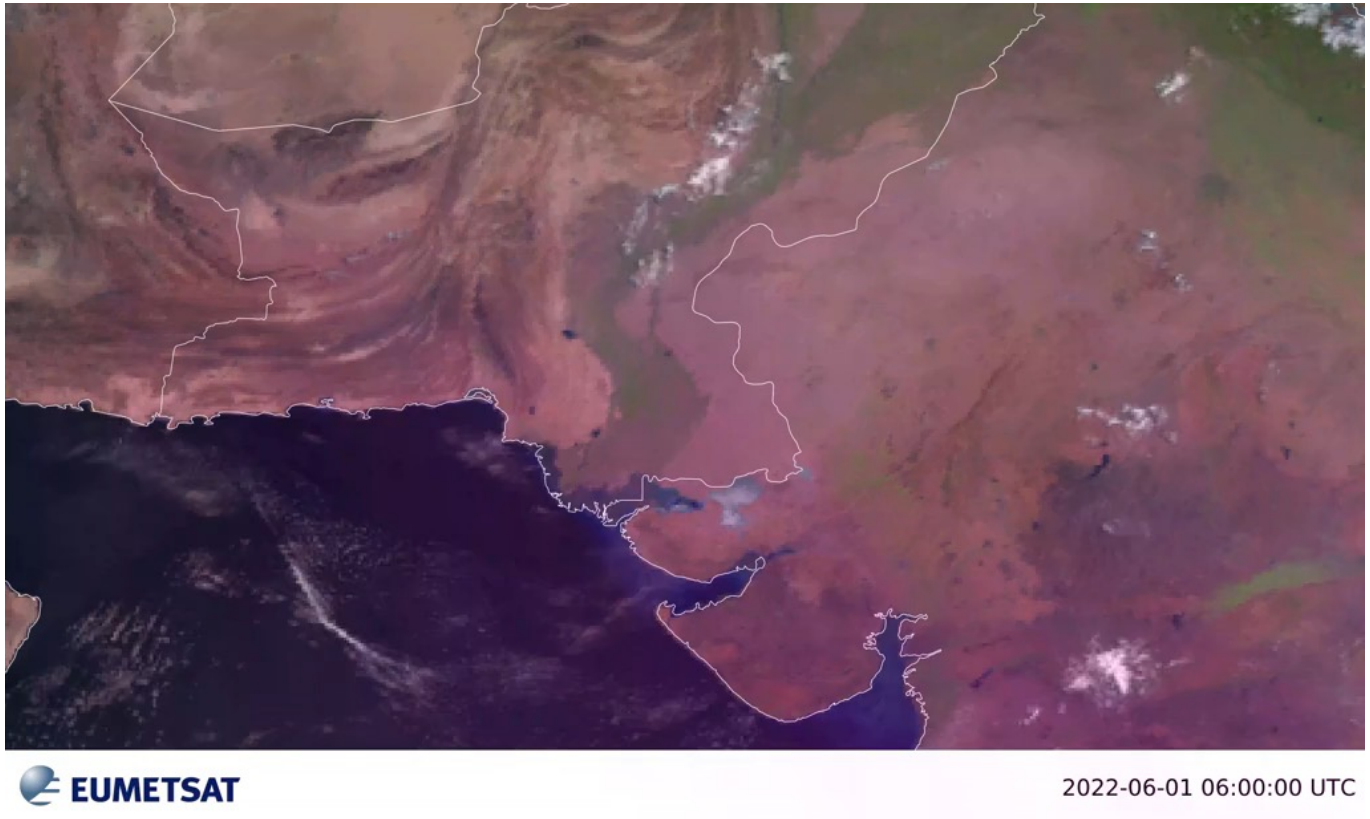
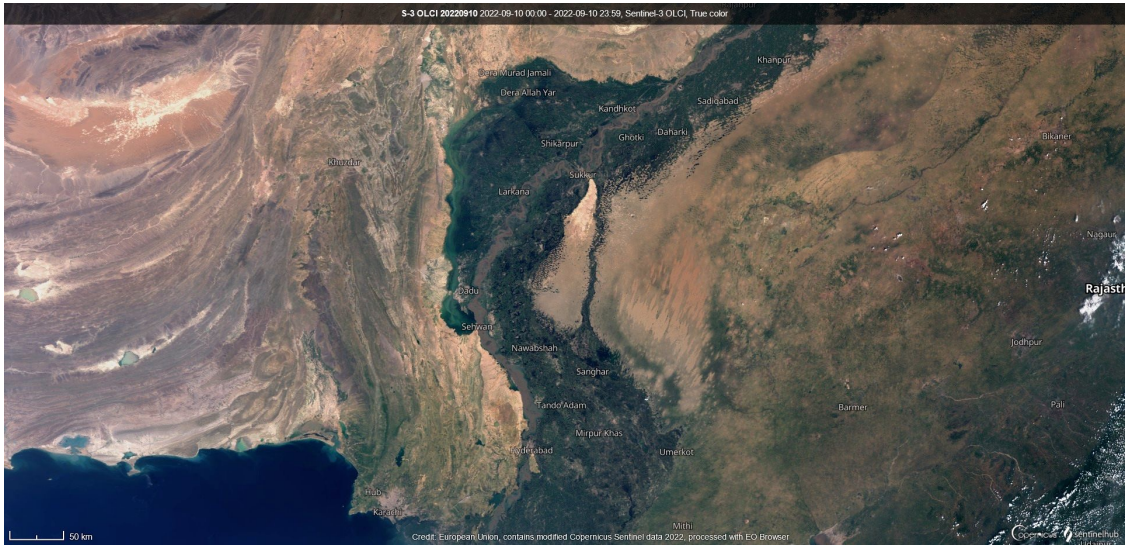


RO Demo 4 activation

The **4th Recovery Observatory Demonstrator** has been triggered 20 September at request of EU, on behalf of the tripartite team (**EU / World Bank and UNDP**), in support of:

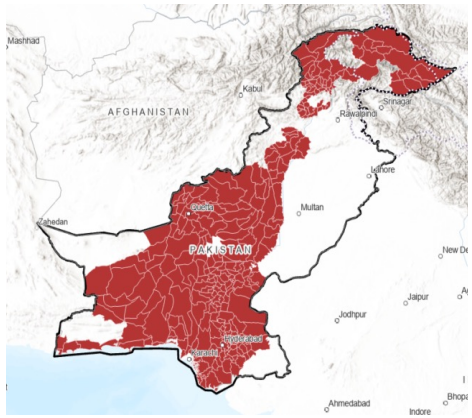
- the **Post Disaster Need Assessment**
- the **Recovery Framework**



PDNA needs

- PDNA officially activated on September 16, 2022
- EU will coordinate the PDNA process and lead the agriculture sector
- The PDNA report is expected for mid-October

- RO activation would focus on providing complementary information to that have been already (or will be) committed (e.g. IPSOS and CIMA/LIST contributions)
- The analysis will focus on 84 districts that have been identified as « calamity districts »
- Needs has been expressed concerning:
  - potential landslides that may have impacted orchards
  - potential impacted Natural Park and Reserve



The 84 calamity districts with a priority level

Existing contributions

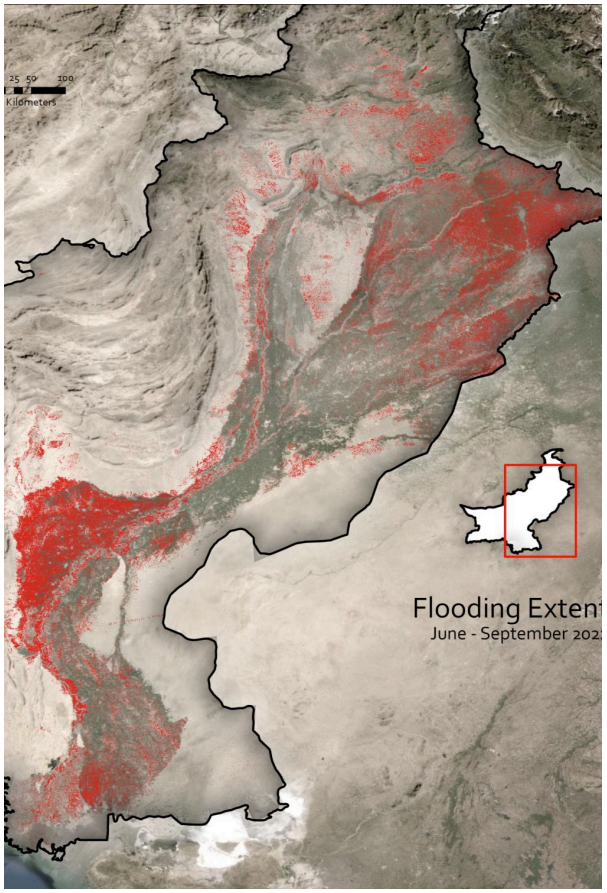
IPSOS

- Subcontractor for the World Bank
- Global flood extent
- Global flood intensity

Using Sentinel-1 (10m) data

- Estimation of damage for major crops

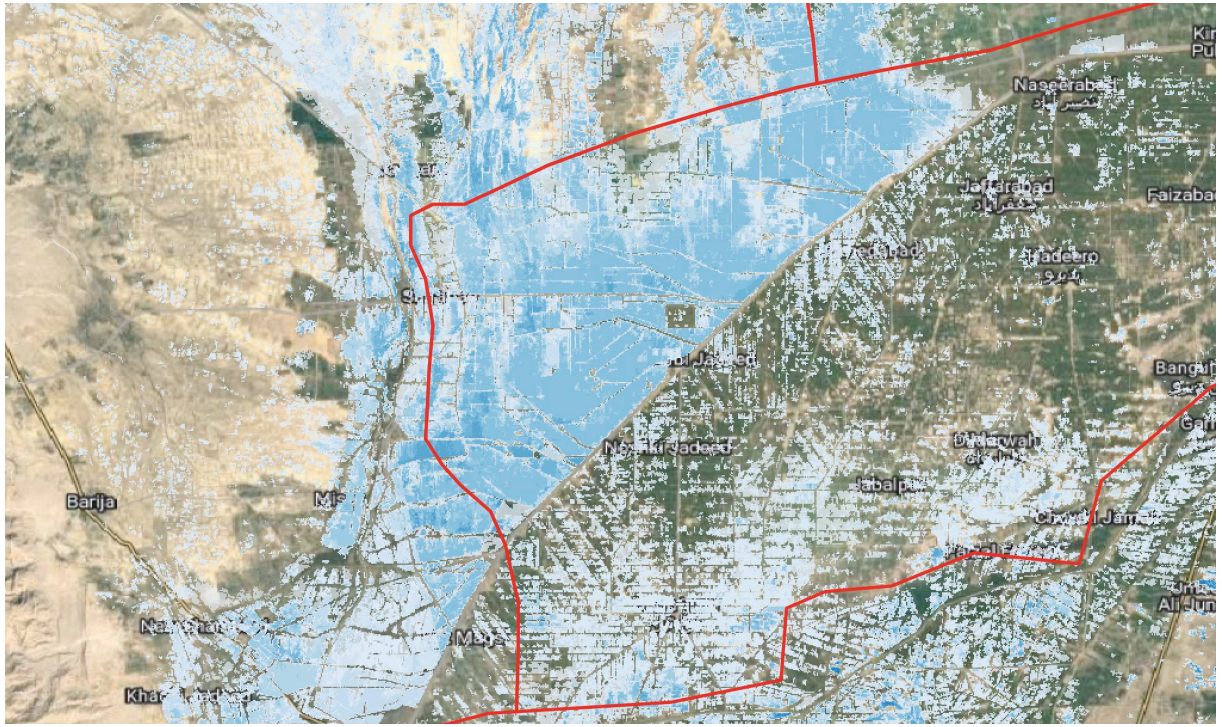
Using databases, publicly available information and field survey



Existing contributions

CIMA/LIST

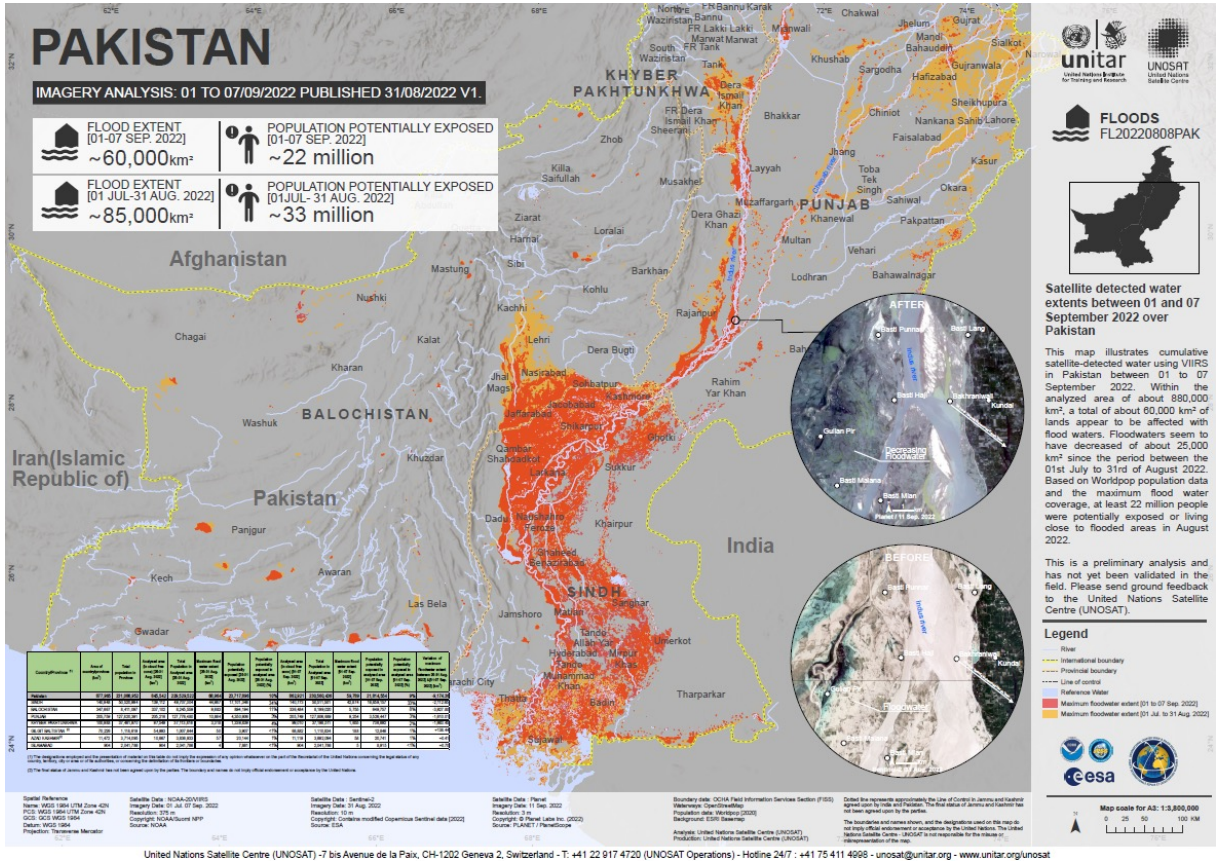
- Contribution through ADB
- Flood cumulative extent June-August
- Flood frequency



Existing contributions

UNOSAT/UNITAR

- Contribution through the International Space and Major Disasters
- Flood extents from July to mid-September



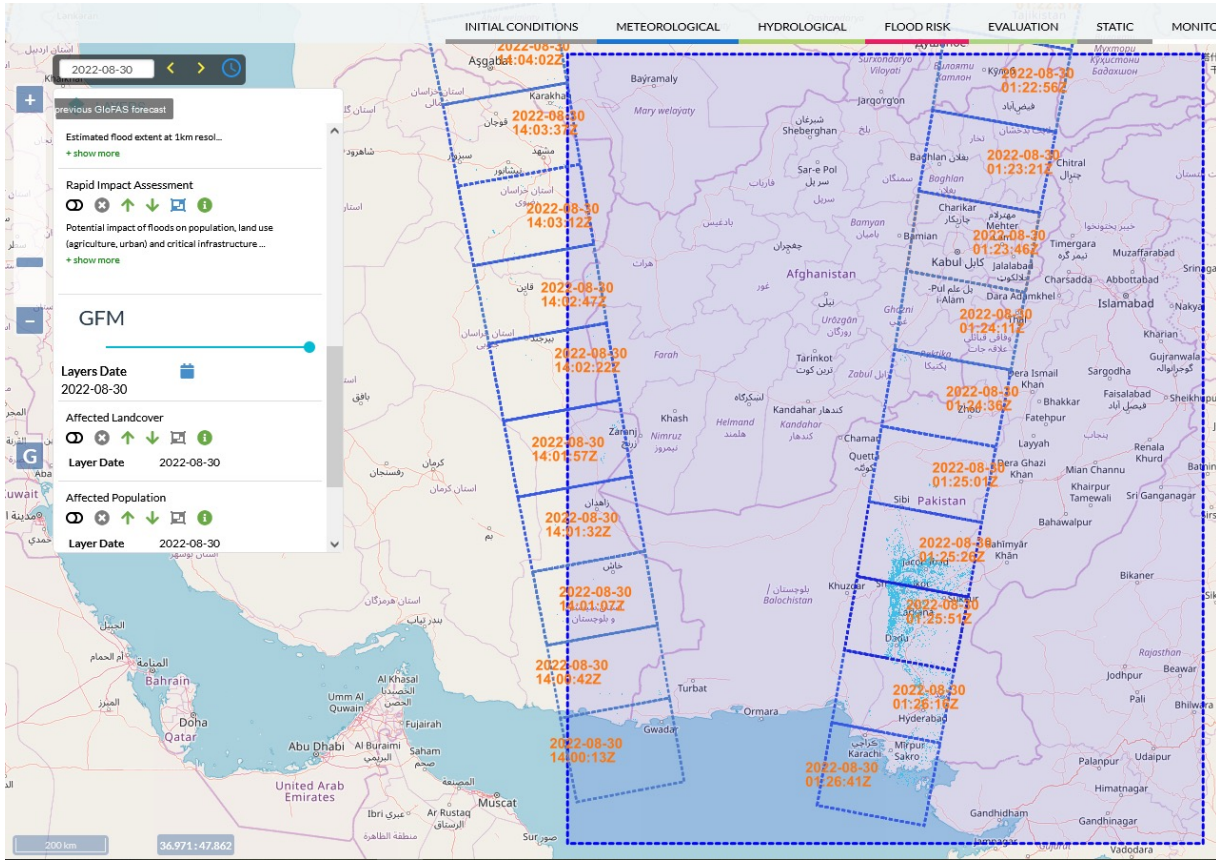
Existing contributions

Global Flood Monitoring

Copernicus Europe's eyes on Earth

Emergency Management Service

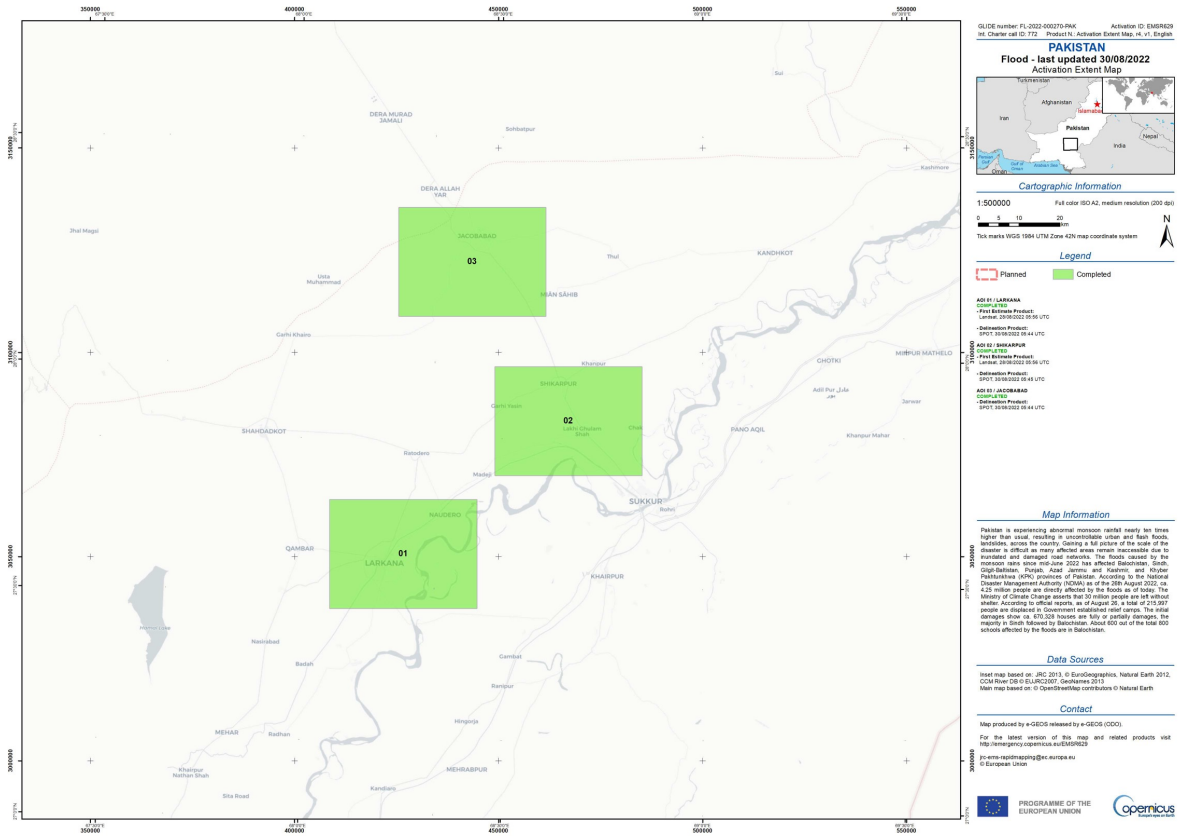
- Estimated flood extent at 1km resolution based on Sentinel-1 data
- Revisit every 12 days



Existing contributions

EMS Copernicus Rapid Mapping

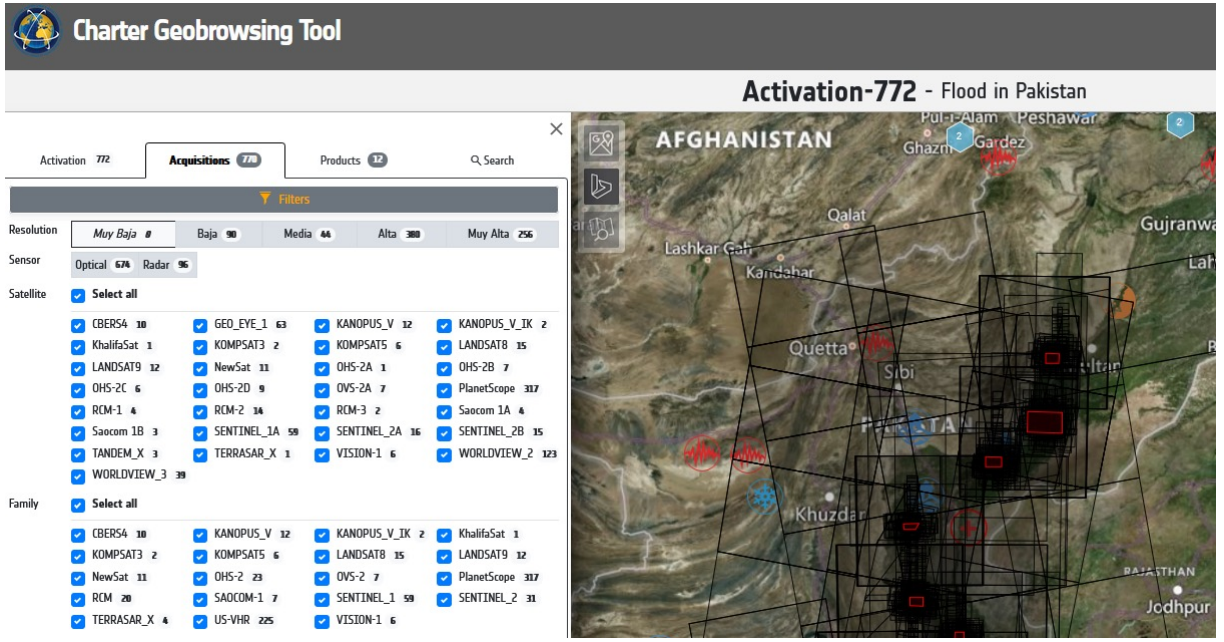
- Detailled flood delineation at 1,5m over 3 inhabited areas



Other available resources

Satellite imagery

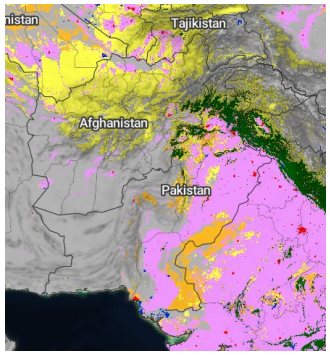
- Systematic and free acquisitions (Sentinel-1/2, Landsat-8/9, VIIRS, MODIS…)
- Images acquired within the framework of the International Space and Major Disasters

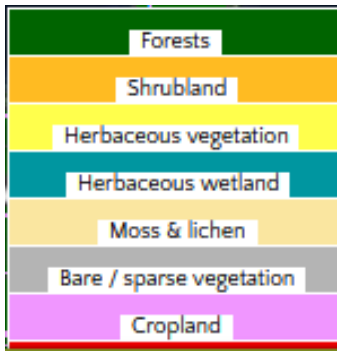


Other available resources

Landcover databases

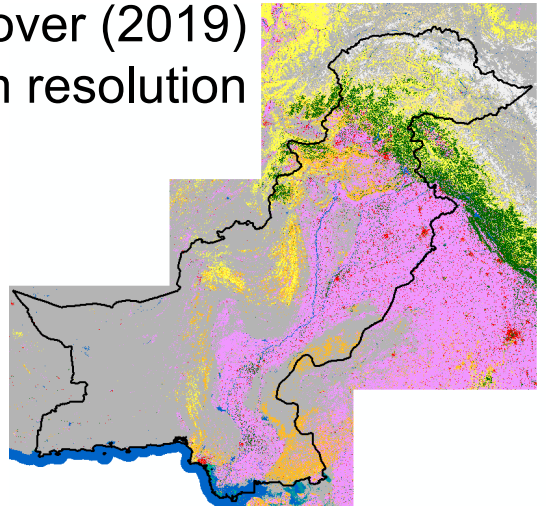
ESA Worldcover (2020)
10m resolution





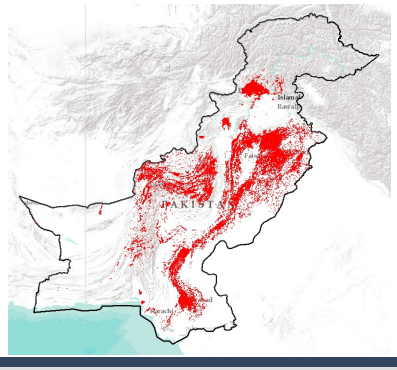
And:
- OSM ?

Copernicus Global Landcover (2019)
100m resolution



FAO Orchards 2021

Mushtaq. F., Ghosh. A., Jalal. R., Dadhich. G., Ali. M., Asghar. A., and Henry. M. for A Rapid Geospatial Flood Impact Assessment in Pakistan, August 2022. (forthcoming). Food and Agriculture Organization of United Nations, Rome, Italy



Possible CEOS contributions

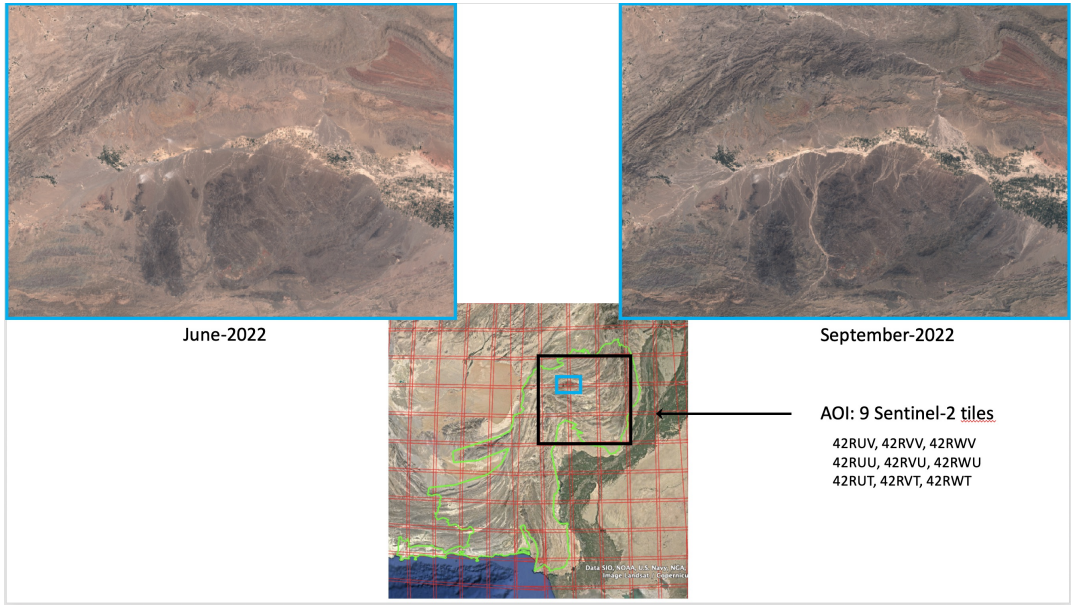
Potential landslides detection

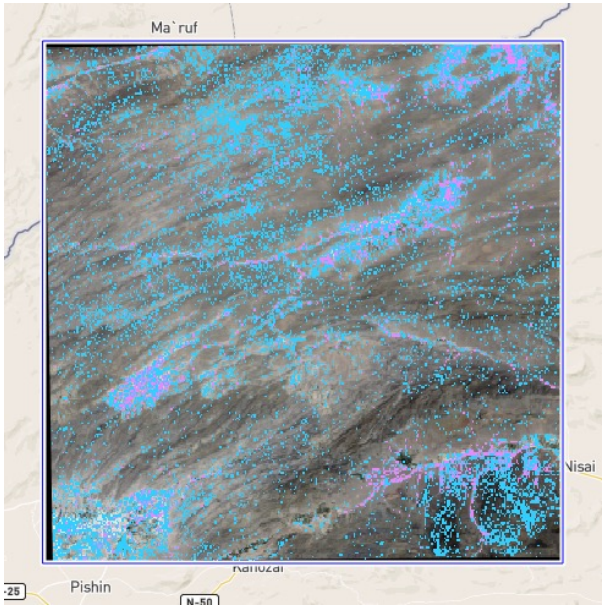
- Solicitation of potential contributors: EOST, NASA, BGC, ASI…
- Identification of two steep areas within the impacted districts

Possible CEOS contributions

Potential landslides detection

- EOST launch some automated process with the ALADIM machine learning service, exploited on GEP, over a part (9 Sentinel-2 tiles) of Balochistan Province





Possible CEOS contributions

Multi-sources flood extraction layers:

- Gathering
- Analysis and validation

Flood synthesis product:

- Generation
- Intersection with landuse/lancover layer
- Statistics derivation

Impact on natural protected areas

Summary of the PDNA phase

	Hazard characterization		Potential support		Synthesis, statistics…
Contributors	**Flood**	**Landslide**	**Imagery**	**Databases**	
ASI		To be confirmed	x		
CIMA	Already provided				
CNES			x		
Copernicus EMS	Already provided			x	
DLR			x		
EOST		To be delivered			
FAO				x	
Icube-SERTIT					To be delivered
International Space and Major Disasters			x		
IPSOS		To be delivered			
LIST	Already provided				
NASA		To be confirmed	x		
UNOSAT	Already provided				
…	…	…	…	…	…

Recovery Observatory – status of Sustainability Subteam

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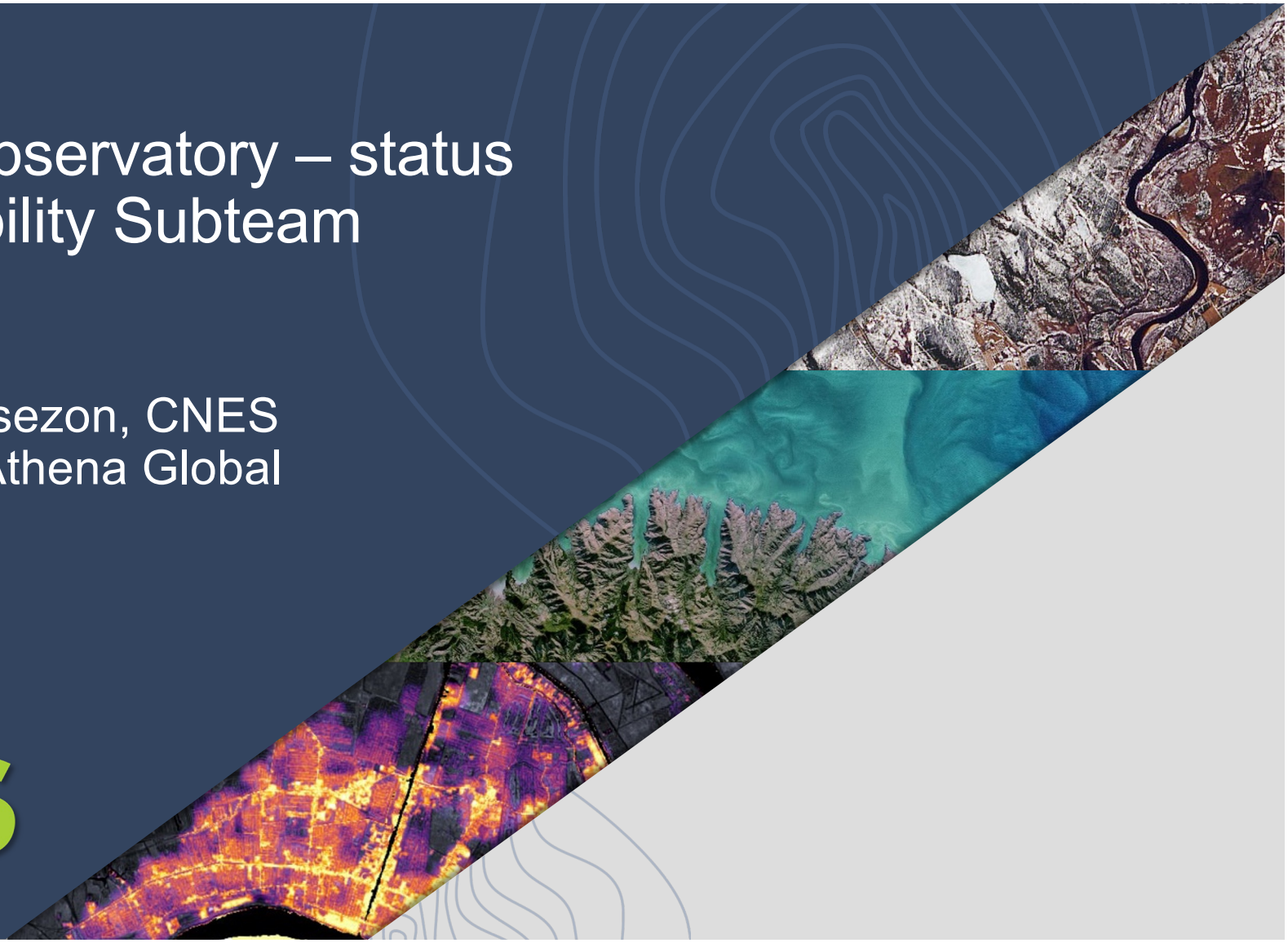

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Sustainability sub-team

- ***Created spring 2022 – representatives from tripartite agreement, space agencies and solution providers***
- ***2 mtgs to date in June and September 2022***
- ***Will report back to RO Demo Team at UR 2022 meeting***
- ***Expected to continue to end 2023, with emphasis moving from concept development to implementation in early 2023***

Partner contributions

Openly available response data and products

- International Charter
- Copernicus EMS RM
- Sentinel-Asia
- UNOSAT
- Open-source sat data (Landsat, Sentinels, DTM)
- Data bases (landcover, population,..)

CEOS best efforts RO data and products

- Dedicated acquisitions of commercial data
- Complex satellite products (e.g. SAR interferometry)
- RO liaison officer and overall coordination
- Value adding services
- Capacity building

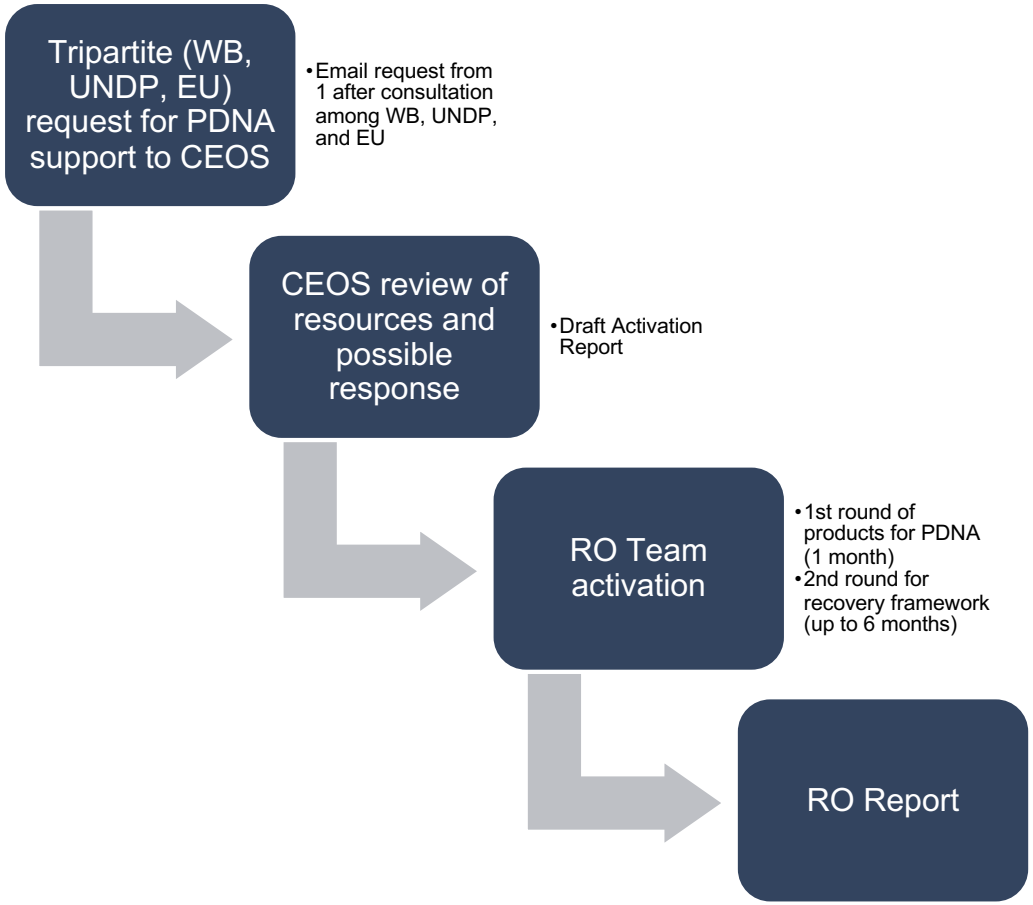
Ad hoc contributions: academia, international organizations (e.g. CEMS, FAO, UN)

- Linkages to Copernicus Risk and Recovery and ESA GDA, EO Clinic
- Value adding services
- Expert analysis
- Integration of other advanced data sources (e.g. social media, drones, …)

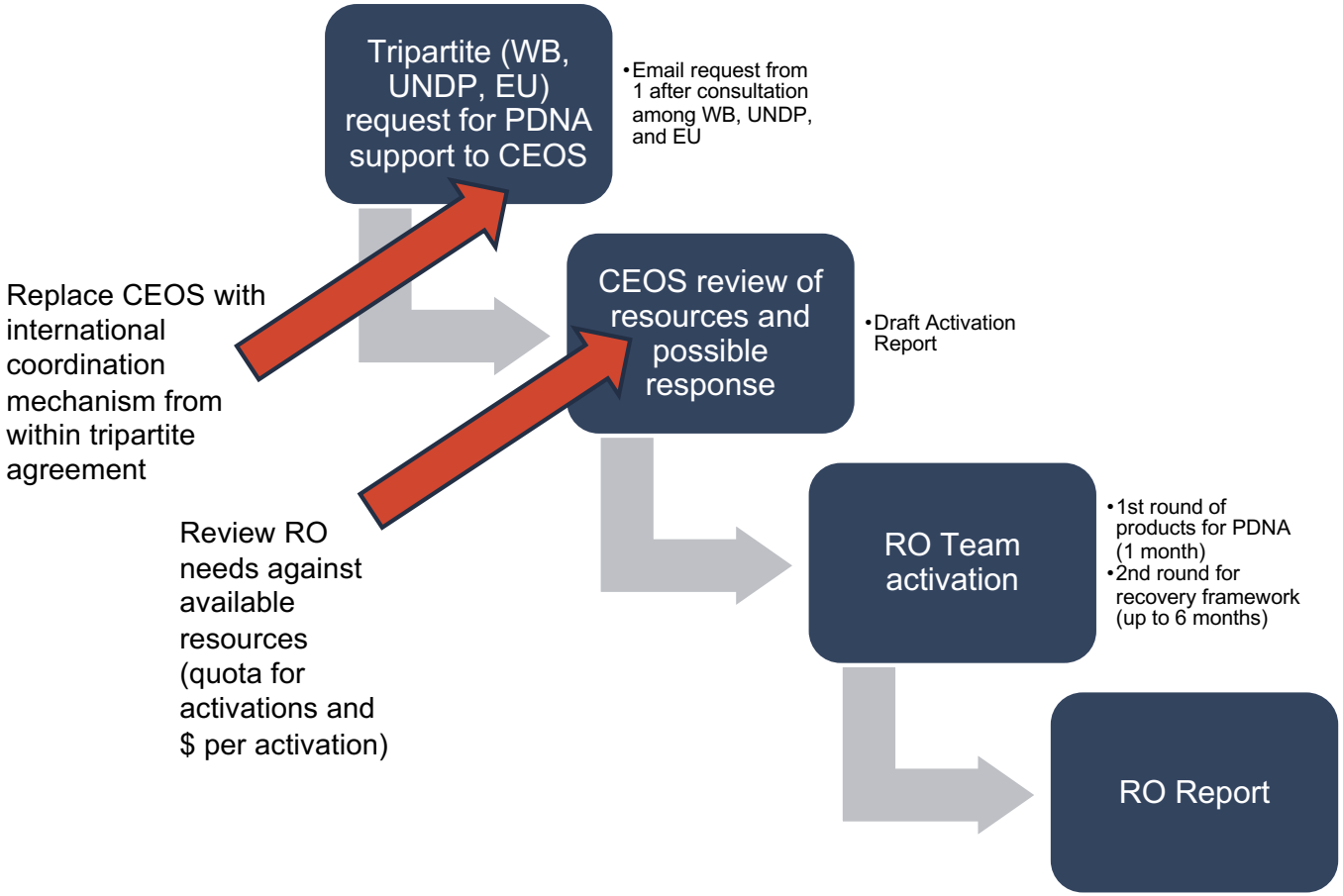
Integrated Situational Awareness to support recovery:

- Informed PDNA;
- Pre and post disaster baselines;
- Medium term monitoring;
- Capacity building assessment and plan.

Activation – RO Demo



Activation – POST RO Demo



Sustainability Challenges – and approaches to address them

- ❖ Many solutions rely on marriage of free and open data with commercial data sets – **data cost** remains a hurdle
  - Work with hotspots and provide **total coverage at varying resolutions**; ensure solutions are scalable.
- ❖ **Awareness** of specific benefit still limited in recovery community
  - Showcase RO Demo successes from **stakeholder viewpoints**
- ❖ Understanding of **differences in satellite data** solutions still low (e.g. free and open data vs commercial datasets)
  - Focus on **integrated solutions** but bring **clear cost-benefit** to show how using commercial data sets augments overall benefit of satellite EO usage
- ❖ Short timeline for PDNA means **budgets** not usually available to invest in EO (especially value-added products which are key)
  - Identify **cost-benefit wins and set up funds in advance of disaster to be able to tap into resources**
- ❖ Continuous effort to be put on **Capacity Building** (not only technical, decision makers too) and **co-construction**
  - Strengthen **links WG CapD / WG Disasters**, for a synergistic action ; Develop **"peer awareness"**

Means

Possible sources of funding:

- ***World Bank/GFDRR – existing trust funds and/or new initiatives?***
- ***EU – existing ACP programs with a focus on capacity building for risk reduction***
- ***UNDP – UNOSAT SOP agreement and training for PDNAs***
- ***Foundations? Private sector?***

Vision to move forward:

- ***Chart out cost-benefit of specific RO activations, either past or imagined;***
- ***Raise profile of RO Demo within tripartite agreement organizations; face-to-face meetings at World Bank, UNDP, Brussels/EU…***
- ***Determine vision for 2024-2026 period, including establishing coordination mechanism for satellite data access; recommendations for action***

Necessary “Core” RO (as perceived to date)

RO Liaison function (to transition from satellite agencies to recovery stakeholders)

- ***Document and encourage satellite contribution from wide array of sources***
- ***Understand needs and coordinate tasking of CEOS satellites if required***
- ***Prepare dedicated PDNA contribution on as required basis***
- ***Serve as principal PoC for satellite community with recovery stakeholders***

Identify dedicated RO funds that can be activated on demand – existence of funding makes significant difference in ability to contribute quality contributions quickly (e.g. Pakistan – IPSOS and CIMA through WB and ADB)

Capacity building – only RO has a developed CB component to involve local and regional technical expertise and create longstanding institutional relationships