DICE storage services for the Geohazards Community terrain motion and volcanic activity monitoring activities

EOSC ask me anything webinar
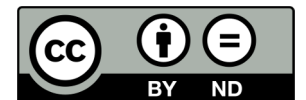
Pedro Gonçalves - Terradue

EOSC Future with C-SCALE DICE (Data Infrastructure Capacity for EOSC) EGI-ACE OpenAIRE | NEXUS Reliance

Join us on Slido

During this webinar we will be collecting questions and feedback via Slido. Join us there via a mobile device to post your own comments or upvote those of others.

Or

Go to **sli.do**

Enter event code **#682308**
and password **EOSC-AMA**

Geohazards – What they are

Geophysical	Hydrological	Meteorological	Climatological	Biological	Extra-terrestrial
Earthquake	Flood	Storm	Drought	Animal accident	Impact
Mass Movement (dry)	Landslide	Extreme temperature	Glacial lake outburst	Epidemic	Space weather
Volcanic activity	Wave action	Fog	Wildfire	Insect infestation	

Centre for Research on the Epidemiology of Disasters (CRED)

Geohazards include
- **Volcanic activity**
- **Earthquakes**
- **Landslides**

14% of all natural disasters

- Flood
- Storm
- Earthquake
- Extreme temperature
- Landslide
- Drought
- Wildfire
- Volcanic activity

2,937 — 43%
1,942 — 28%
552 — 8%
381 — 6%
369 — 5%
322 — 5%
255 — 4%
105 — 1%

CRED, 2015

Geohazard Supersites and Natural Laboratories (GSNL)

A global initiative to improve and coordinate geohazard scientific research and hazard assessment in support of Disaster Risk Reduction

https://geo-gsnl.org/

A **geohazard supersite** is a site of the Earth prone to high seismic or volcanic hazard

Modus operandi

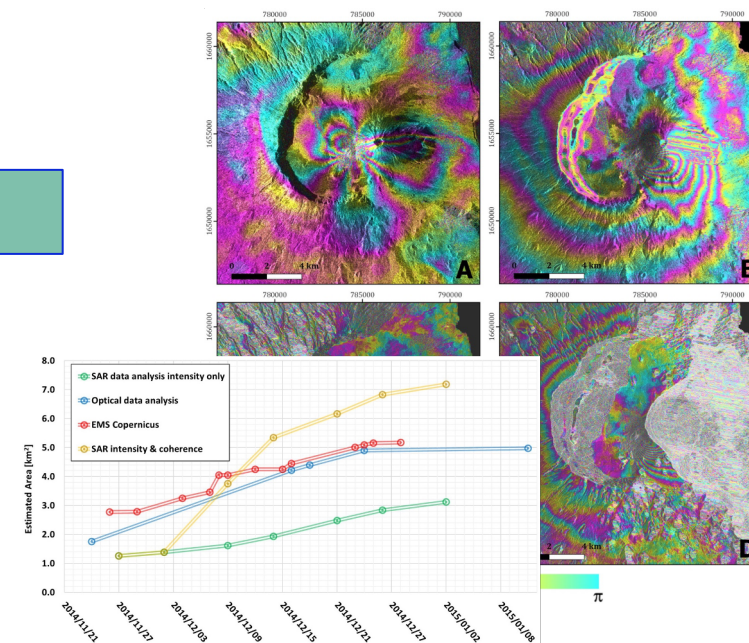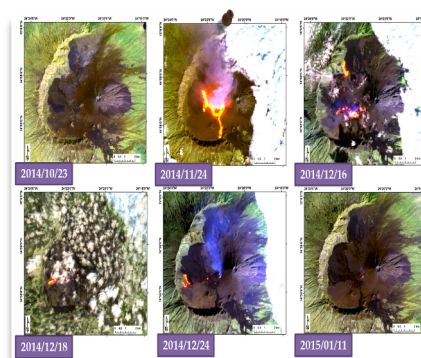## Data

Copernicus Data from space agencies catalogs

Mission	Sensor	Date of acquisition	Orbit direction
Sentinel-1	SAR	2014/11/03*	Ascending
Sentinel-1	SAR	2014/11/08*	Descending
Sentinel-1	SAR	2014/11/27*	Ascending
Sentinel-1	SAR		Descending
Sentinel-1	SAR		Ascending
Sentinel-1	SAR		Descending
Sentinel-1	SAR		Ascending
Sentinel-1	SAR	2014/12/26	Descending
Sentinel-1	SAR	2015/01/02	Ascending
Lansat-8	OLI	2014/10/23	Descending
Lansat-8	OLI		
Earth-Observing-1	ALI		
Earth-Observing-1	ALI		
Earth-Observing-1	ALI		
Lansat-8	OLI	2015/01/11	Descending
COSMO-SkyMed	SAR		Ascending
COSMO-SkyMed	SAR		
COSMO-SkyMed	SAR		
COSMO-SkyMed	SAR		
COSMO-SkyMed	SAR		
COSMO-SkyMed	SAR		Descending

Copernicus ESA Sci-Hub

Copern. Third Miss. NASA GSFC

Copern. Third Miss. Upon agreement ASI-INGV*

Software/methods

Computing facilities
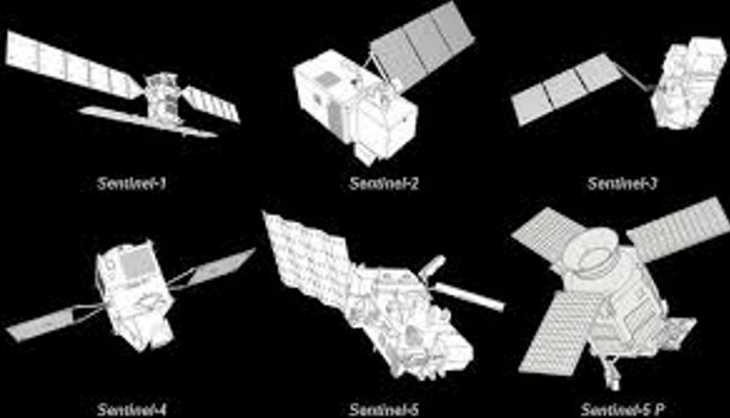
Personal workstations
Institutional HPC
(sites.google.com/ingv.it/hpcrm)

Data – results management

Personal storage
Results presented at meetings with ppt/poster stored

Collaboration

In person, telecon
Sharing by drive/cloud (Google Drive - institutional)

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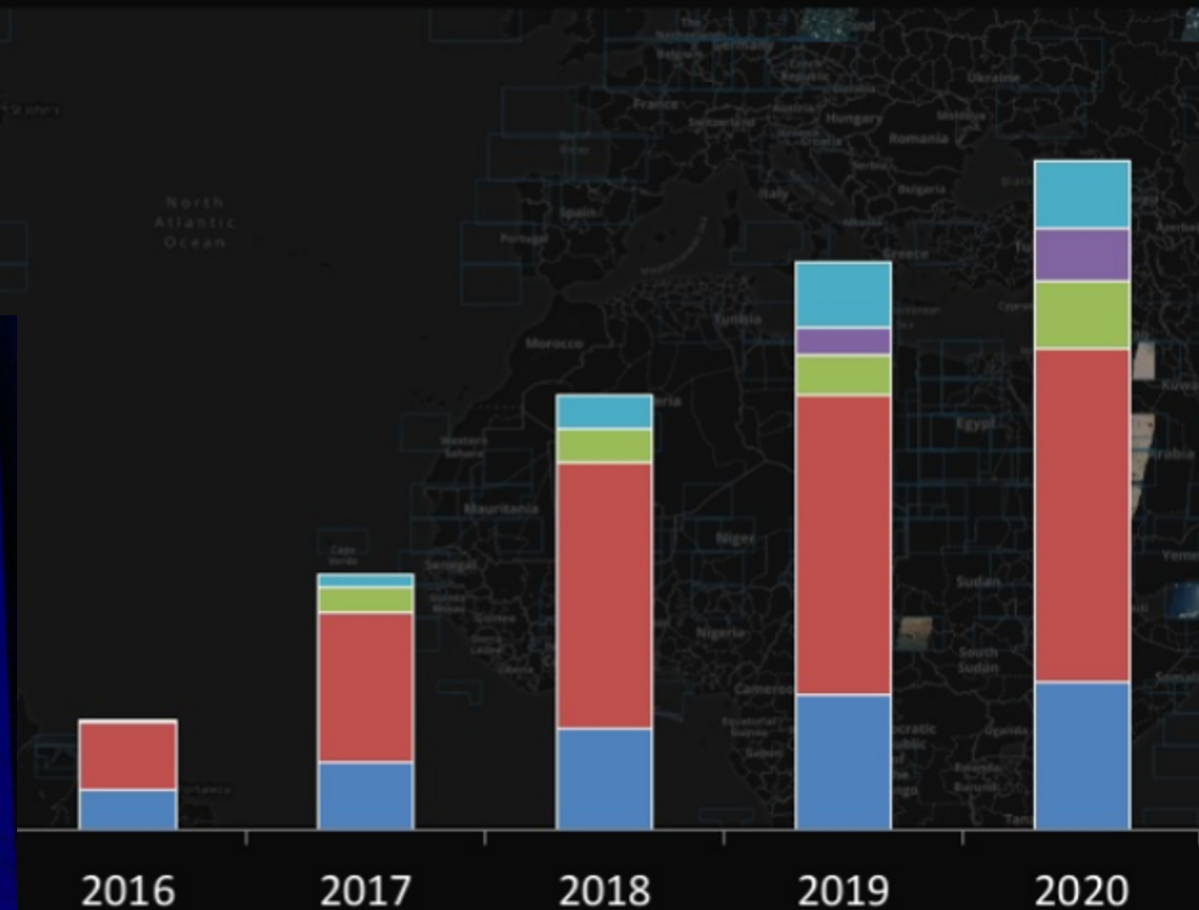
Copernicus Sentinels as the next generation Earth Observation satellites

Typical EO data volumes
500MB (S-2) < a single product < 8GB (S-1)

Copernicus Data and Information Access Services (DIAS)

- DIAS facilitate access data from Sentinel missions and Copernicus services

- Represented opportunity to federate the access to the Copernicus data close to processing facilities

- Promising researchers to easily build applications and added-value data processing with large time series
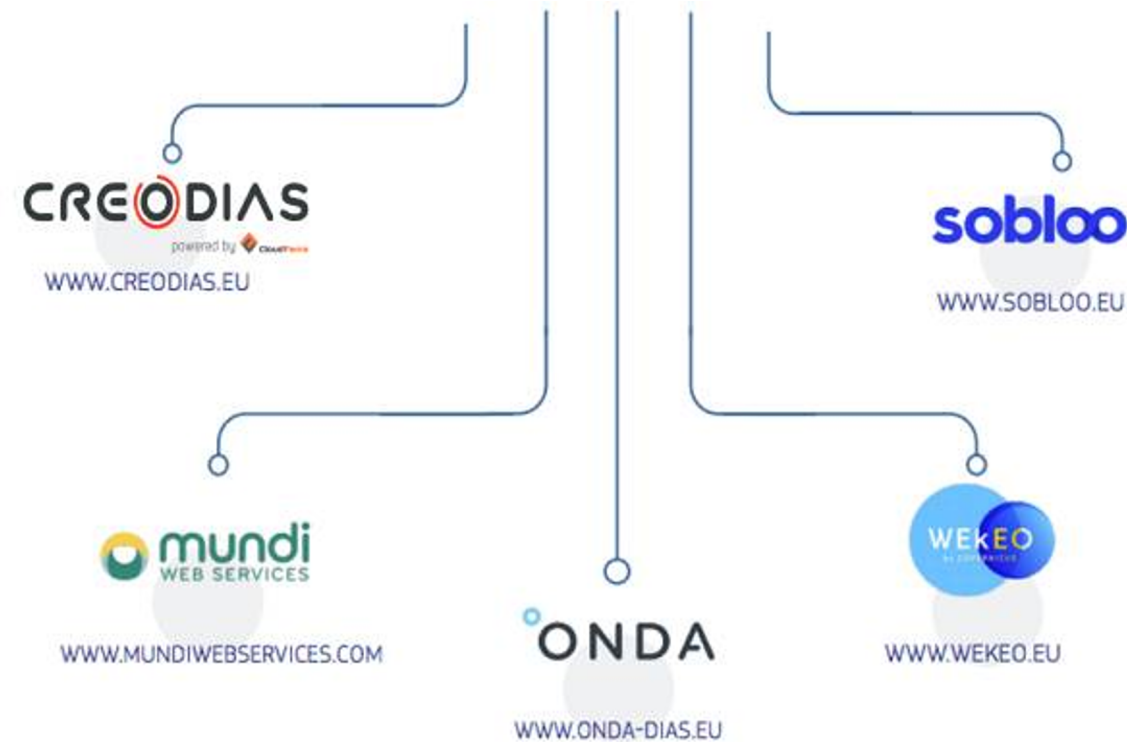
Copernicus DIAS

- Since the second half of 2020, Sentinel-1 data have been gradually moved from on-line rolling cache to long-term storage. Two-steps approach:
  - First: order and wait
  - Then: access data

- No data retention policy and with stringent quotas applied (e.g. on ONDA DIAS max 20 products per hour)

- Hampers long time series processing data pipeline
  - … but represents an opportunity for RELIANCE and EOSC

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Data Infrastructure Capacity for EOSC

- Provide storage resources scaling-out the EOSC Portal

- Enhance the data management service provisioning to cover the whole research data lifecycle interoperable with the EOSC core
  - Engage research communities in the exploitation of DICE services
  - Advance community platforms with data services
 - Provide support for the management of sensitive data

Copernicus Data in EOSC

- Collaboration with the DICE project initiated to establish a 300-500 TB storage for specific areas

- GEO Geohazard Supersites identified the need to access to long time series of Sentinel-1 Data (SLC)

- Full mission over the Supersites locations
  - 358 TB (with a subsequent 78 TB yearly volume update).
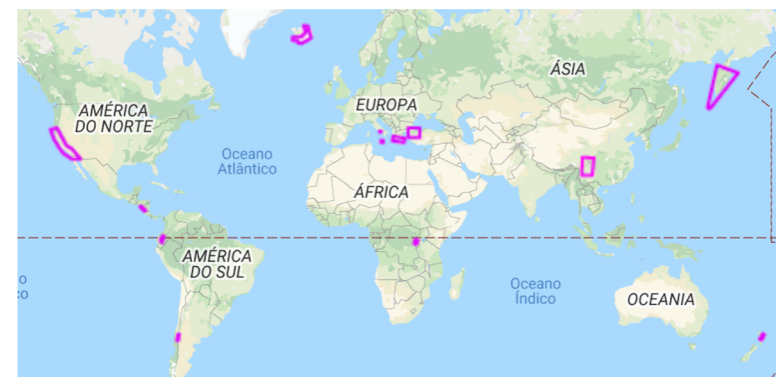
Activity Status

- Supersites data population
  - 14 site on-going (~190 TB)

- Deploy STAC API catalog
  - Discovery and access data from Jupyter Notebooks

- Kubernetes processing cluster being deployed at PSNC

- Showcase from the GEO Geohazard Supersites community
  - Define an OGC Application Package (CWL + STAC)
  - Test and validate Application Deployment in PSNC (.. and EOSC)
  - Document the full cycle as Research Object
  - Deliver long time series data to a Data Cube

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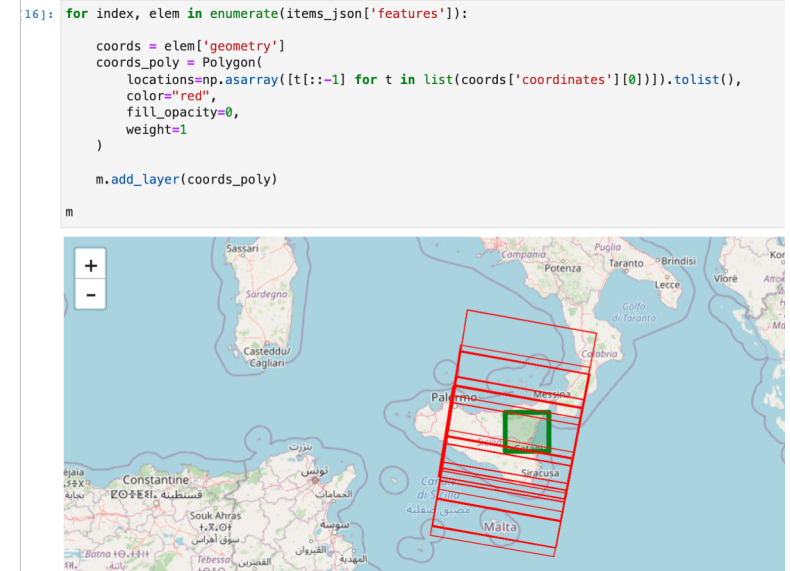
Key Points

1. Collaboration between DICE and RELIANCE will provide access to long time series of Sentinel-1 SLC (currently not available in any COPERNICUS provider)

2. EOSC and PSNC resources will offer a virtual environment to access, store, analyse and re-use data and support the development of cloud-based services for open science

3. RELIANCE will provide EOSC with an integrated virtual environment to share / reuse **EO data** where Earth Observation applications can be packaged and make ready for deployment

New OGC Best Practice for EO Application Packages — Open Geospatial Consortium

See you next time!

Thanks for joining us today.
Don't forget to attend our next ask
me anything webinar

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