EUROPEANPLATEOBSERVINGSYSTEM

Thematic Core Service Satellite Data

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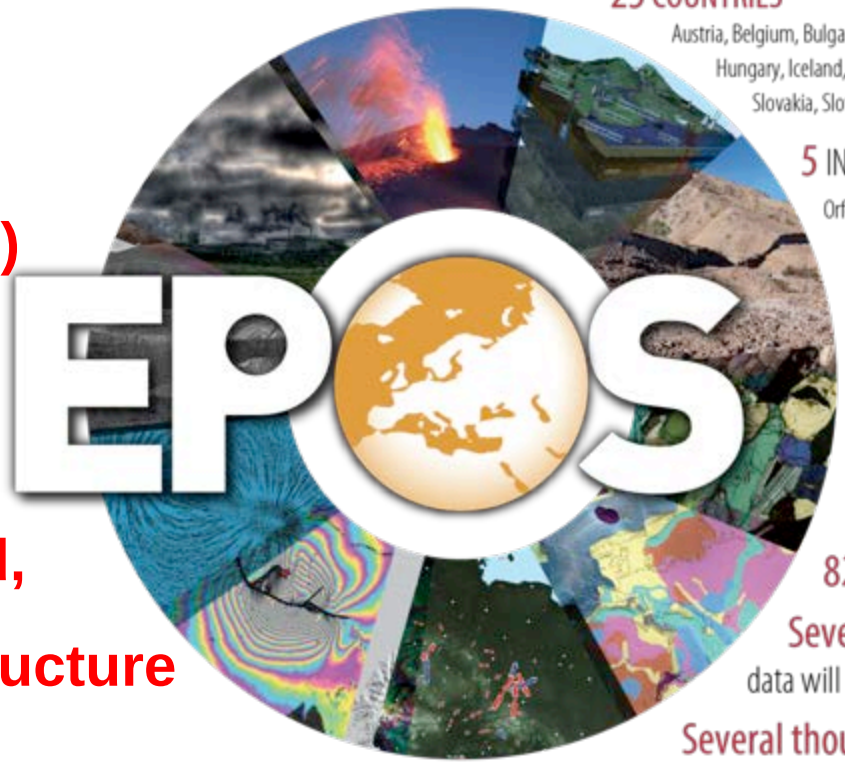
Conferenza DIITET- Informatica
Pisa
30/11/2018

What is EPOS?

EPOS is a long-term plan for the integration of research infrastructures for solid Earth Science in Europe

EPOS integrates the **existing (and future)** advanced European facilities into **a single, distributed, sustainable infrastructure** taking full advantage of new **e-science opportunities**



25 COUNTRIES
Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Grecee, Hungary, Iceland, Ireland, Italy, The Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom

5 INTERNATIONAL ORGANIZATIONS
Orfeus, EMSC, EUREF, INTERMAGNET, EuroGeoSurveys

256 NATIONAL RESEARCH INFRASTRUCTURES

4939 SEISMIC STATIONS

2272 GPS RECEIVERS

464 TB SEISMIC DATA

118 LABORATORIES

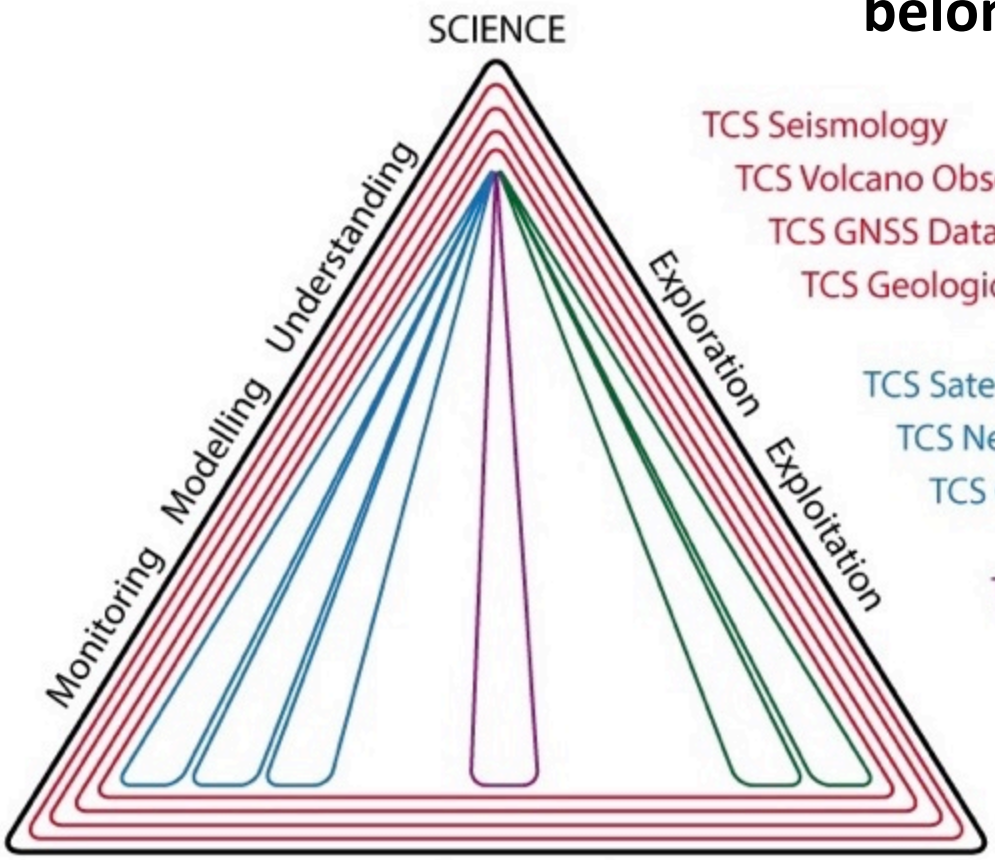
828 INSTRUMENTS

Several PetaBytes of solid Earth Science data will be available

Several thousands of **users** expected to access the infrastructure

EPOS Community

EPOS brings together solid Earth scientists belonging to diverse communities



TCS Seismology
TCS Volcano Observations
TCS GNSS Data and Products
TCS Geological Information & Modeling

TCS Satellite Data
TCS Near Fault Observatories
TCS Geomagnetic Observations

TCS Anthropogenic Hazards

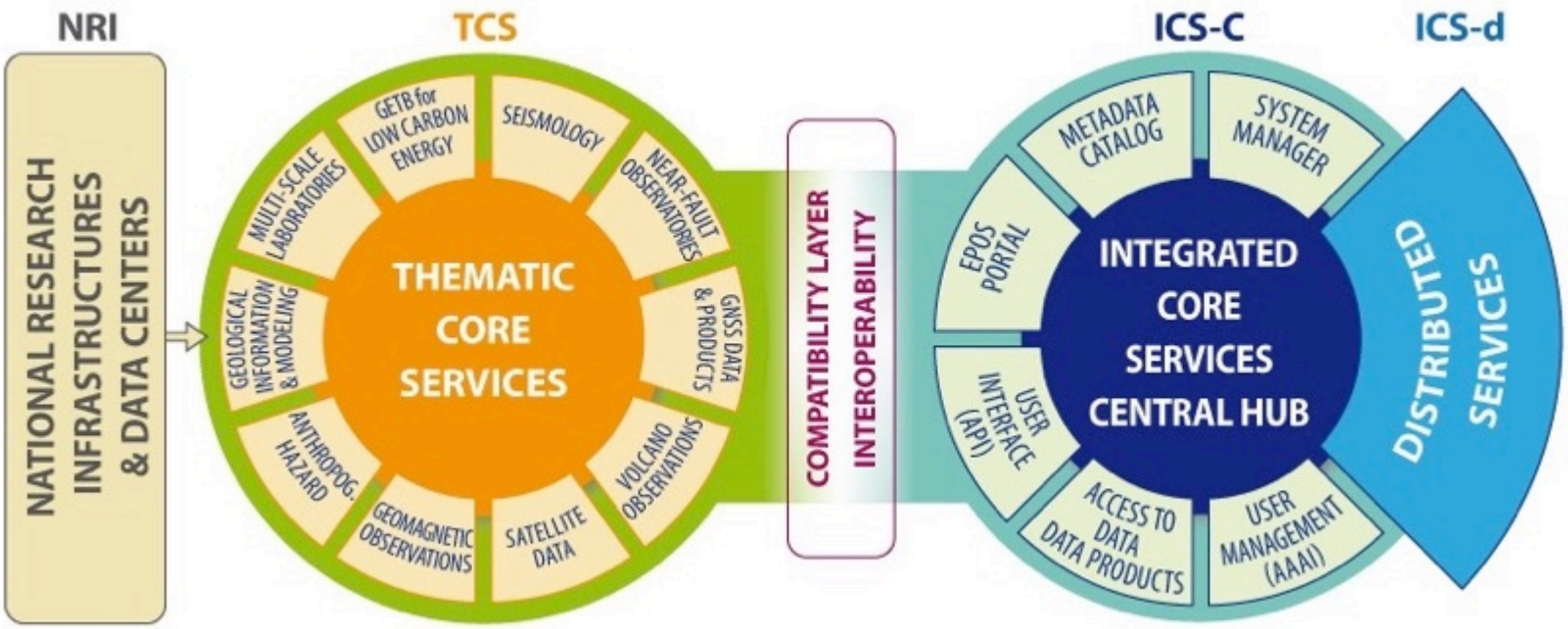
TCS Multi-scale Laboratories
TCS GETB for Low Carbon Energy

EPOS aims at increasing the efficiency of the RIs participating to the integration plan by improving and simplifying the access (TNA&VA) to them and the use of their data and products

How EPOS works

Community Layer
community-specific integration

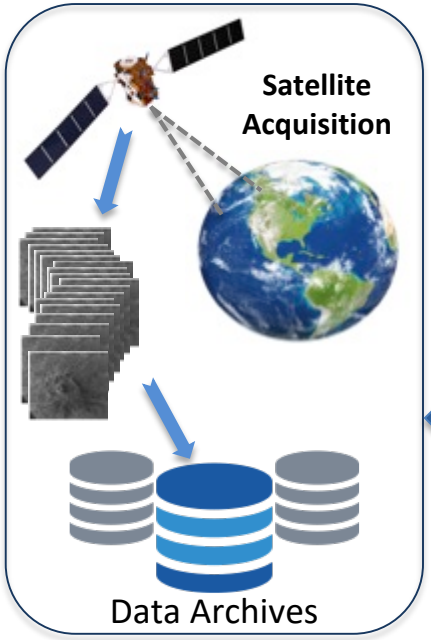
Integration Layer
novel e-infrastructure

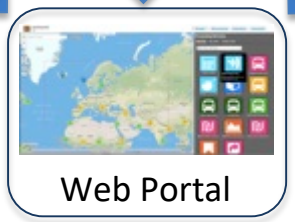


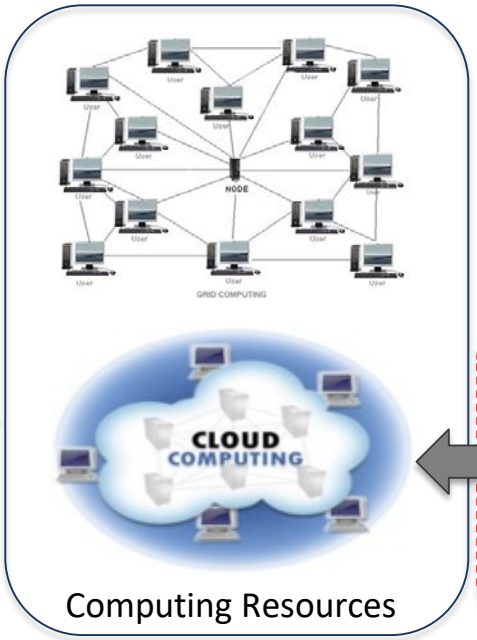
EPOS is more than data archiving and data mining

EPOS will guarantee access to data, metadata, and data products, but also to tools and software giving the unique opportunity of processing them to make new data and products

TCS Satellite Data – Components





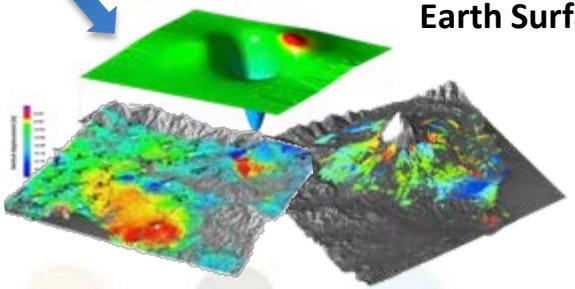


DIAS

EOSC-hub

Private Cloud
(AWS, Google, etc)

Scientific Community



Earth Surface Monitoring

TCS Satellite Data – Access Rules

FREE & OPEN ACCESS DATA

Registered users can freely access to satellite products and services

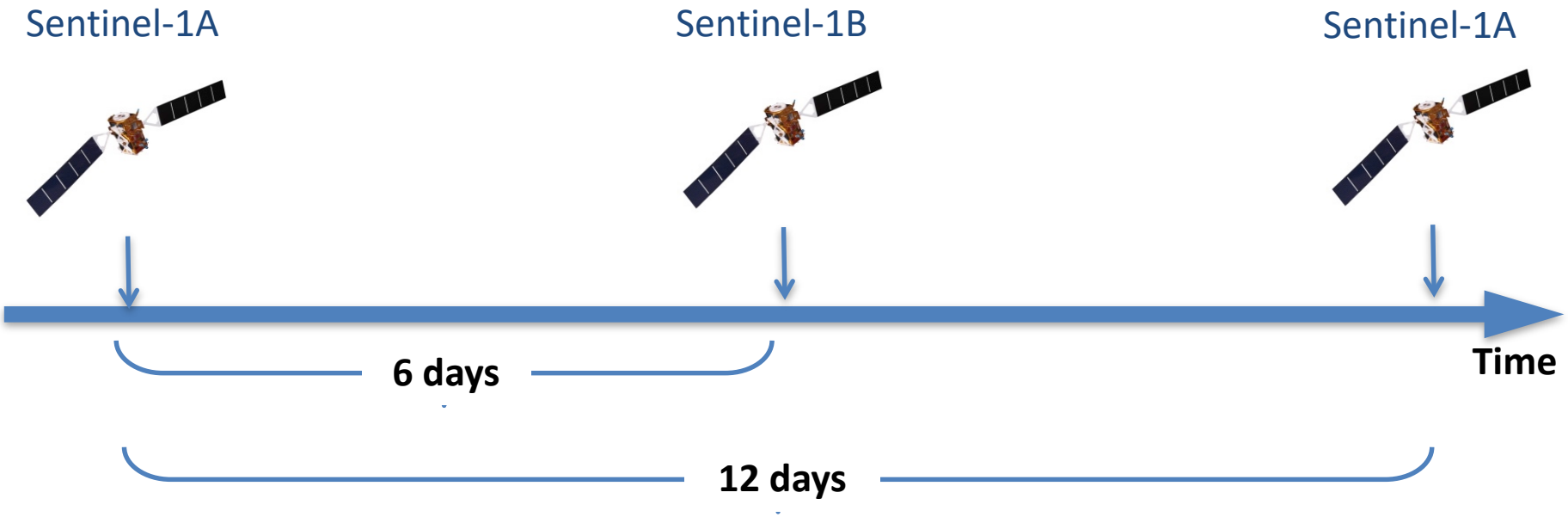
INTEROPERABLE FORMATS & STANDARDS

TCS provides advanced satellite products by adopting interoperable standards and formats shared by the community

METADATA & WEB-SERVICES

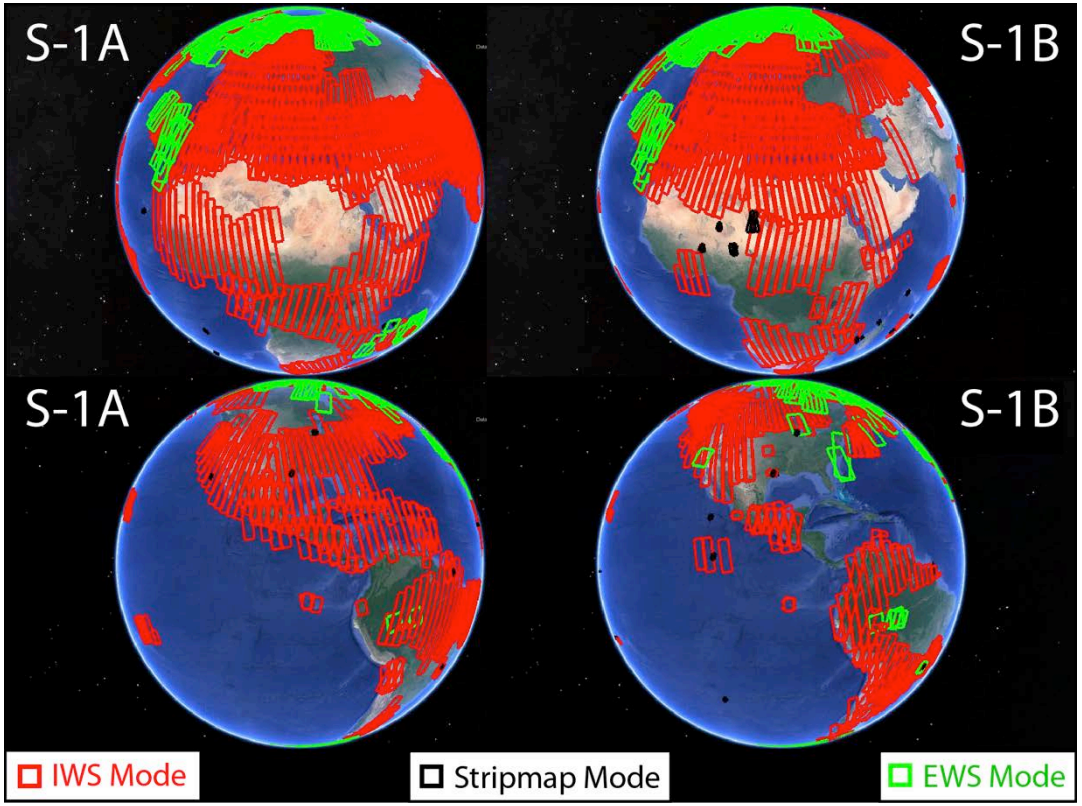
TCS adopts metadata and standards compliant with the guidelines of the international organizations (OGC, INSPIRE)

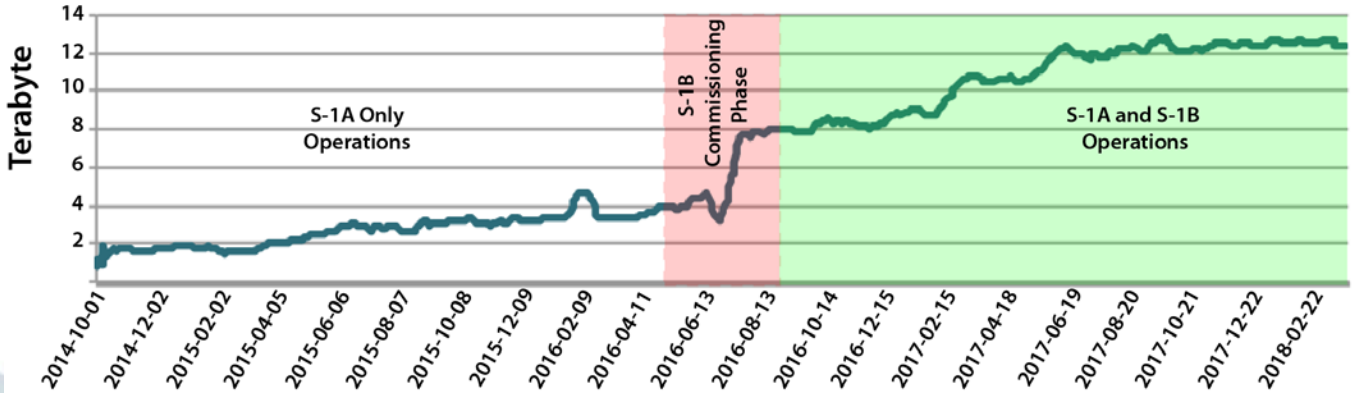
Sentinel-1 Constellation



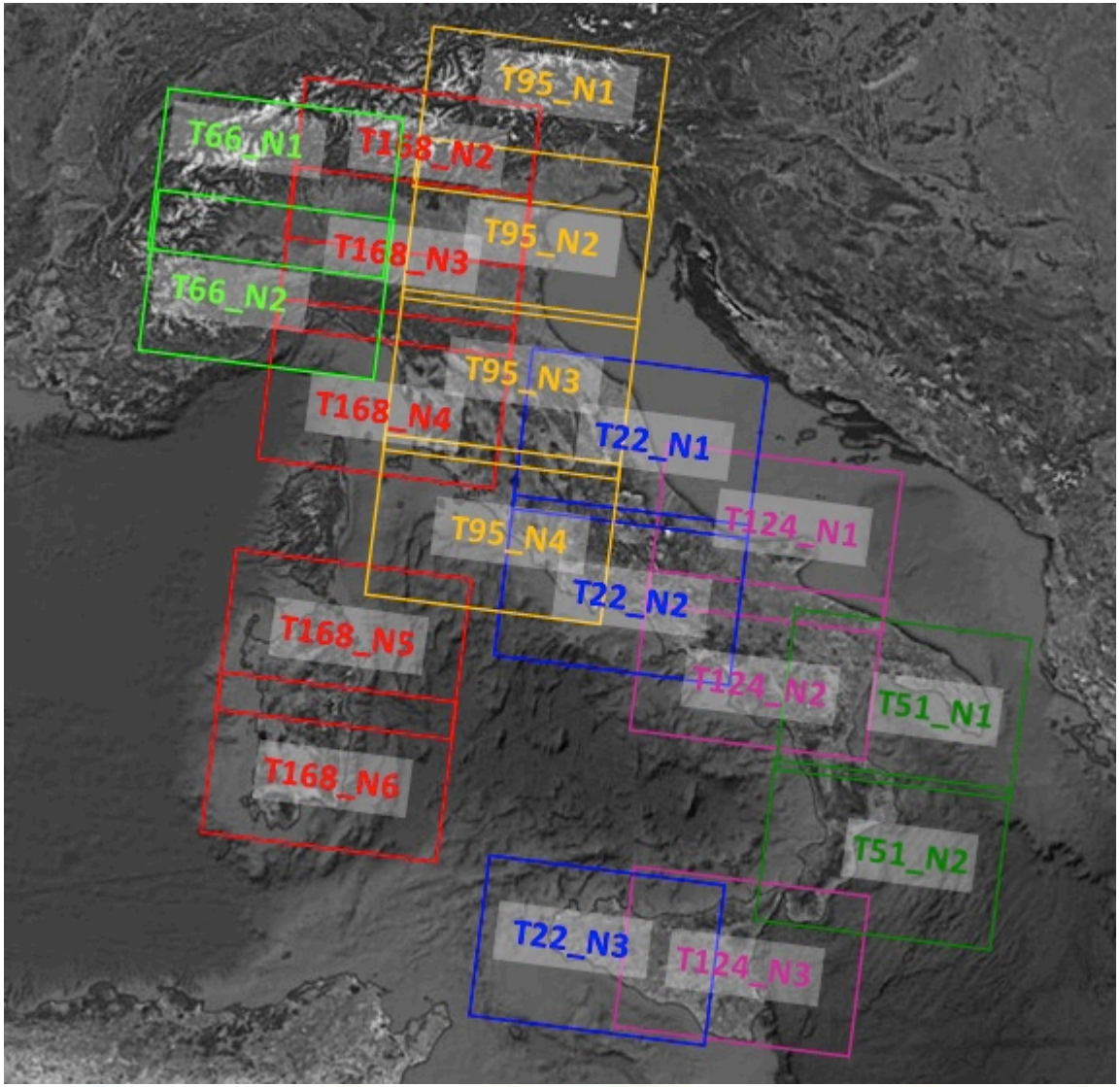
- Sensor spatial resolution: **15 x 4 m**
- Spatial coverage: ~ **250 x 250 km**
- **C-band**
- **Global coverage**
- **Free and open access** data policy

Sentinel-1A and Sentinel-1B spatial coverage





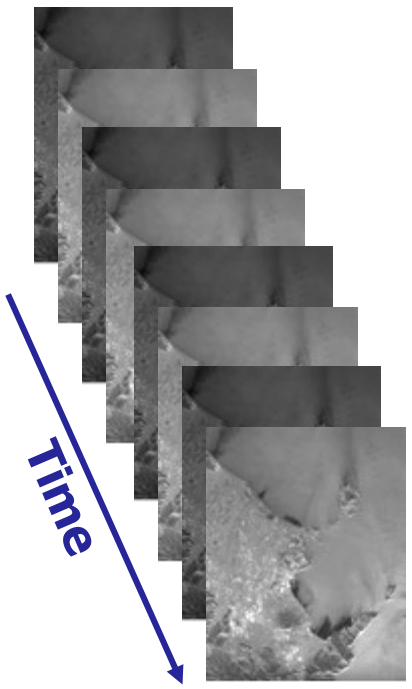
Sentinel-1 constellation: national scale DInSAR analyses



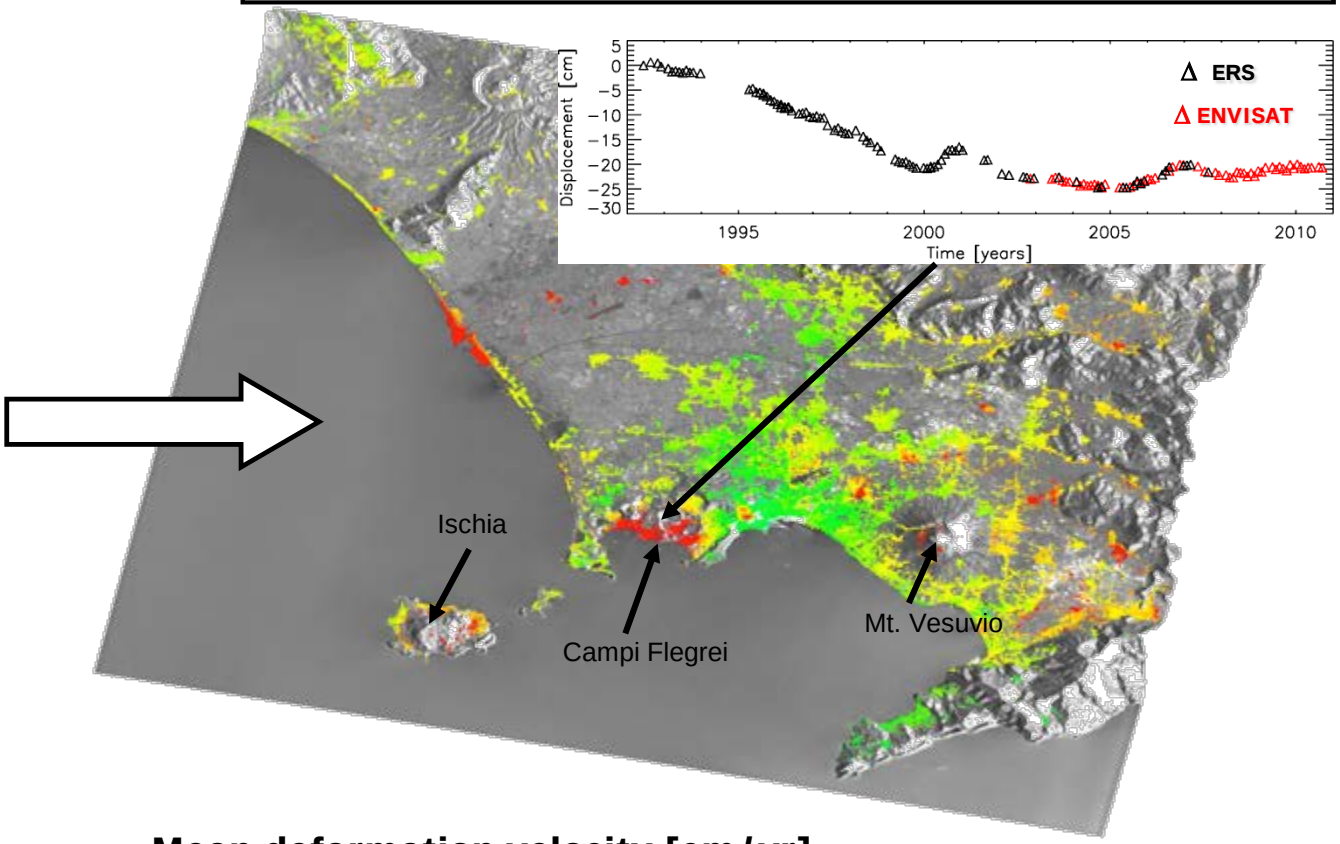
Frame	Number of S-1 slice	Number of S-1 acquisitions
T66_N1	128	71
T66_N2	186	71
T168_N2	128	72
T168_N3	119	68
T168_N4	135	67
T168_N5	154	67
T168_N6	116	66
T95_N1	128	64
T95_N2	144	64
T95_N3	130	65
T95_N4	130	65
T22_N1	155	66
T22_N2	160	67
T22_N3	120	66
T124_N1	134	67
T124_N2	177	67
T124_N3	184	72
T51_N1	138	68
T51_N2	174	68
TOTAL	**2740**	**1281**

Time interval: March 2015 – April 2017, descending orbits

Advanced DInSAR technique: the EPOSAR service



ERS / ENVISAT images (1992 – 2010)



Mean deformation velocity [cm/yr]

<- 0.75 **> 0.75**

Berardino et al., 2002, IEEE Trans. Geosci. Remote Sens.
Pepe et al., 2005, IEEE Trans. Geosci. Remote Sens.

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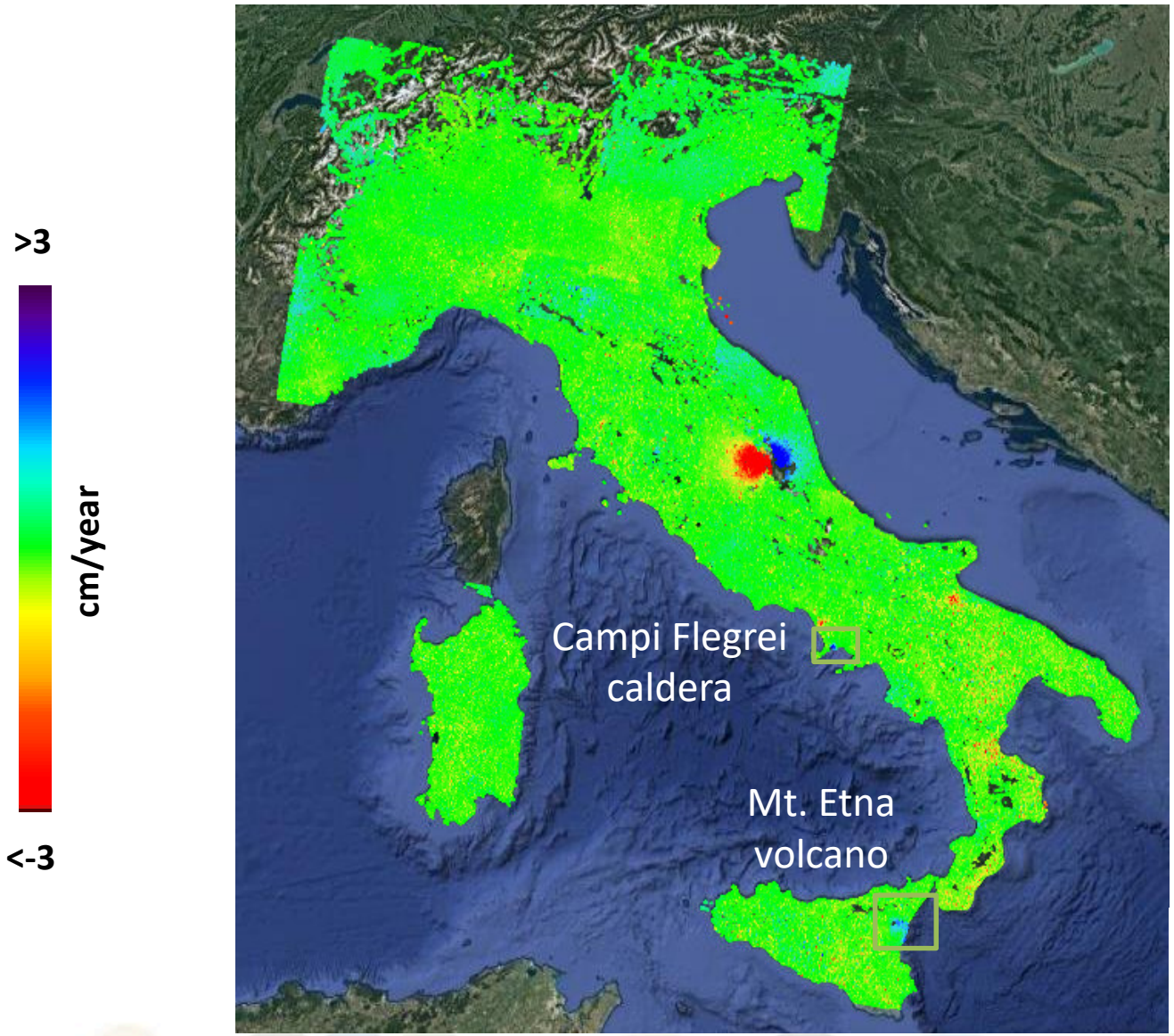
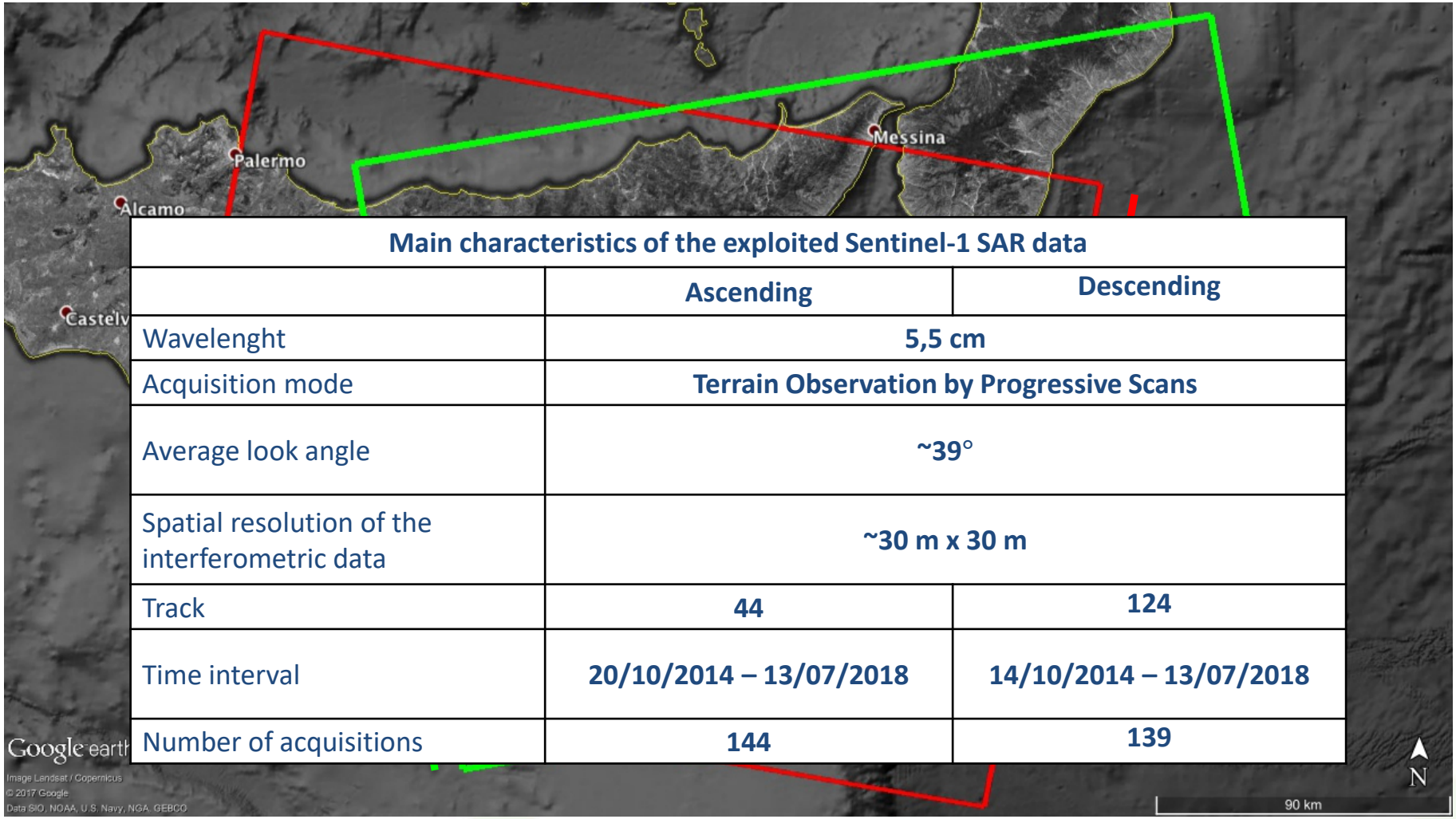


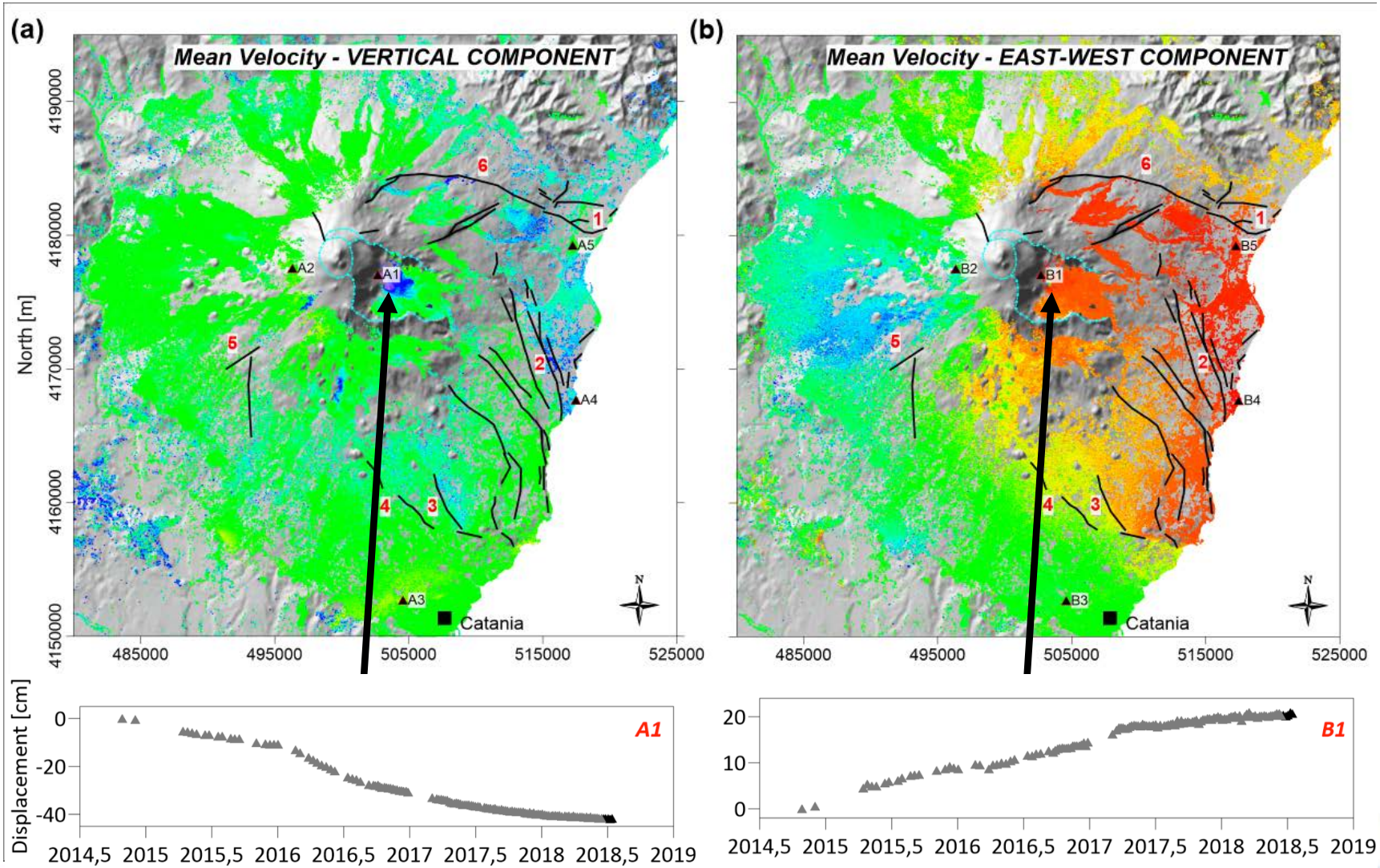
Time interval: March 2015 – April 2017, descending orbits

Mt. Etna volcano: Sentinel-1 SAR data

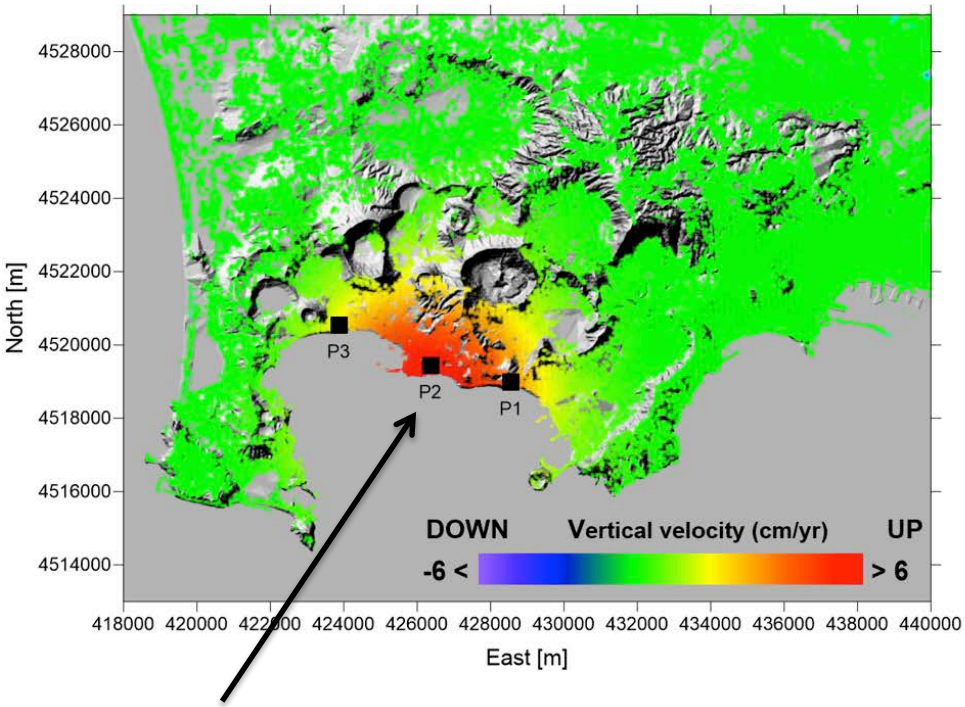


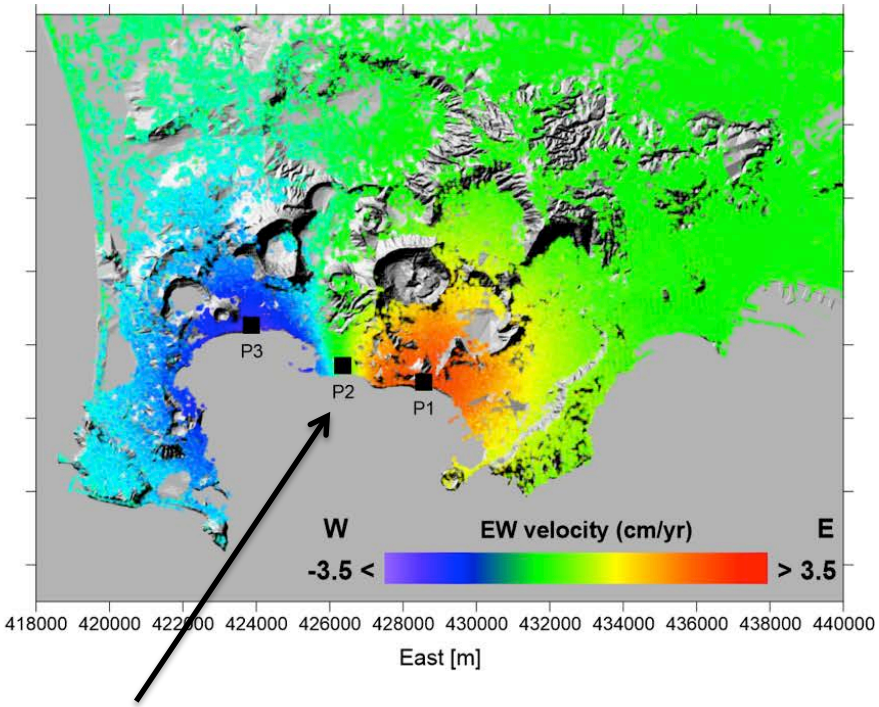
Main characteristics of the exploited Sentinel-1 SAR data		
	Ascending	**Descending**
Wavelenght	**5,5 cm**	
Acquisition mode	**Terrain Observation by Progressive Scans**	
Average look angle	**~39°**	
Spatial resolution of the interferometric data	**~30 m x 30 m**	
Track	**44**	**124**
Time interval	**20/10/2014 – 13/07/2018**	**14/10/2014 – 13/07/2018**
Number of acquisitions	**144**	**139**

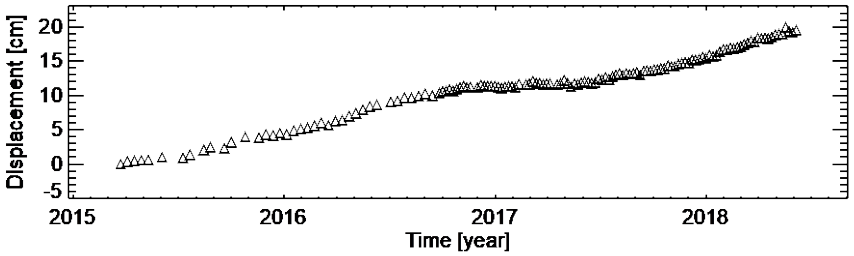
Mt. Etna volcano: Sentinel-1 DInSAR analyses

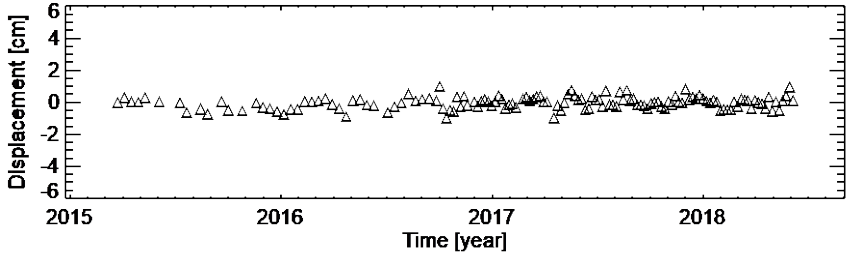


Campi Flegrei caldera: Sentinel-1 DInSAR analyses









Rione Terra

EPOS: a single, pan-European distributed RI