Spaceborne and airborne geohazard monitoring

BEYOND GeoHUB

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The BEYOND Advisory Committee meeting
June 24, 2016

FP7-Regpot-2012-13-1

GeoHUB

Data & methods tier

- Sentinel Mirror Site
- NSN
- ENIGMA
- NOANET
- In-situ

Earth Observation - SAR Interferometry

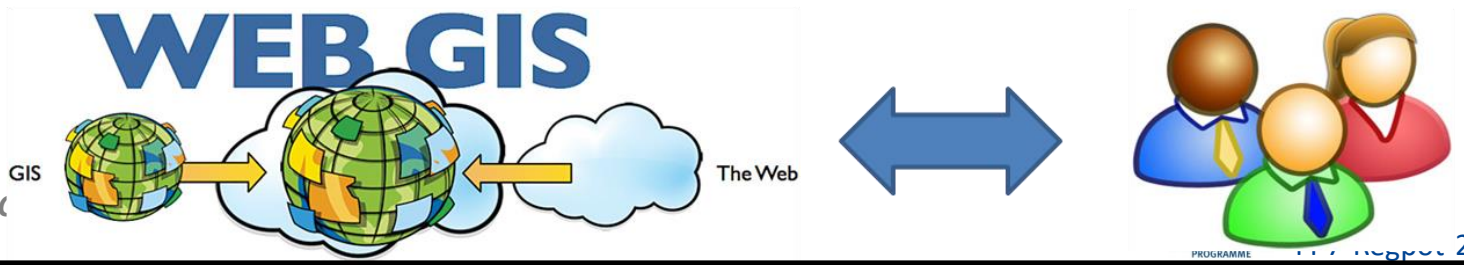
Services tier

- Geodesy
- Modeling
- Hazard assessment
- Large scale processing

Applications tier

- Volcanoes
- Tectonics
- Landslides
- Subsidence

Users tier



An overview

Service	Status	Input data	Scale
Mapping of large-scale ground velocities & 3D decomposition	Operational	SAR, GPS	National
Estimation of earthquke 3D crustal deformation	Operational	multi-angle SAR, GPS	Local
Seismic risk estimation	pre-operational	SAR, in-situ, GIS	Local
UAV based damage assessement	Operational	Aerial data	Local
Mapping of tectonic hazard areas in subduction zones	Research	SAR, GPS	Regional
Monitoring of volcanic activity	Operational	SAR, GPS, in-situ	Local
Monitoring dispersion of volcanic ash	pre-operational	Weather data	Regional
Detection of new landslides	Operational	SAR	Local
Update of landslide inventory maps	pre-operational	SAR, in-situ	Regional
Estimation of landslide susceptibility	pre-operational	SAR, in-situ, GIS	Regional
Detection of subsidence in urban & peri-urban areas due to manmade activities & physical processes	Operational	SAR, GPS	Regional
Monitoring of construction activities in urban environment	Operational	SAR, GPS	Local

Earthquake deformation mapping

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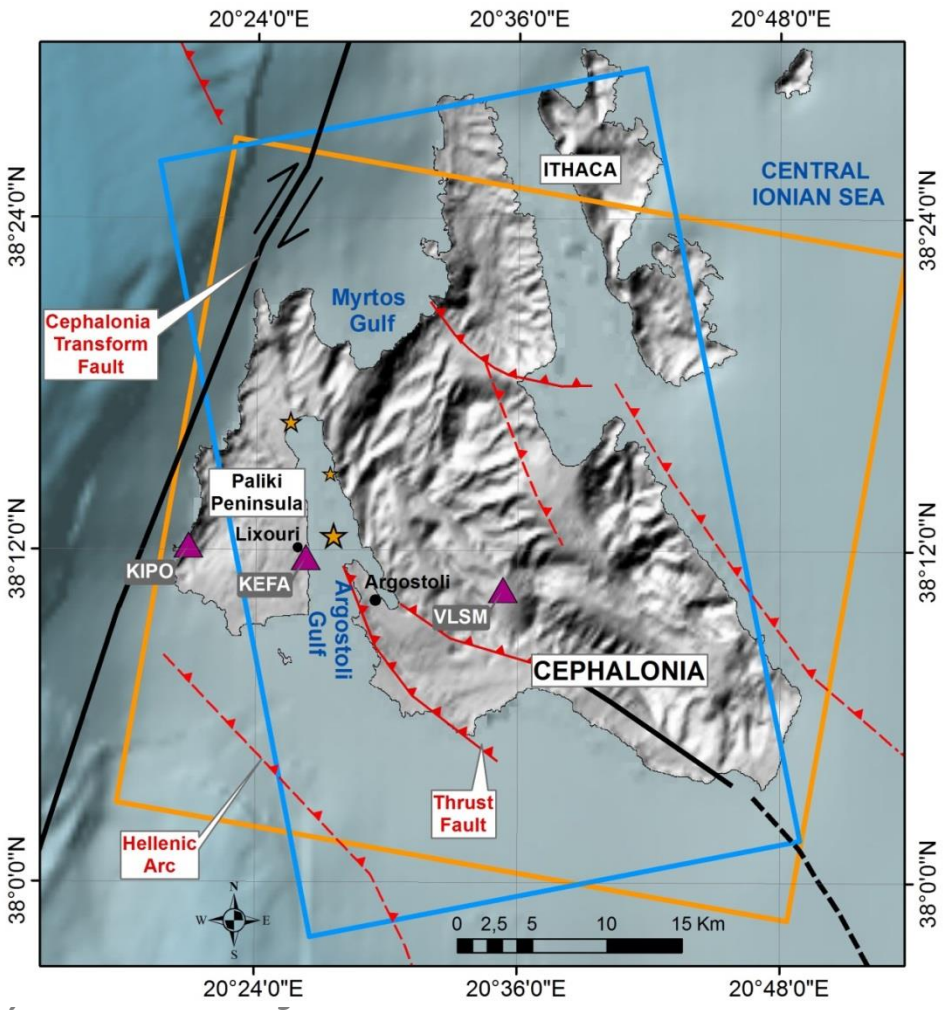
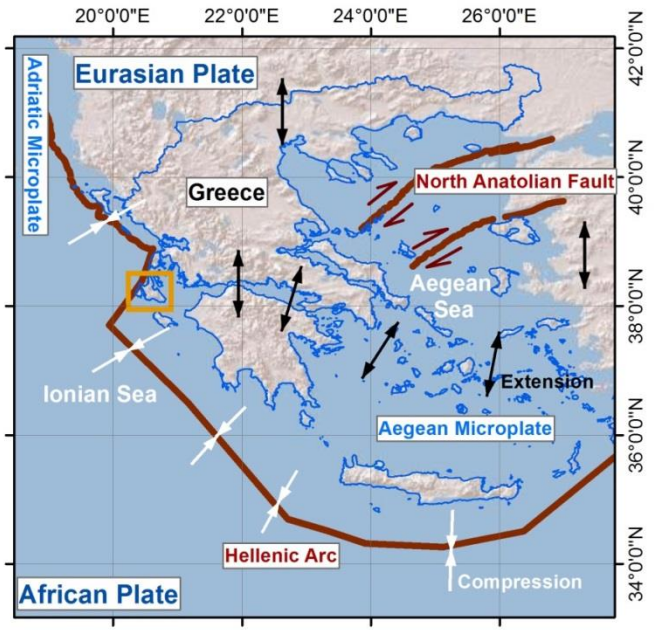




Mapped faults
- Strike-slip inferred
- Strike-slip
- Reverse inferred
- Reverse

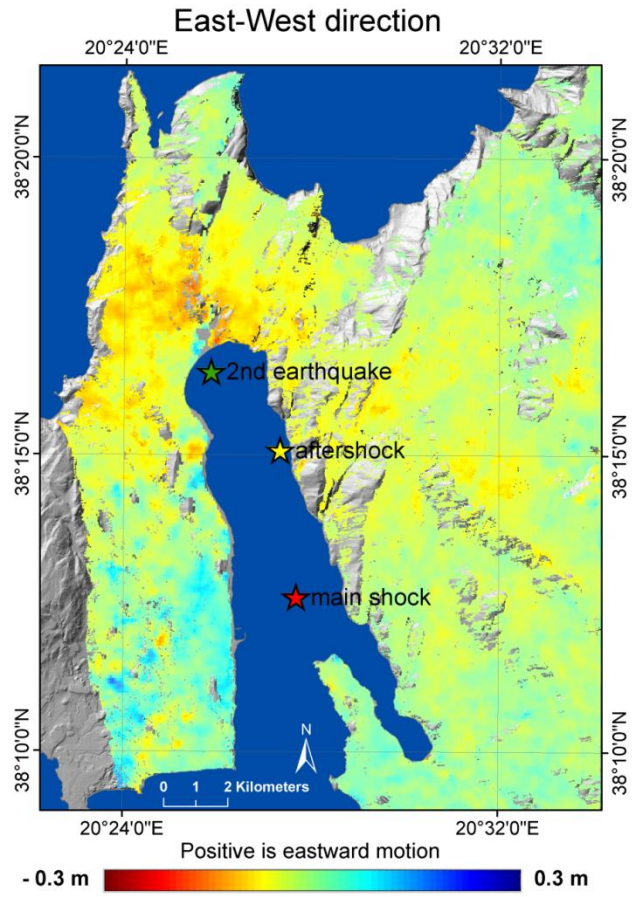
Main earthquake events
- 26/1/2014 ML 5,1
- 3/2/2014 ML 5,7
- 26/1/2-14 ML 5,9

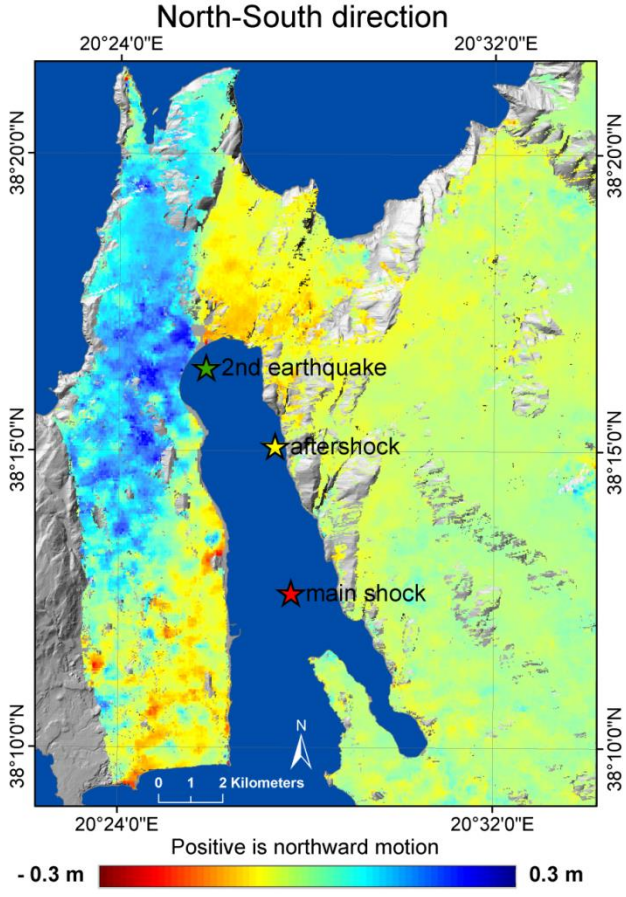
GPS stations
- cGPS

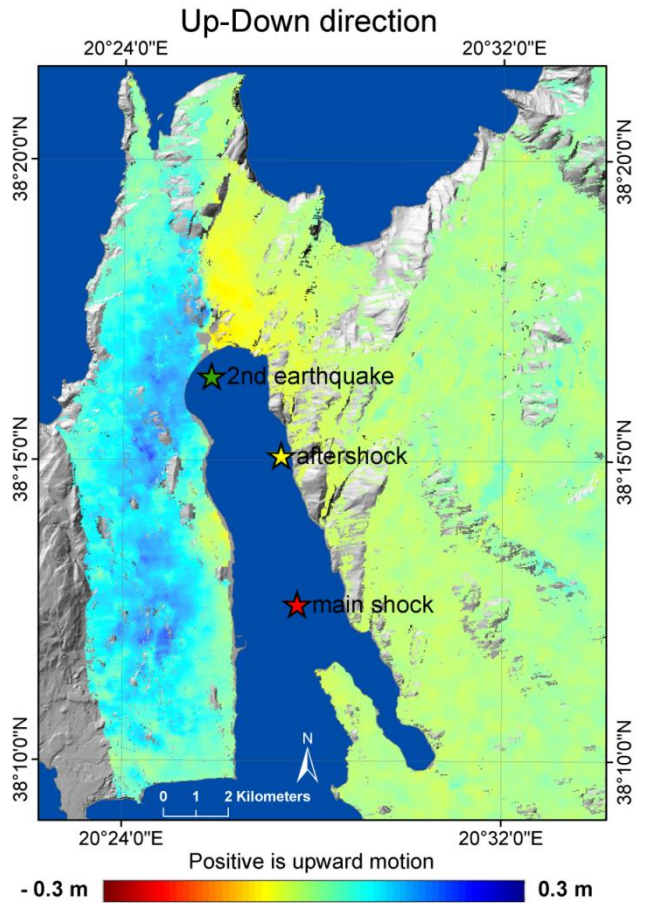
SARframes
- COSMO-SkyMED
- TerraSAR-X

Earthquake deformation mapping

- 3D crustal deformation from TerraSAR-X & COSMO-SkyMed data
- Inversion to estimate fault parameters







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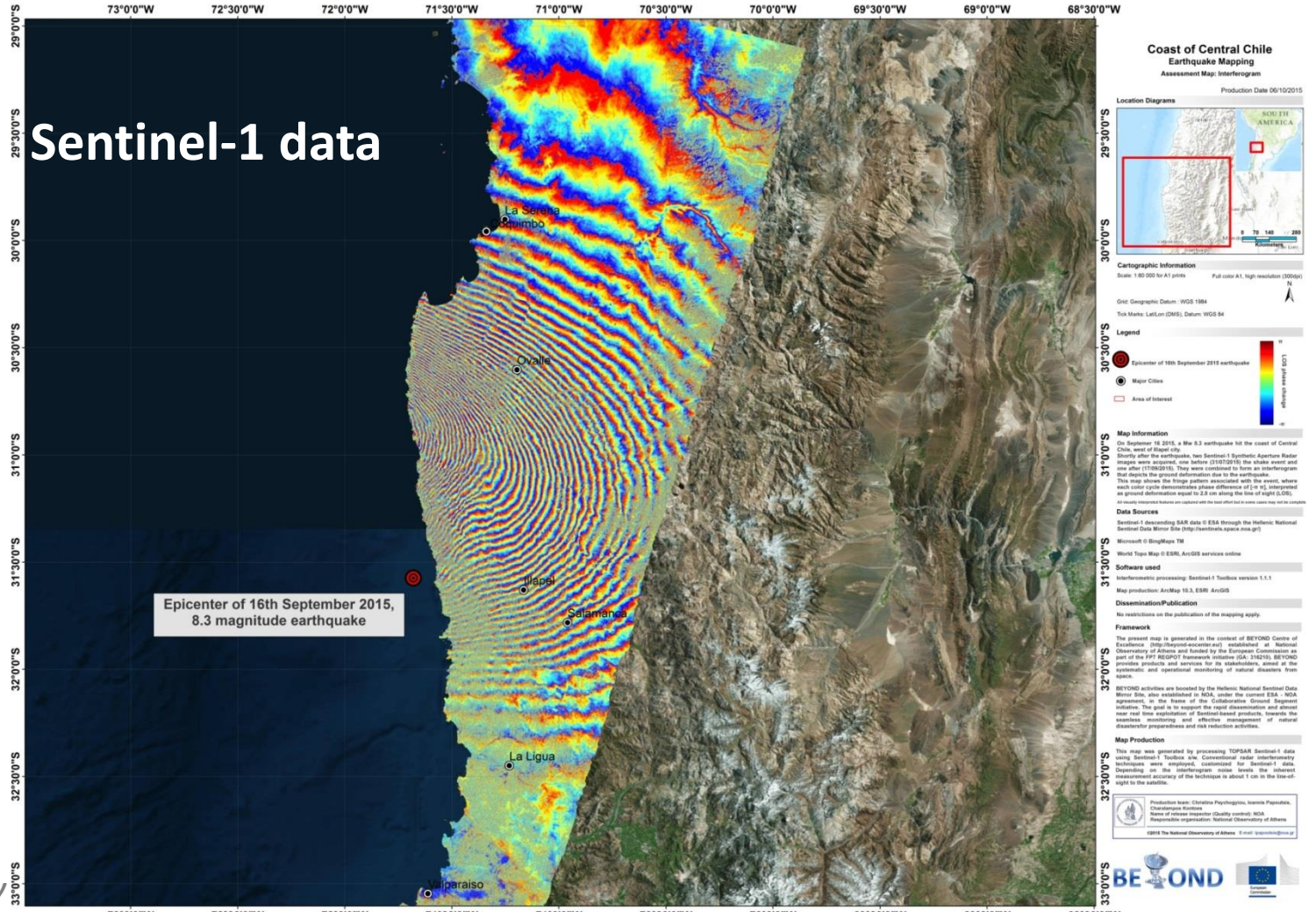
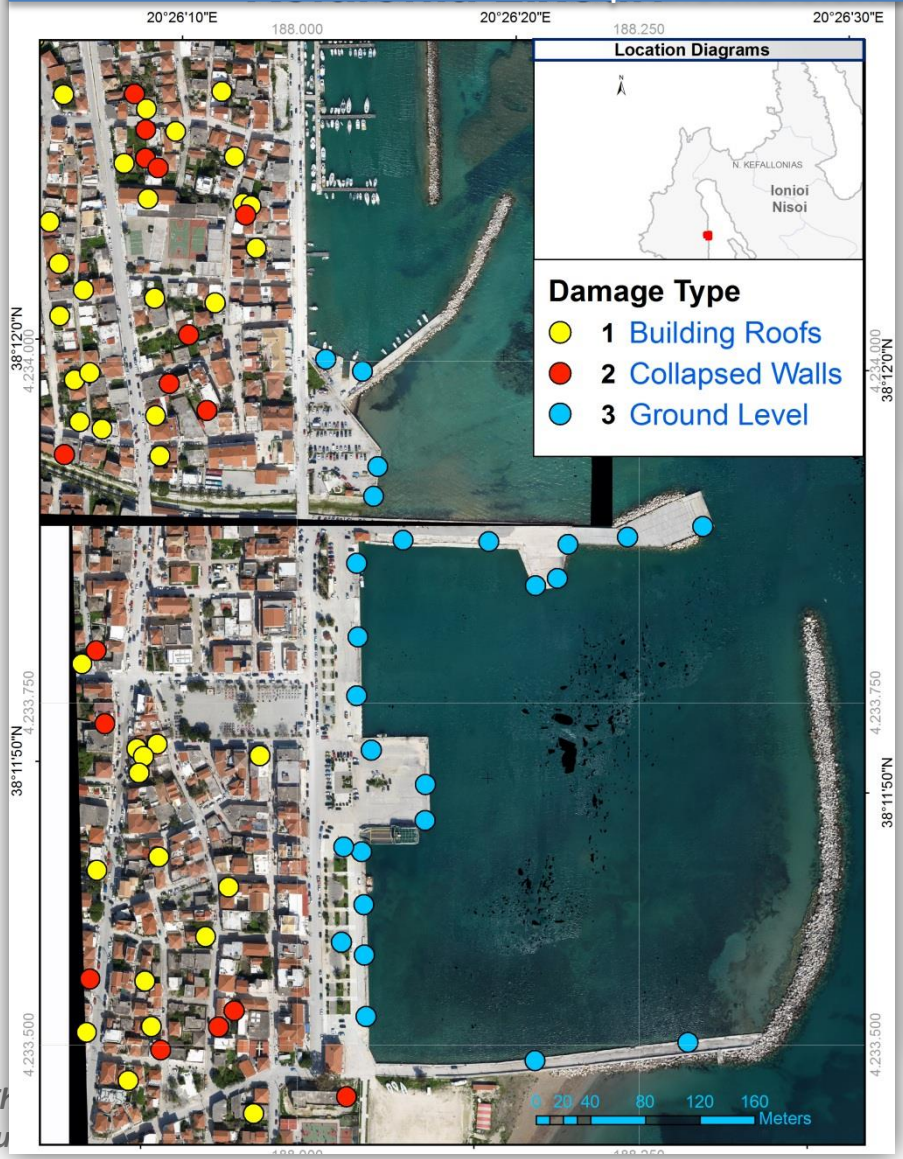
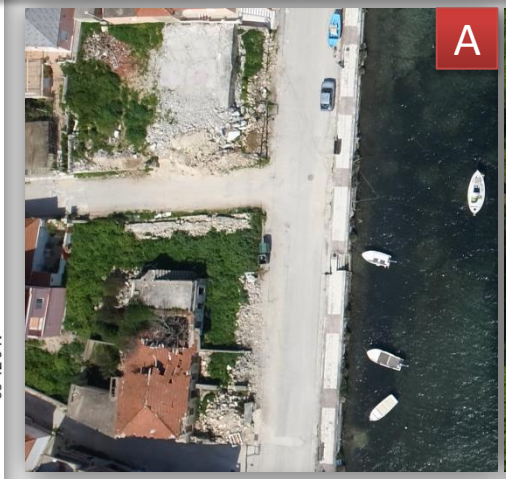
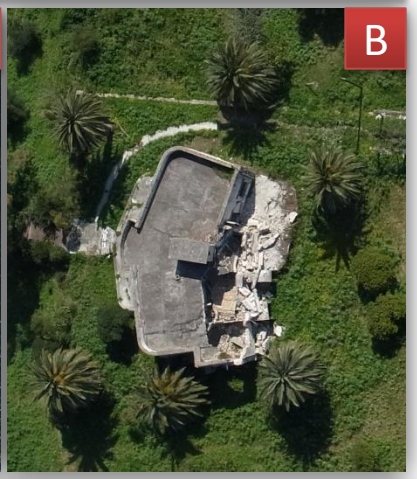


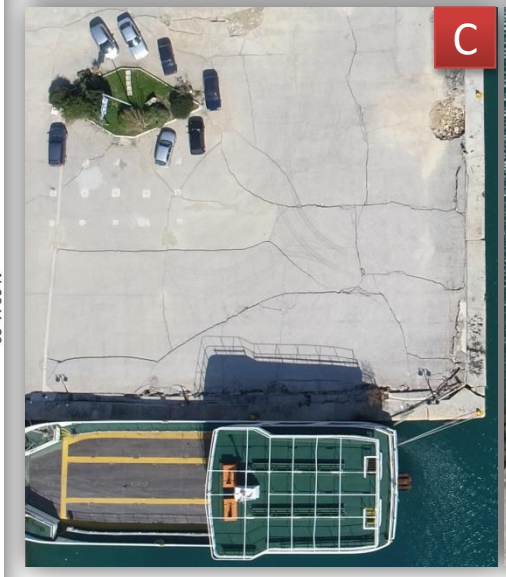
UAV damage assessment

Cephalonia Island – Town of Lixouri









UAV octocopter

Monitoring volcanic activity

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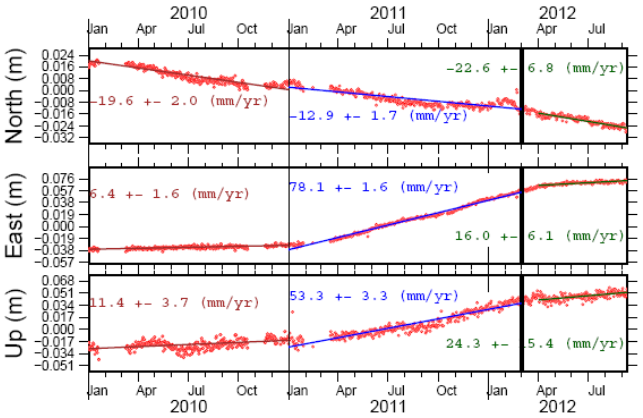
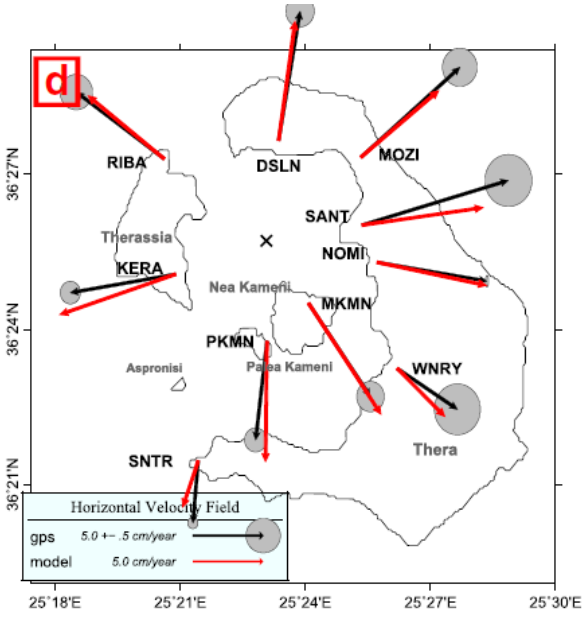
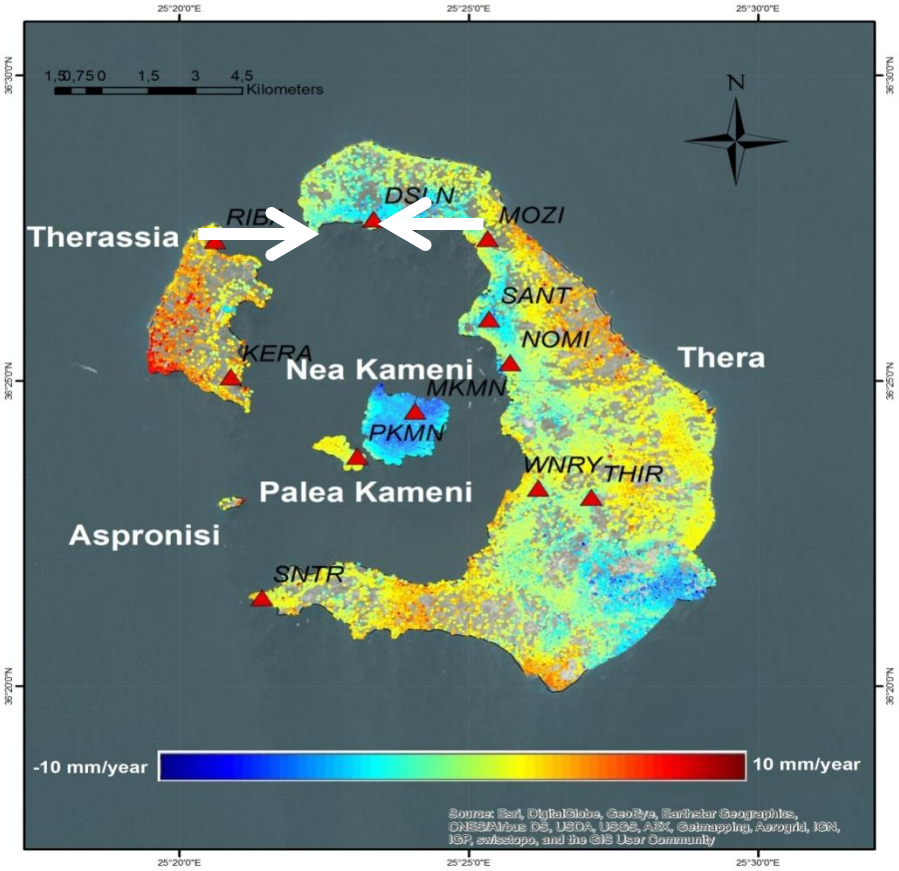




Post-inflation monitoring



Kaskara et al., LPS 2016

Urban subsidence monitoring & uplift tracking

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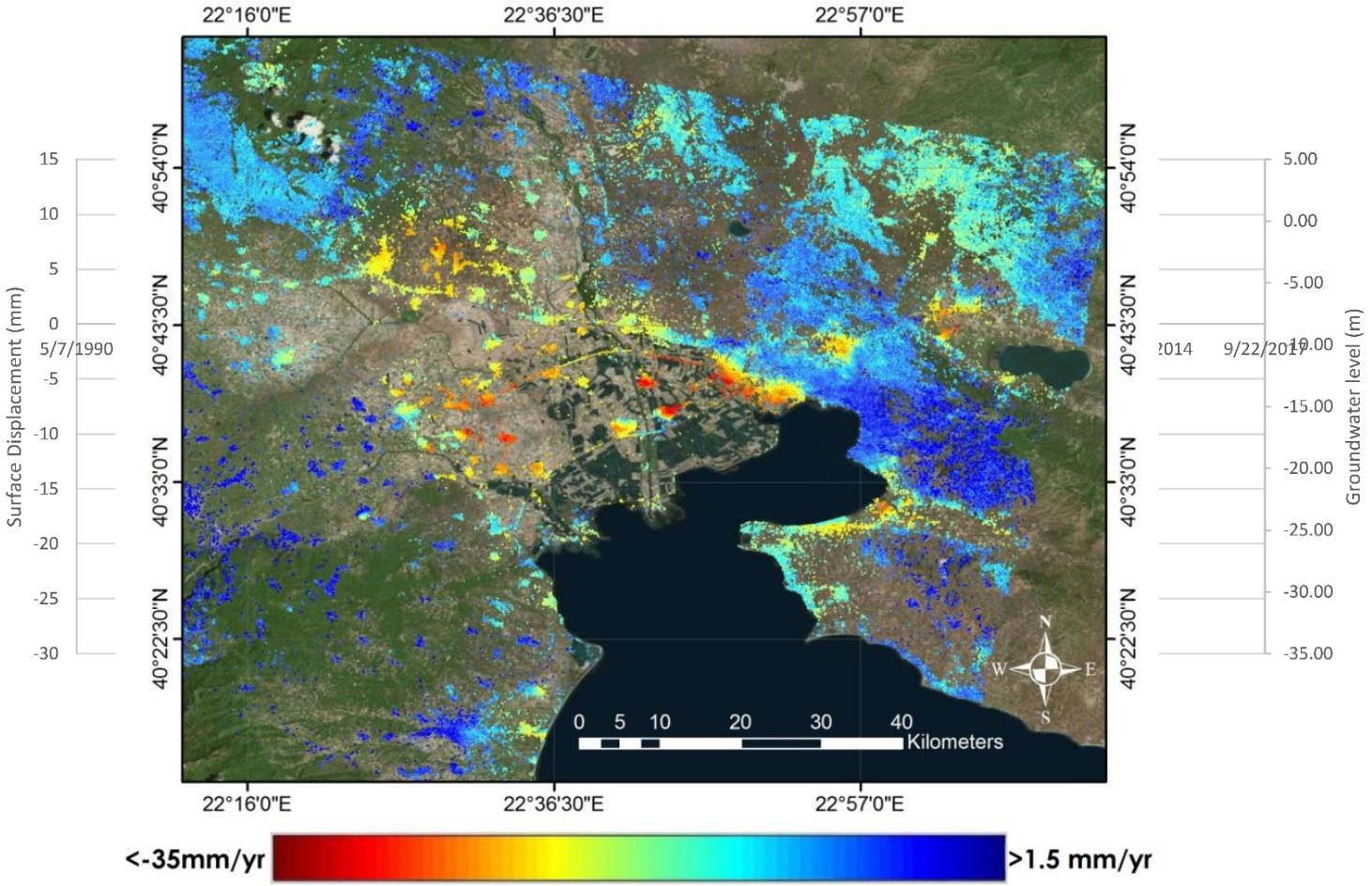

Driver: water over-pumping, Svigkas et al., Engineering Geology, 2016

Large scale ground velocity estimation

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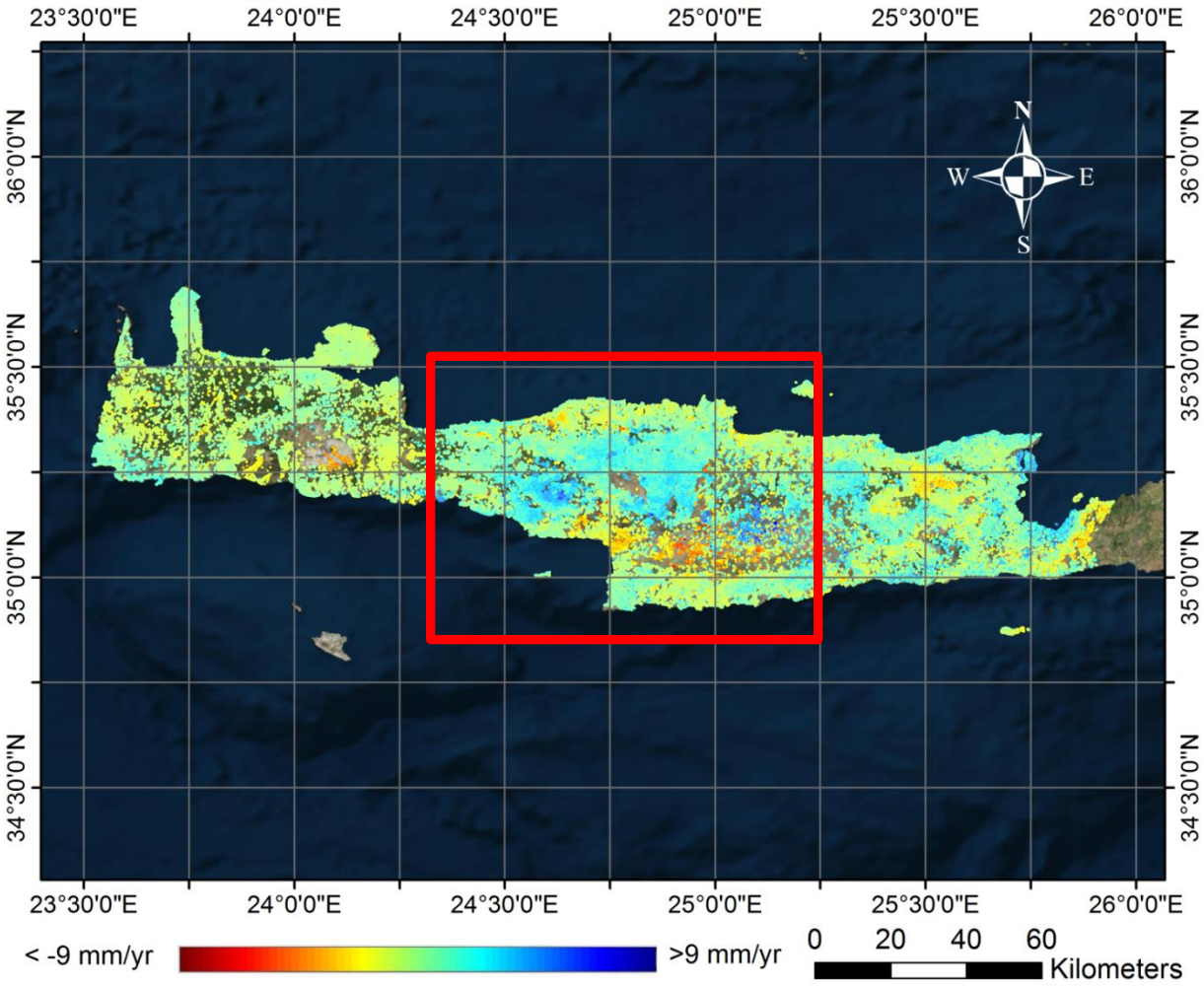

Regional landslide hazard assessment

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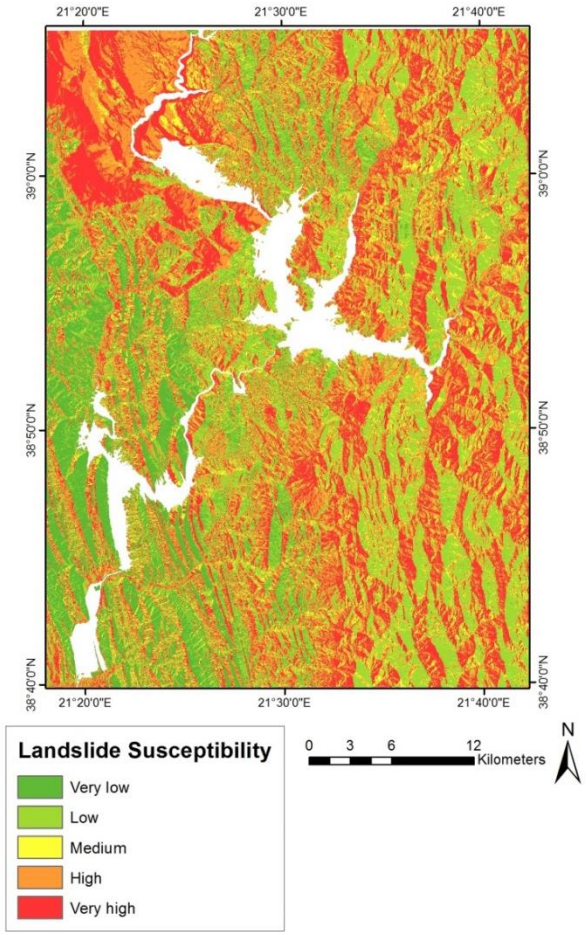

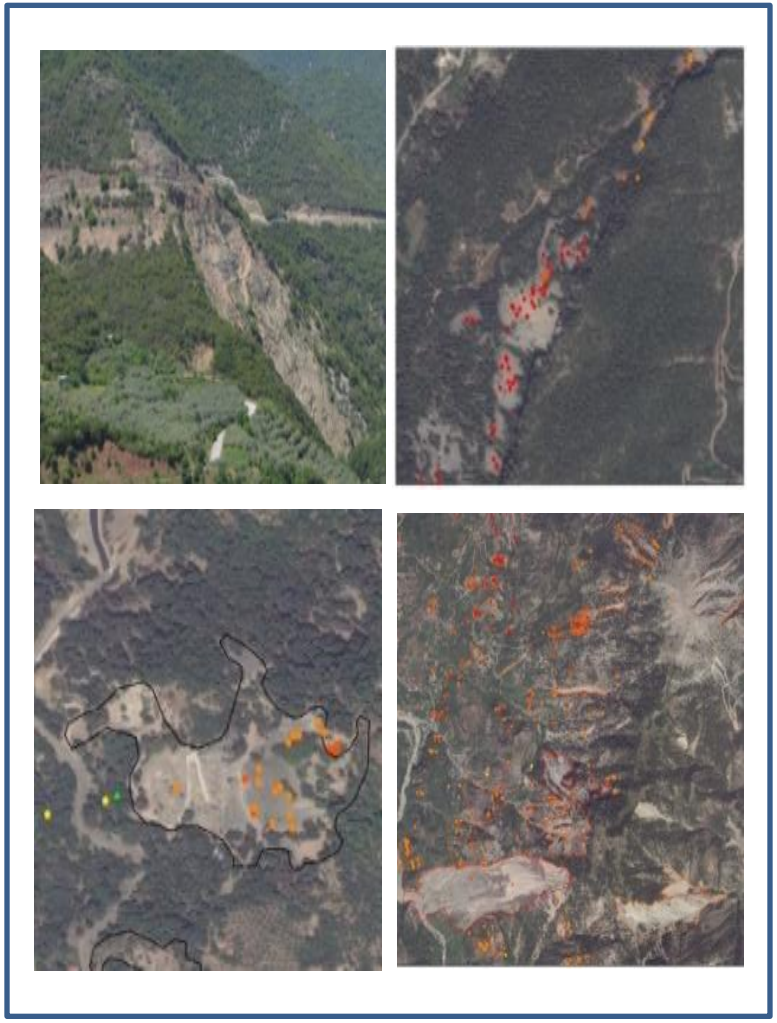

A new geomagnetic data service

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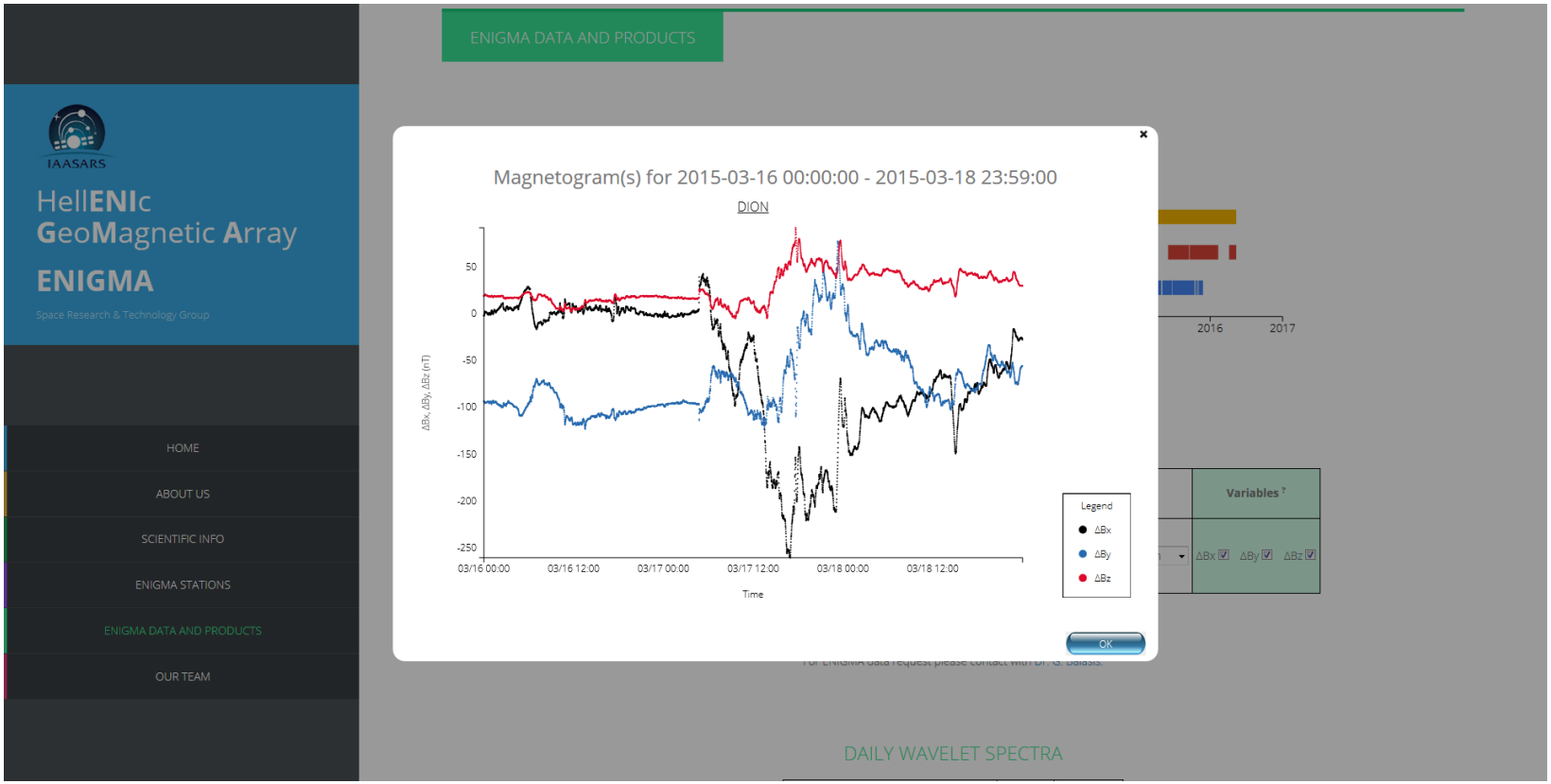

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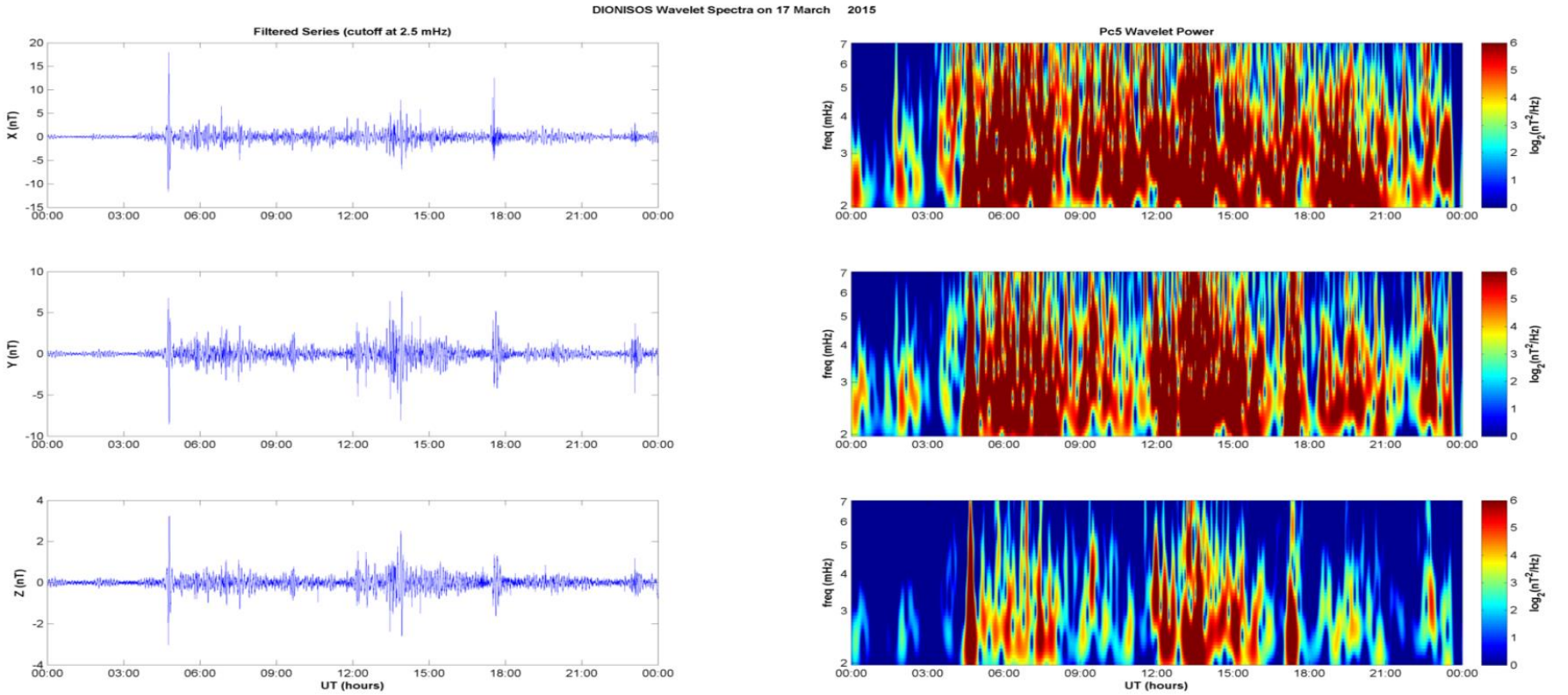

The future: BEYOND GeoHUB