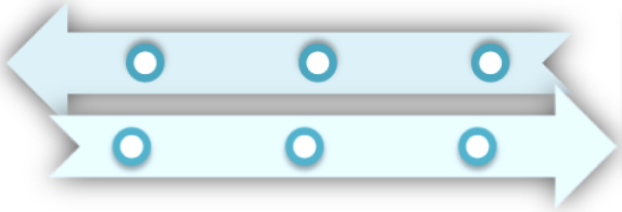
The EU Copernicus Program and the importance of Earth Observation
The European Center of Satellite Remote Sensing BEYOND in Disaster Management, and Civil Protection

Dr. Charalampos (Haris) Kontoes
Head of the Research Center of Excellence BEYOND
Research Director – National Observatory of Athens NOA



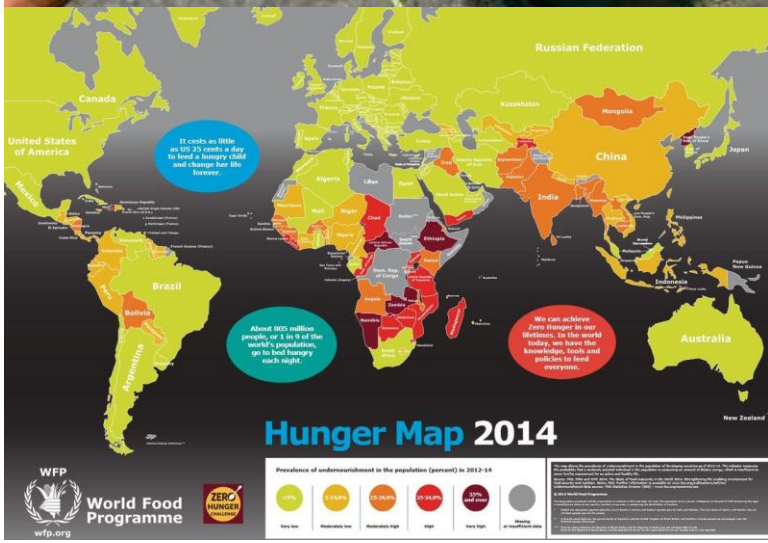
Center of Excellence BEYOND (www.beyond-eocenter.eu)
Institute for Astronomy, Astrophysics, Space Applications and Remote Sensing
National Observatory of Athens

World hunger in numbers

(Source : United Nations)

- **11.3% of the world's population suffers from hunger**
- **805 millions of people** consume less than **2100 calories per day**
- **25,000 die from hunger every day**
- **9.1 millions of people die worldwide each year because of hunger**
- **4 children die from hunger every minute**

Poverty is the main cause of hunger
Poor land-use, over-exploitation of resources, and **lack of knowledge** in supporting the agricultural policy are factors that opposed to food security, rural economy and environmental/ ecological protection

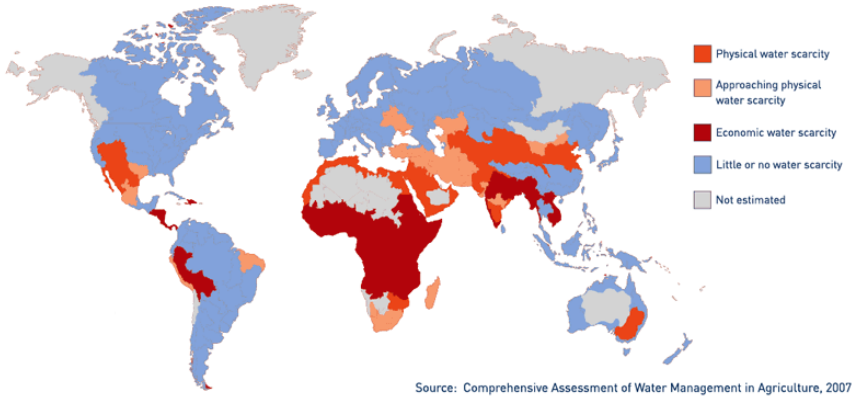


Project funded by the EUROPEAN UNION

Water scarcity

(Source: United Nations)

- **2.8 billion people around the world** suffer from water scarcity for at least one month every year
- **1.2 billion people** lack access to clean drinking water
- **2.4 billion people** are exposed to diseases such as **cholera, typhoid fever** and others due to water scarcity
- **The absence of clean water and drainage systems contribute to infectious diseases,** with a huge impact on deaths worldwide
- **The irrational use, and the inability to know the water balance,** combined with **climate change** are the main water scarcity factors



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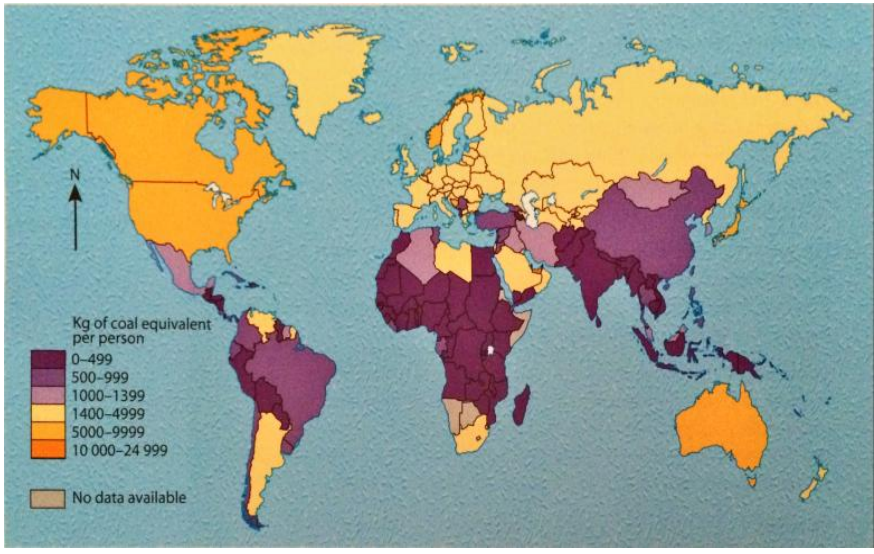
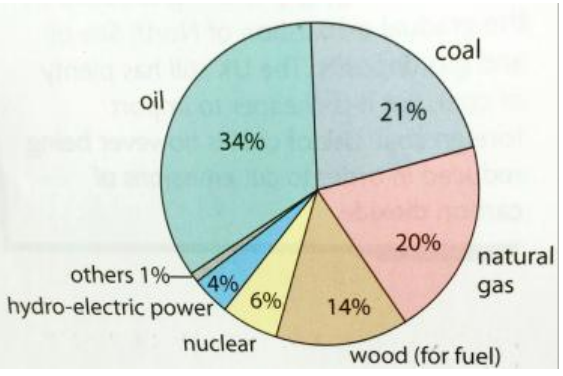
Energy

- **The demand for energy is rising and** is linked to the development of countries
- **Europe and N. America consume 70%** of the world's energy stock, although it accounts for 20% of the world's population
- **Negative energy balance** has been noted worldwide
- Energy is produced from **coal, petroleum, natural gas**, and a small amount of renewable energy resources (solar/ wind energy, water resources)





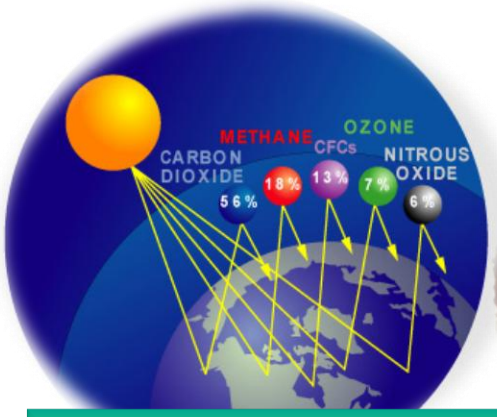
EC: Year 2030, 27% of energy from renewable sources

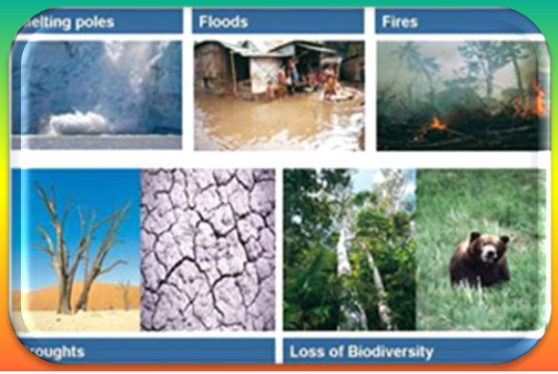
Egypt: Negative energy balance 2022

Project funded by the EUROPEAN UNION

Climate change

- 1 in 9 people are forced to migrate due to climate change
- 220 million people are expected to migrate in 2020 due to the climate change phenomenon
- 1 billion will be forced to leave Africa in the next 30 years due to drought and desertification





Project funded by the EUROPEAN UNION

ANALYSIS OF THE FLOOD EVENT 15/11/2017 IN WEST ATTICA USING SATELLITE REMOTE SENSING

FloodHub

BEYOND
www.beyond-eocenter.eu

ΙΑΑΔΕΤ

ΕΘΝΙΚΟΝ ΑΣΤΕΡΟΣΚΟΠΕΙΟΝ ΑΘΗΝΩΝ
NATIONAL OBSERVATORY OF ATHENS

MANDRA WEST ATTICA

15 November 2017

The 3rd worst flooding disaster in Attica History (based on the number of deaths)

BEYOND

FireHub

European Operational Remote Sensing Center of Excellence BEYOND
National Observatory of Athens

MATI
EAST
ATTICA

10 August 2018

Deadly
fire

Peloponnese 2007 – The worst wildfire in forest ecosystems of recent decades

Project funded by the EUROPEAN UNION

Peloponnese 2007 – The worst wildfire in forest ecosystems of recent decades

Project funded by the EUROPEAN UNION

Peloponnese 2007 – The worst wildfire in forest ecosystems of recent decades

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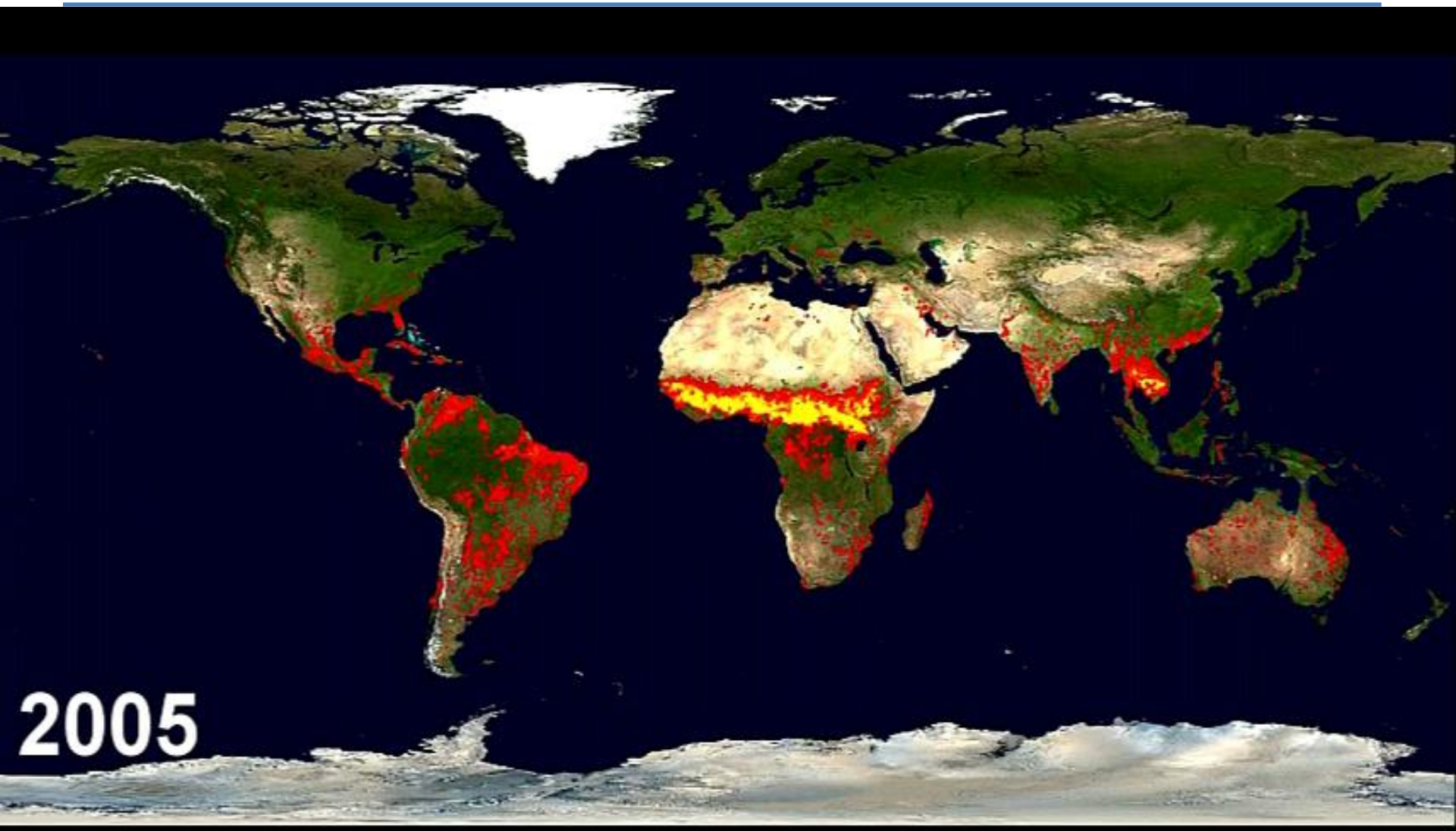
National Observatory of Athens

Global Satellite Fire Detection System



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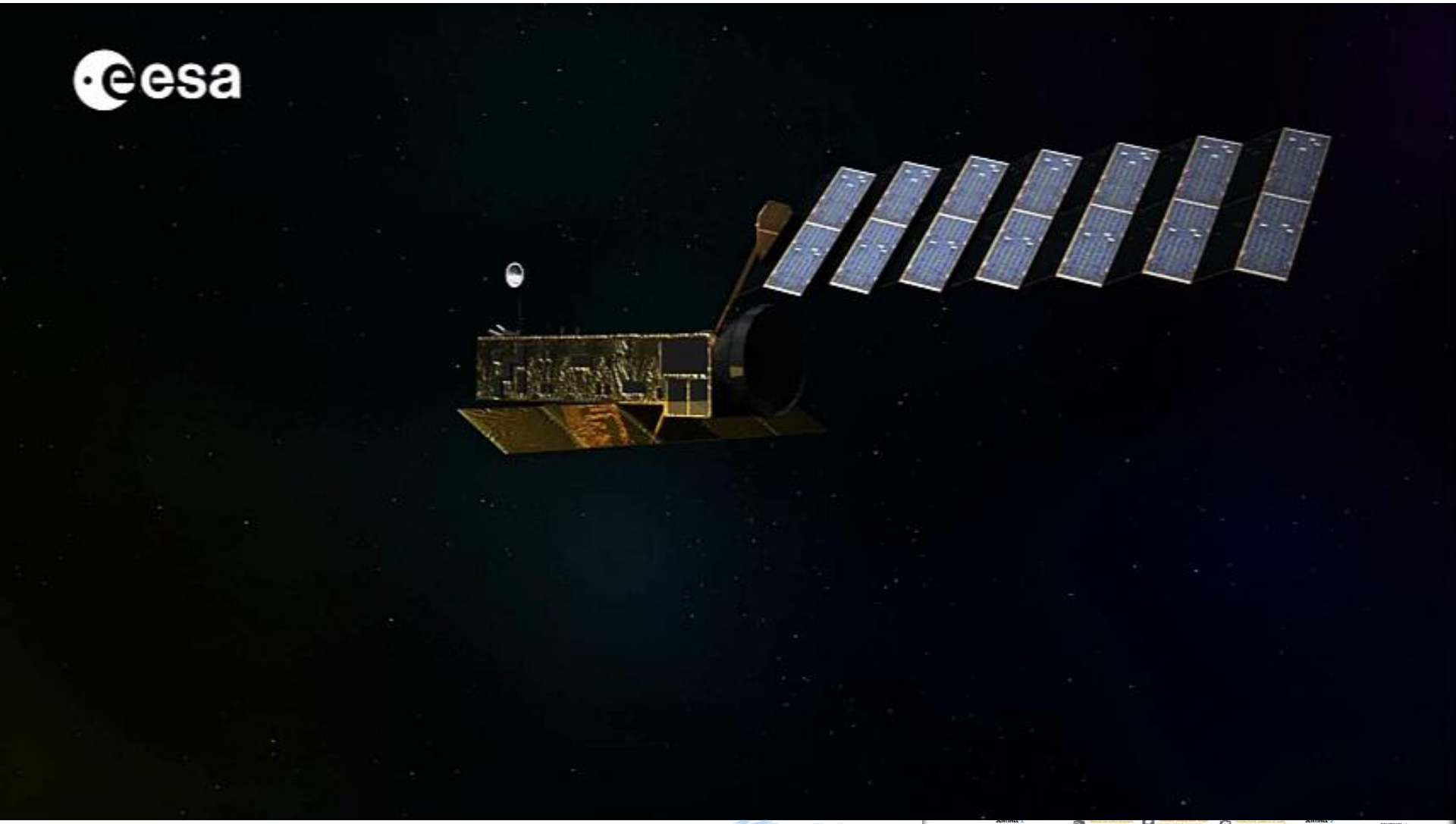
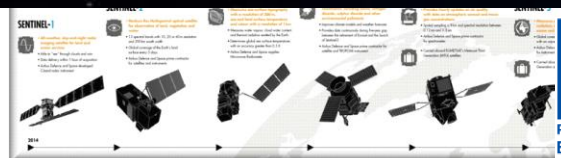


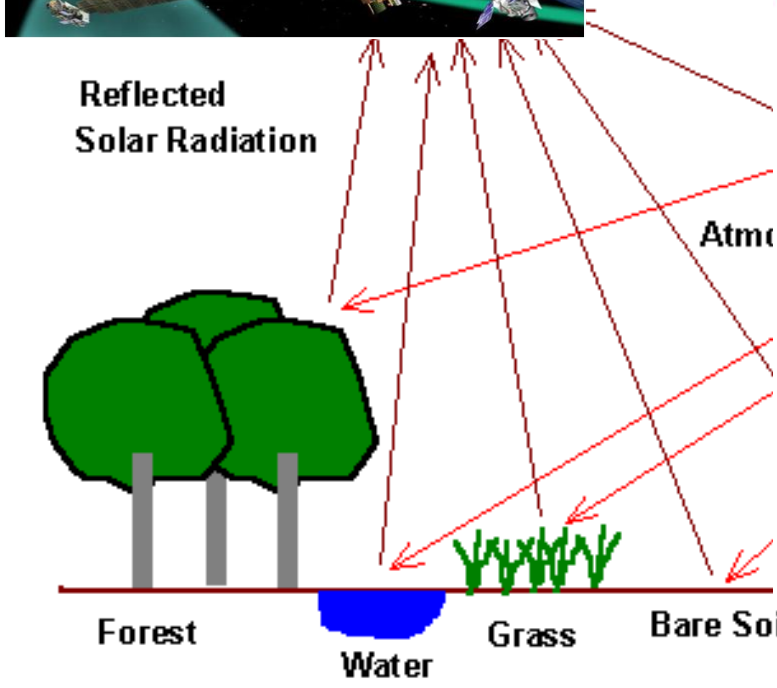
POLAR ORBIT SATELLITES SENTINELS – COPERNICUS PROGRAM

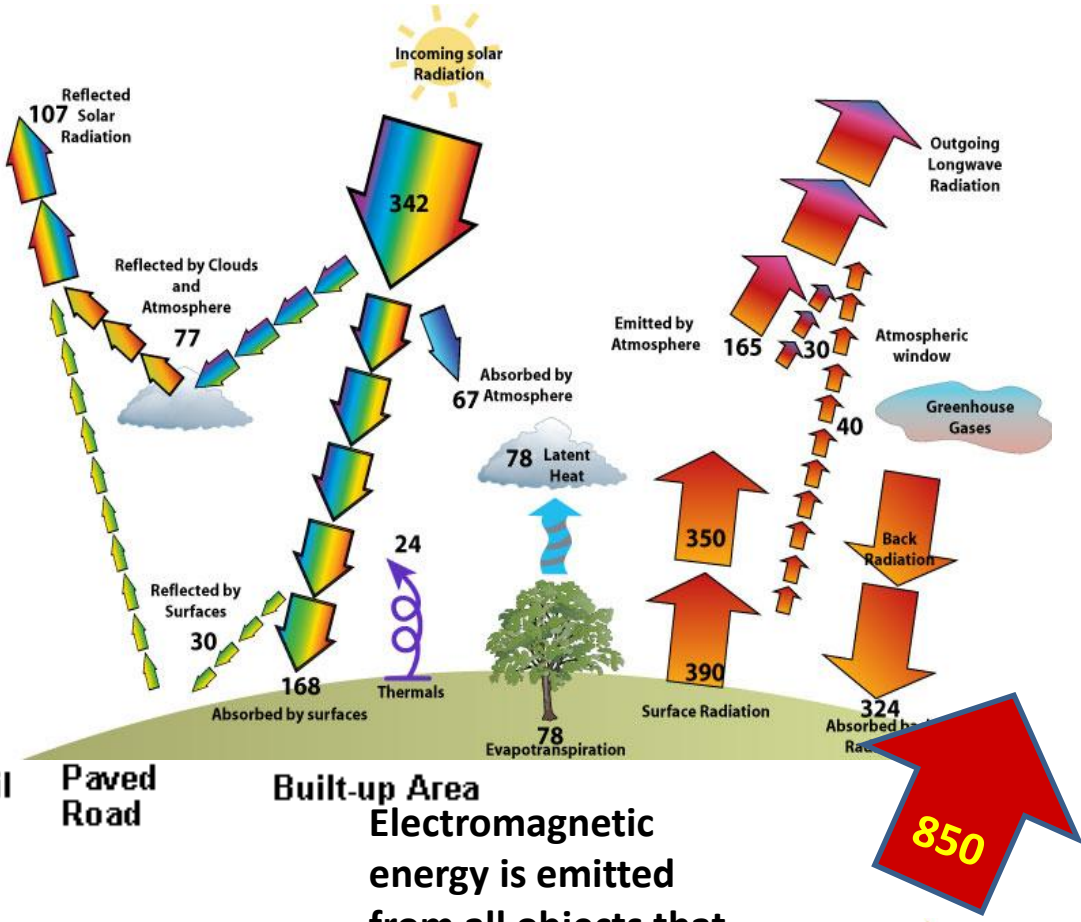


Project funded by the EUROPEAN UNION

Sensors technology

Satellites

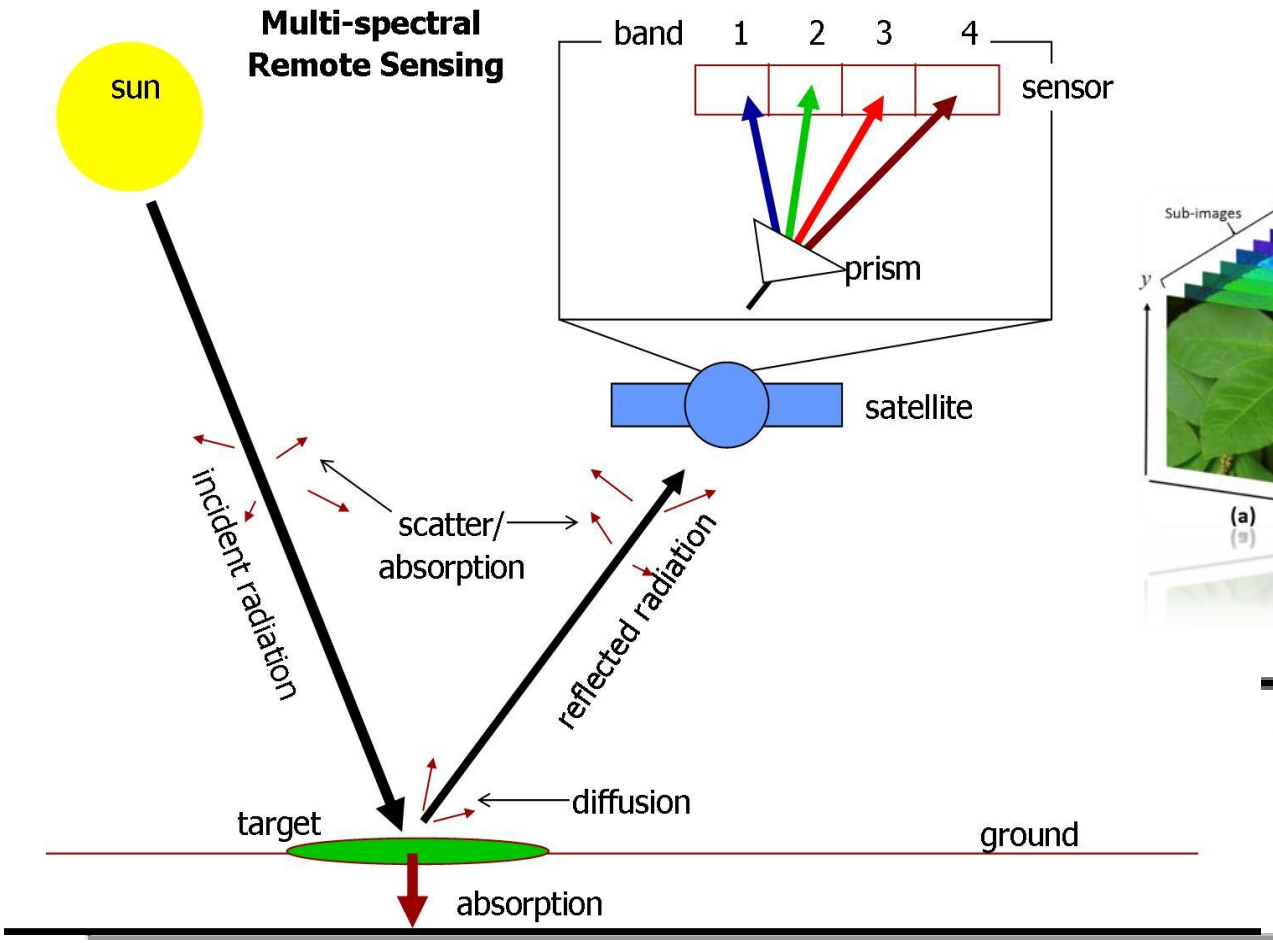


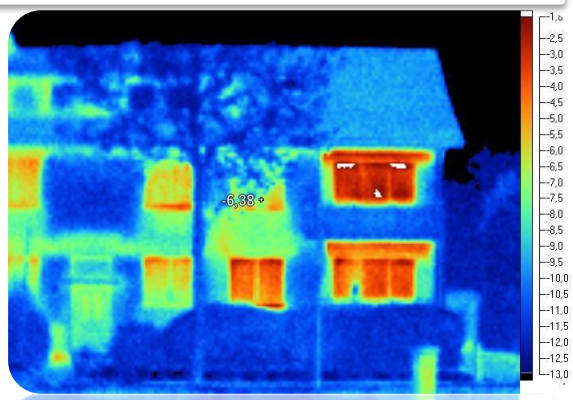


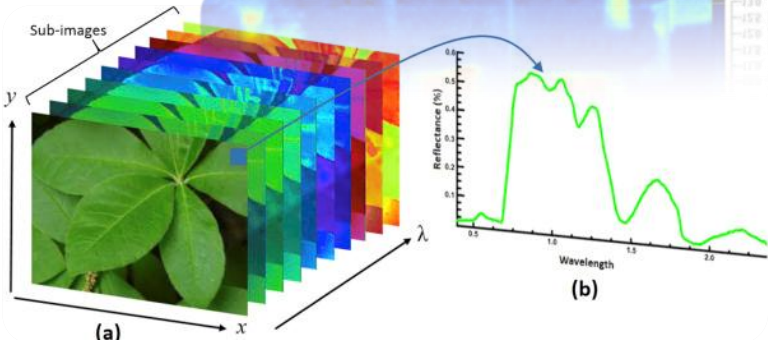
Electromagnetic energy is emitted from all objects that have a temperature greater than absolute zero (0 K or -273°C).

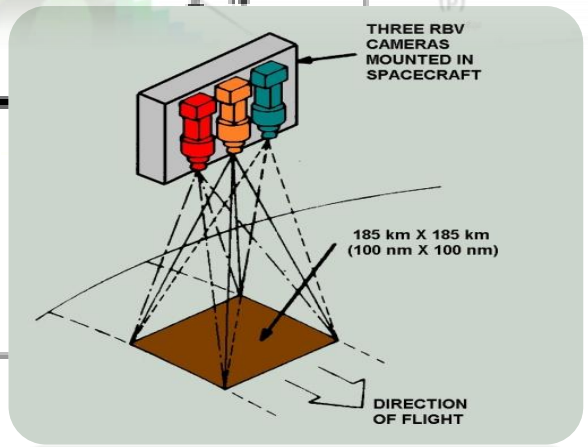
Sensors technology

Satellite









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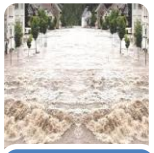
Flood


Landslide


Earthquake Erosion


Fire


Extreme Phenomena


Volcano


Industrial pollution


Tsunami

Aim

Natural Disasters Monitoring

Area of interest:

Southeast Europe, Mediterranean, Middle East, North Africa

Aim

Risk and disaster assessment and protection measures

Area of interest:

Global scale

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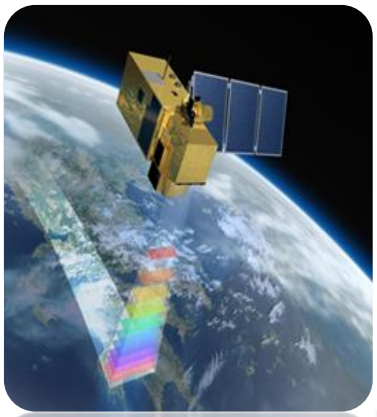
National Observatory of Athens

Monitoring Systems

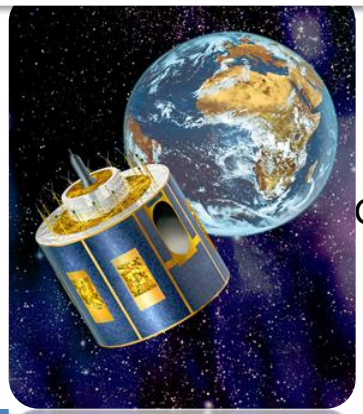


Satellites
Polar Orbit

X-/L-band
Station

Sentinel
Mirror Site

DATA → **ANALYSIS/ PROCESSING** → **INFORMATION/ RESULTS**



Satellites
Geostationary
Orbit

MSG Seviri

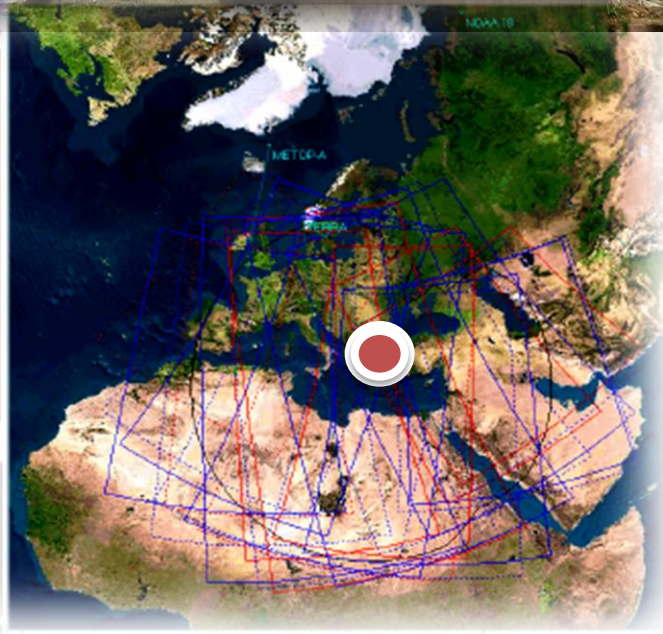
Aerial Vehicle
or Unmanned
Aerial Vehicle

in-situ

Terrestrial
Platforms and
Networks

European Operational Remote Sensing Center of Excellence BEYOND
National Observatory of Athens

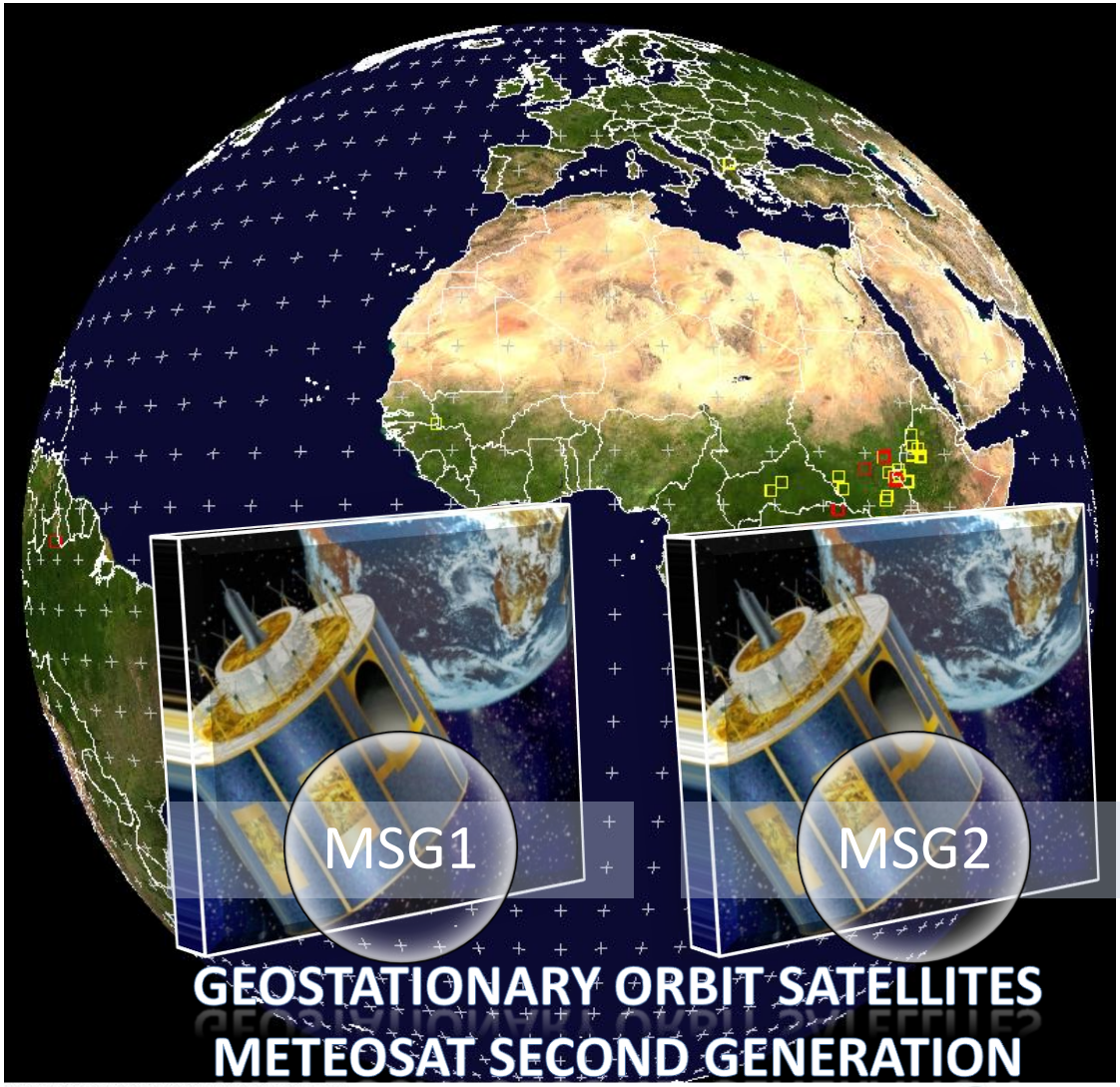
Infrastructure of Satellite EO Data Collection

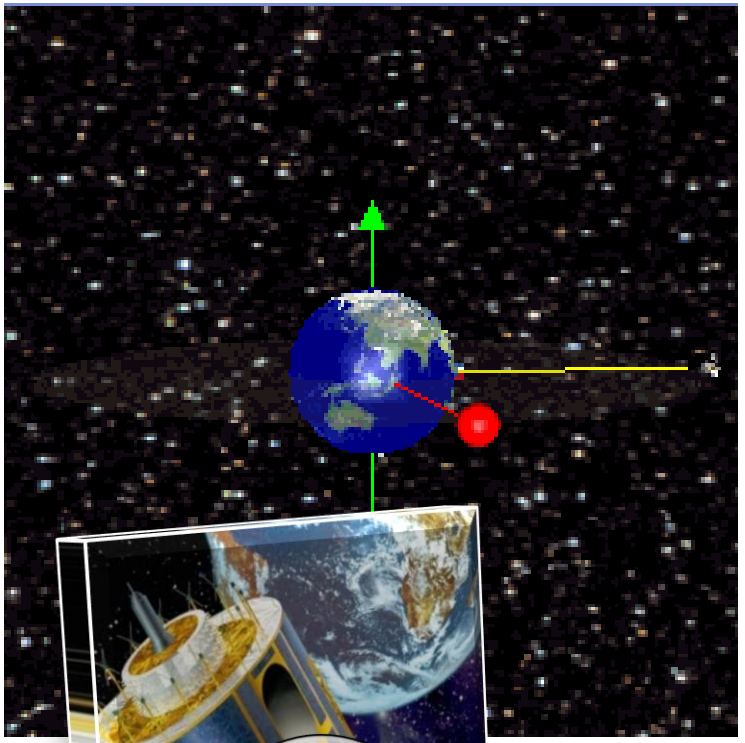


SATELLITES OF POLAR ORBIT, X-/L-BAND –
300TB ARCHIVE – SERVICE 24/7

European Operational Remote Sensing Center of Excellence BEYOND
National Observatory of Athens

Infrastructure of Satellite EO Data Collection





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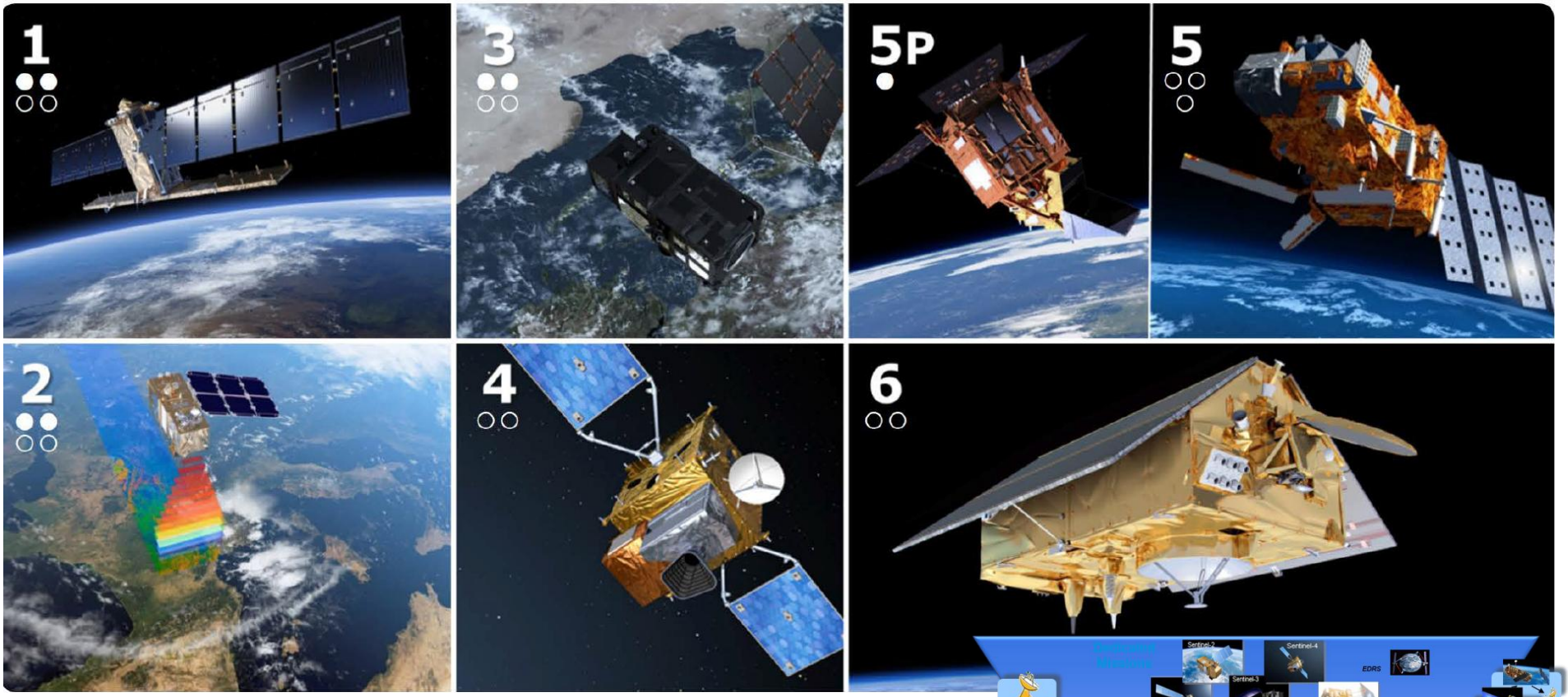
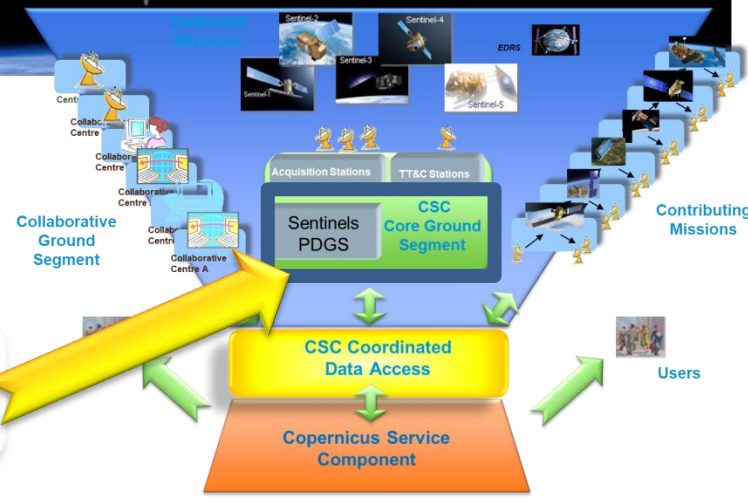
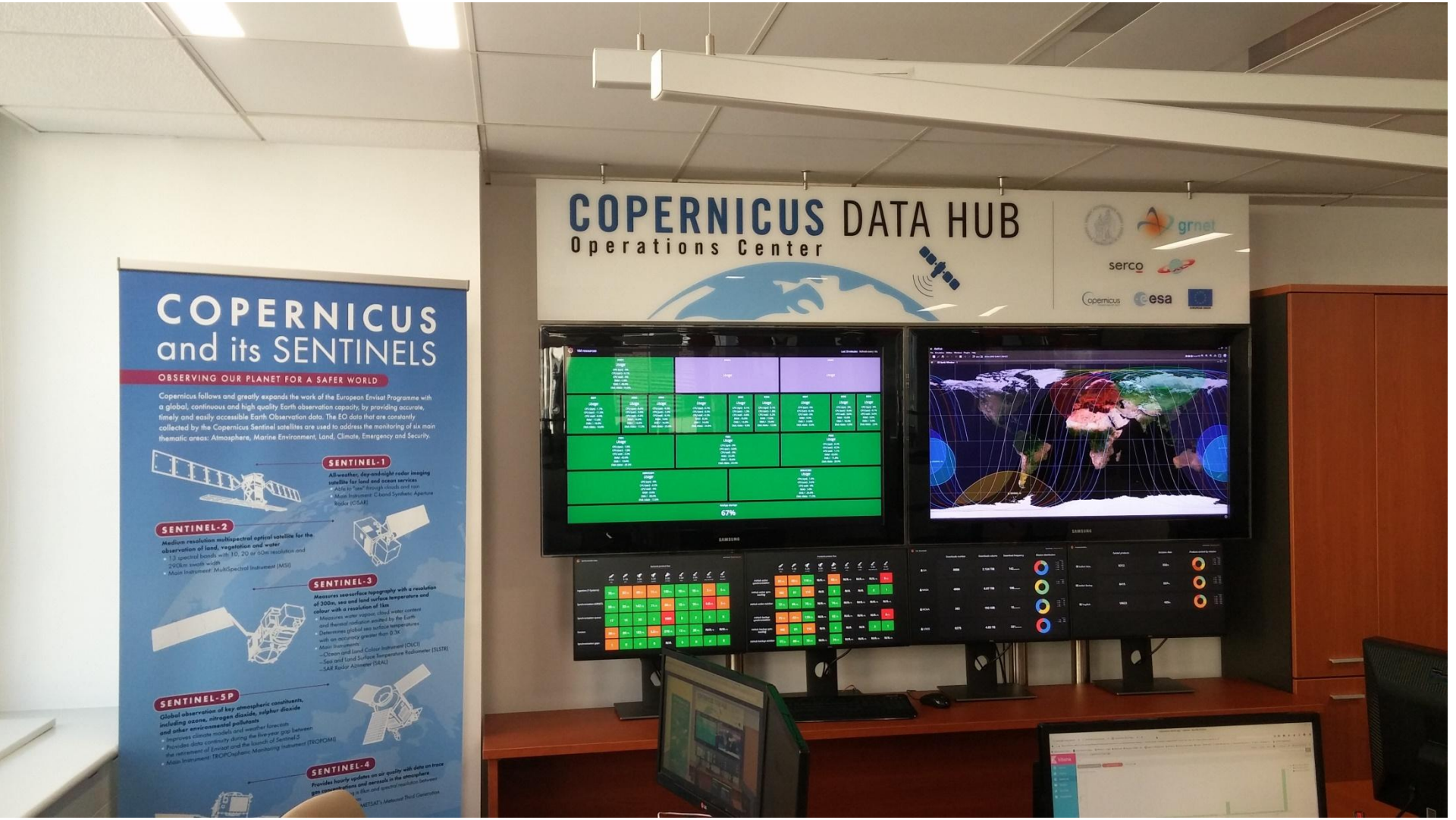
National Observatory of Athens



Copernicus Sentinel Missions and Data Access





Sentinels Greek Hub | Operations bridge

European Operational Remote Sensing Center of Excellence BEYOND
National Observatory of Athens

Sentinel DataHub

PARTNESRSHIP ESA – NOA – GRNET S

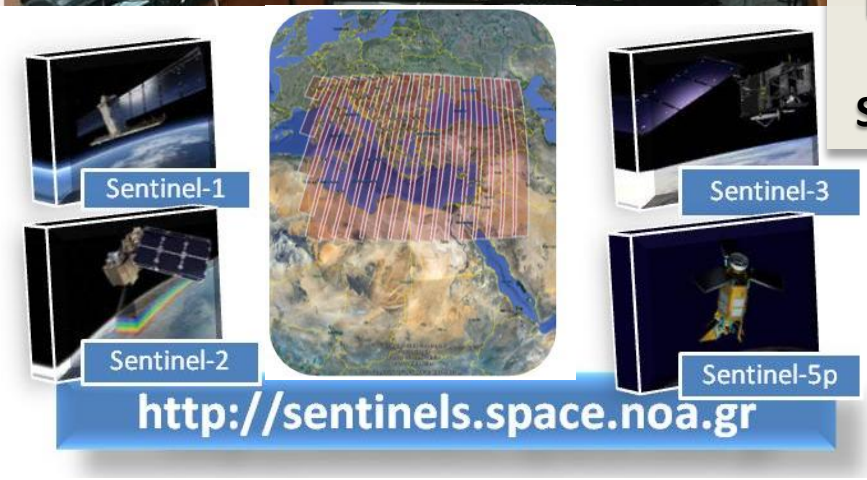
COPERNICUS DATA HUB
Operations Center

SENTINELS GREEK HUB

- INTHUB #1
- COLHUB #3
- DIASHUB #3
- AfricaCastHub
- S-5p PreOps Hub
- S-5p Expert Users Hub
- TMPHUB #1
- HNSDMS

Distributes 55 TB Data/ Day
Operations 24/7/365
Speed GEANT 500-700 Mbps

60 VMs
storage: 800 TiB,
680 CPU cores,
2.2 TiB RAM



A **550 TB** network filesystem for storing > **500 thousand** Sentinel products at any time

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National Observatory of Athens

Copernicus – the European EO programme

esa

European Earth Observation System, led by the EU

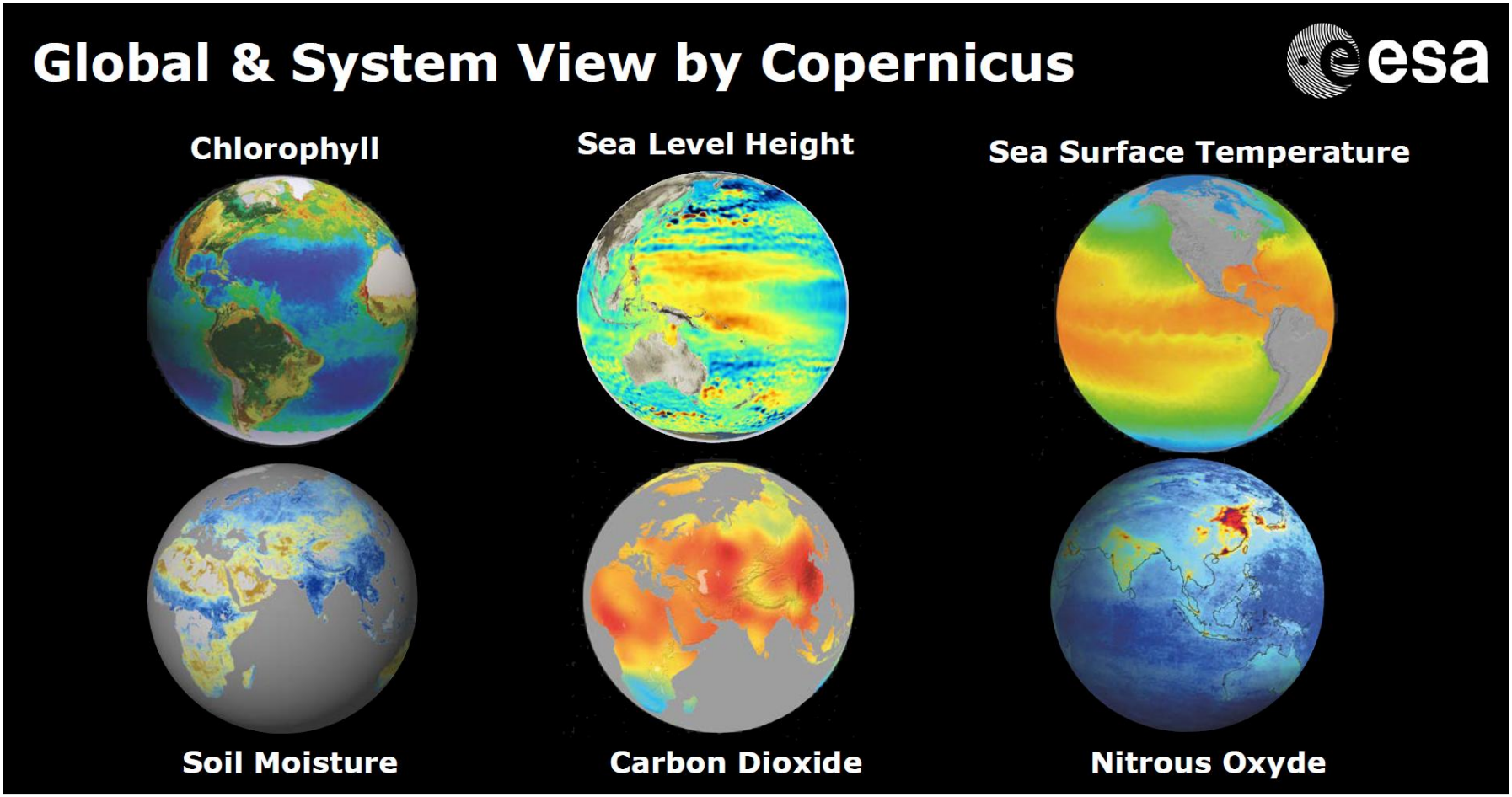
European response to global needs:

- to manage the environment
- to mitigate the effects of climate change
- to ensure civil security

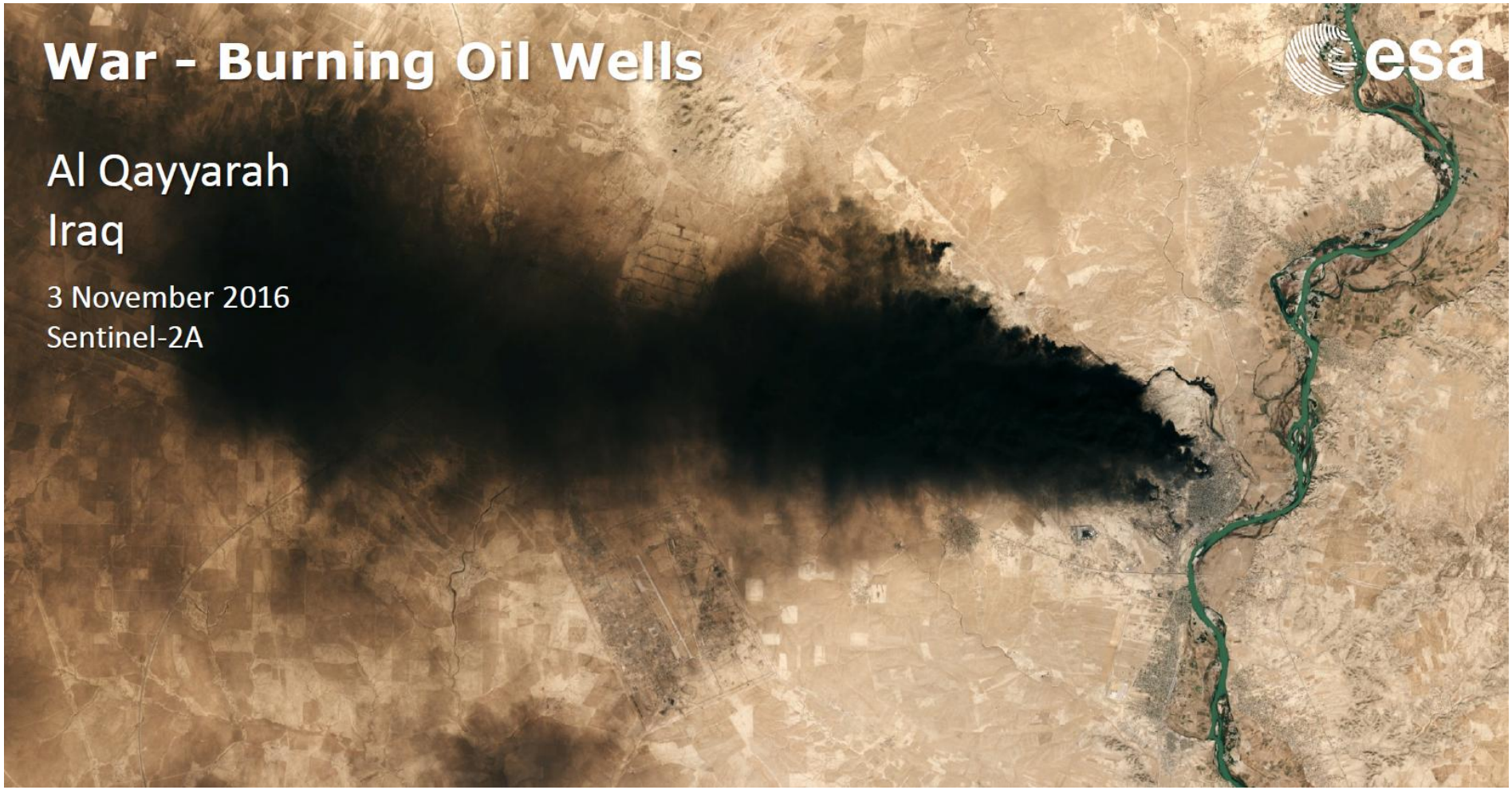
FULL, FREE AND OPEN ACCESS TO DATA

- ATMOSPHERE MONITORING
- MARINE ENVIRONMENT MONITORING
- LAND MONITORING
- CLIMATE CHANGE
- EMERGENCY MANAGEMENT
- SECURITY

opernicus
Europe's eyes on Earth



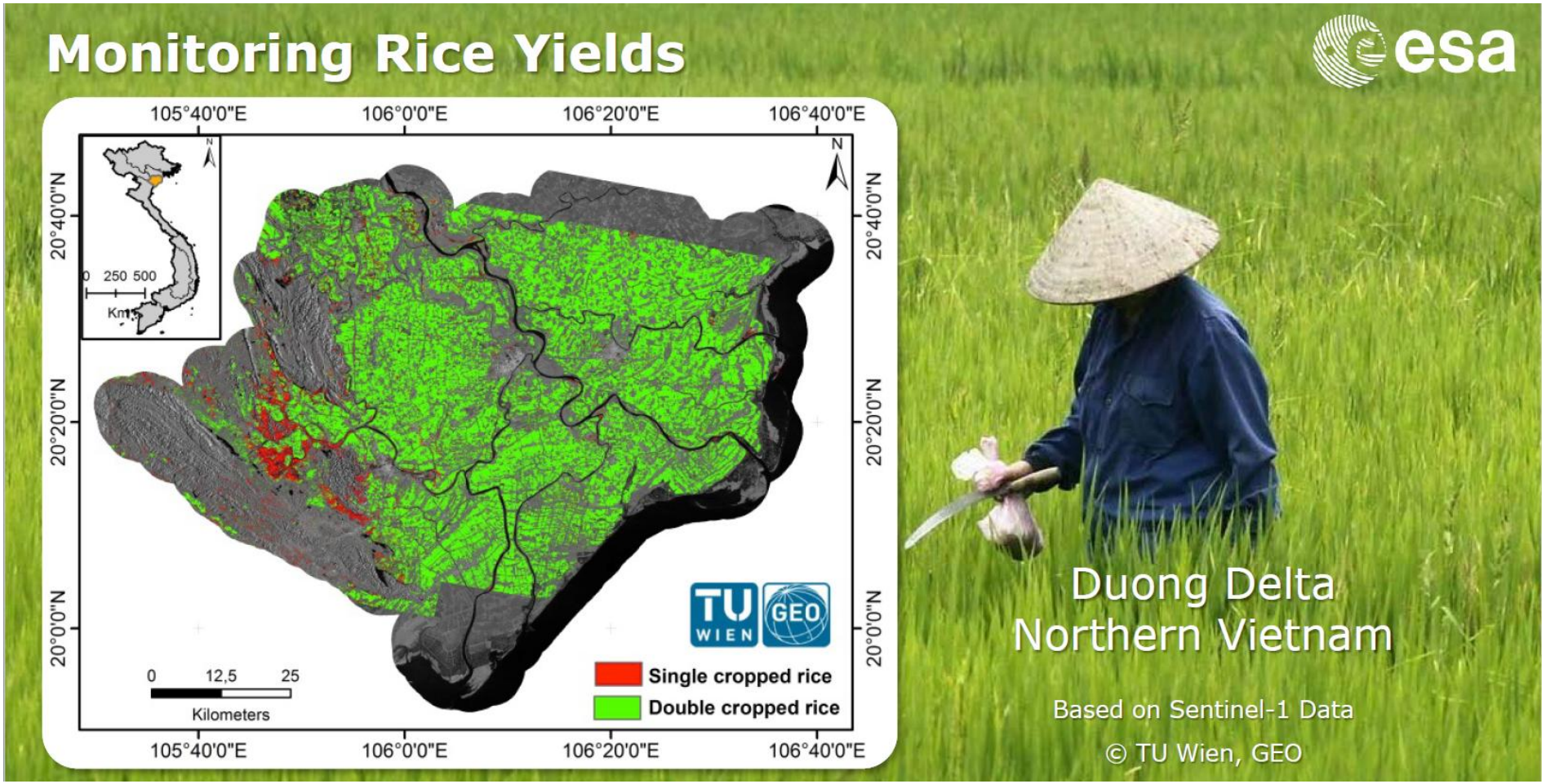
Copernicus Core Services



Copernicus Core Services

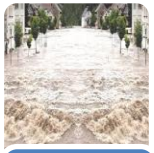
Copernicus Core Services

European Operational Remote Sensing Center of Excellence BEYOND
National Observatory of Athens



Copernicus Core Services

European Operational Remote Sensing Center of Excellence BEYOND
National Observatory of Athens


Flood


Landslide


Earthquake Erosion


Fire


Extreme Phenomena


Volcano


Industrial pollution


Tsunami

Aim

Natural Disasters Monitoring

Area of interest:

Southeast Europe, Mediterranean, Middle East, North Africa

Aim

Risk and disaster assessment and protection measures

Area of interest:

Global scale

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Project funded by the EUROPEAN UNION

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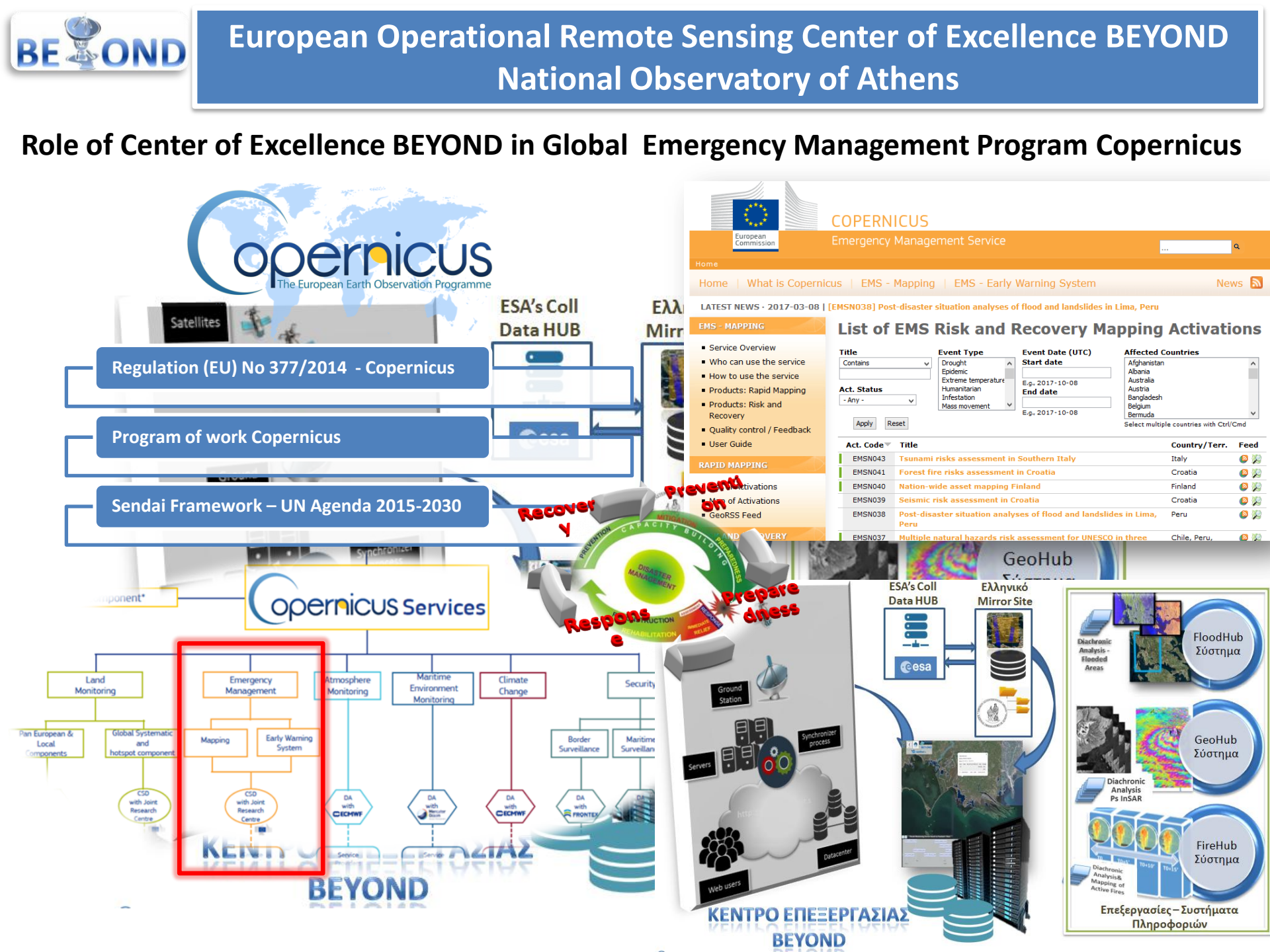
National Observatory of Athens

Role of Center of Excellence BEYOND in Global Emergency Management Program Copernicus



European Operational Remote Sensing Center of Excellence BEYOND
National Observatory of Athens

Activation of BEYOND in the Copernicus Emergency Management Service EMS
Prevention – Preparedness – Assessment – Response – Recovery

ACTIVATIONS OF CIVIL PROTECTION 2017-2018

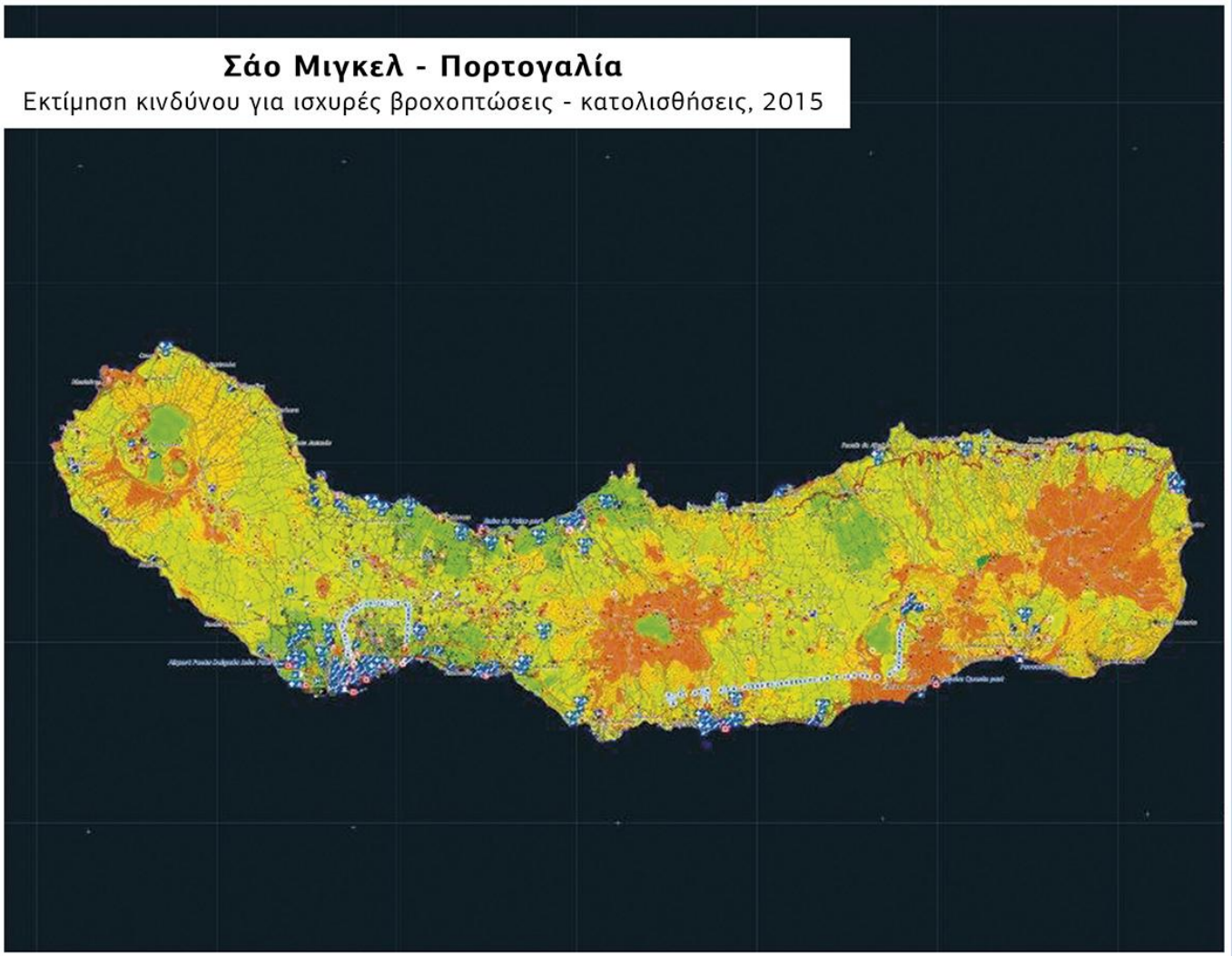
European Operational Remote Sensing Center of Excellence BEYOND
National Observatory of Athens

Copernicus EMS Risk & Recovery Activations

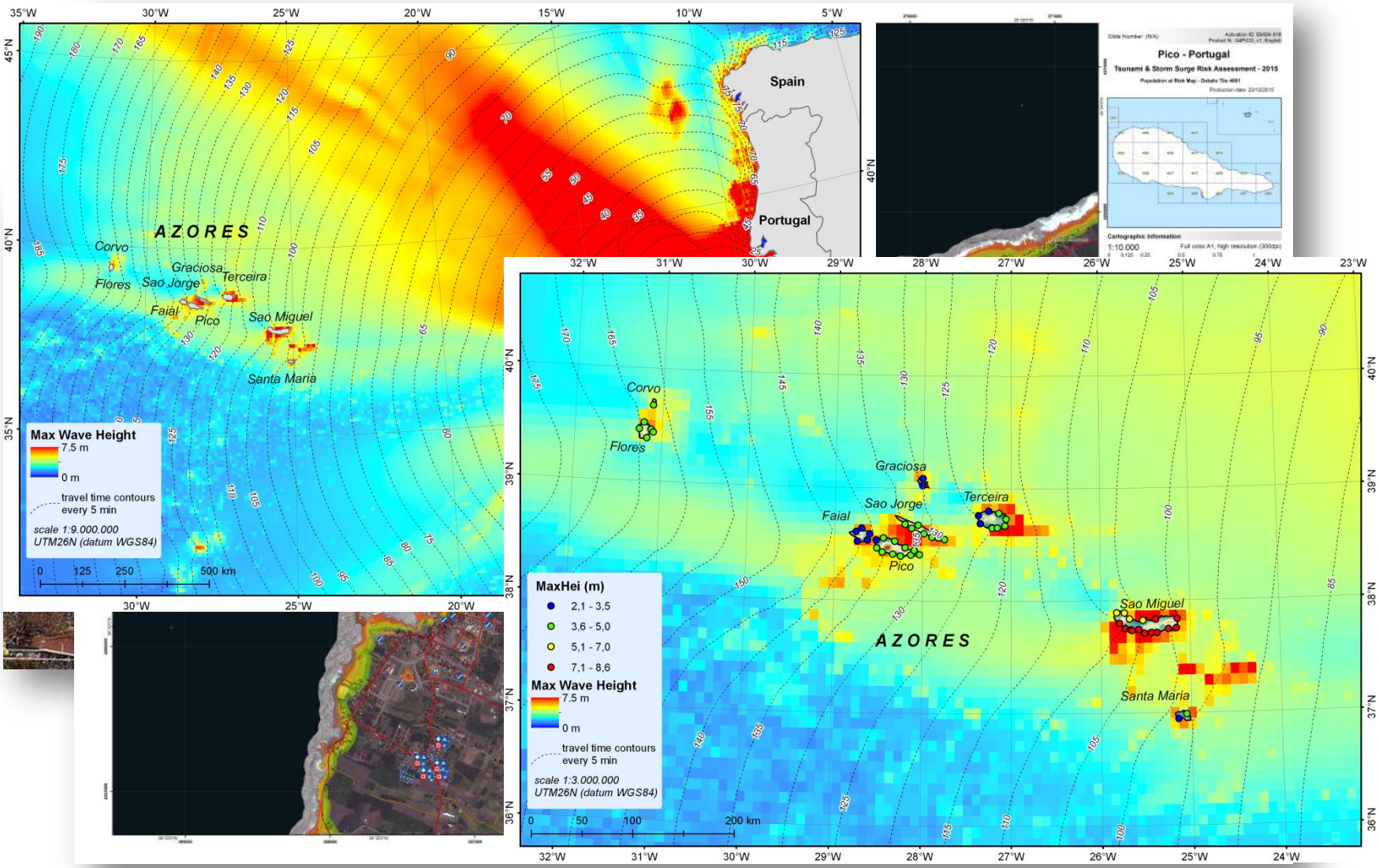
Azores islands, Portugal
EMSN018

Multiple natural hazards:

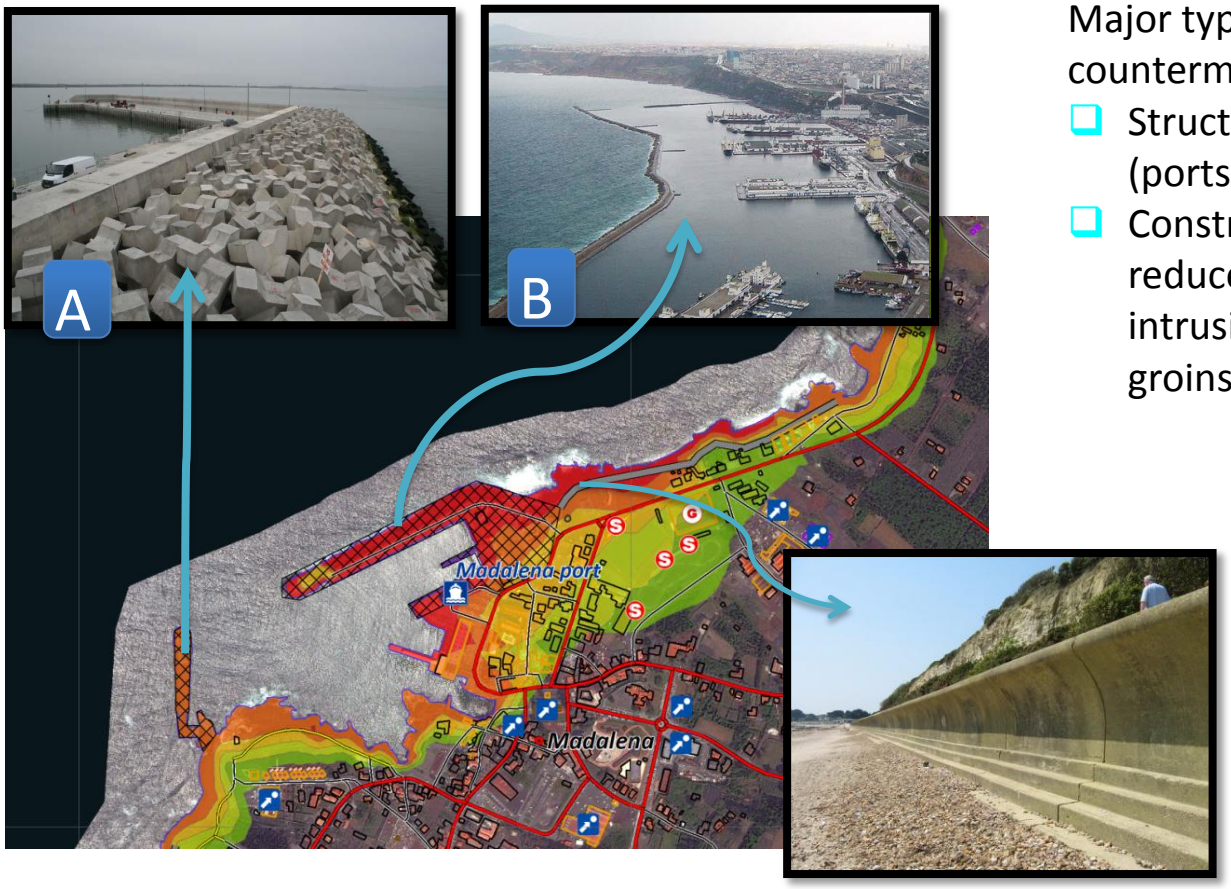
- Seismic
- Flash Flood
- Tsunami & Storm Surges
- Landslide & Erosion
- Lava Flow
- Coastal Erosion



Azores activation Tsunami



Azores activation Tsunami



Major types of structural countermeasures:

- Structural reinforcement of assets (ports & other on-land facilities) [A]
- Construction of defences in order to reduce tsunami & storm surges intrusion (Breakwaters, seawalls, groins, quays, dykes / levees) [B]

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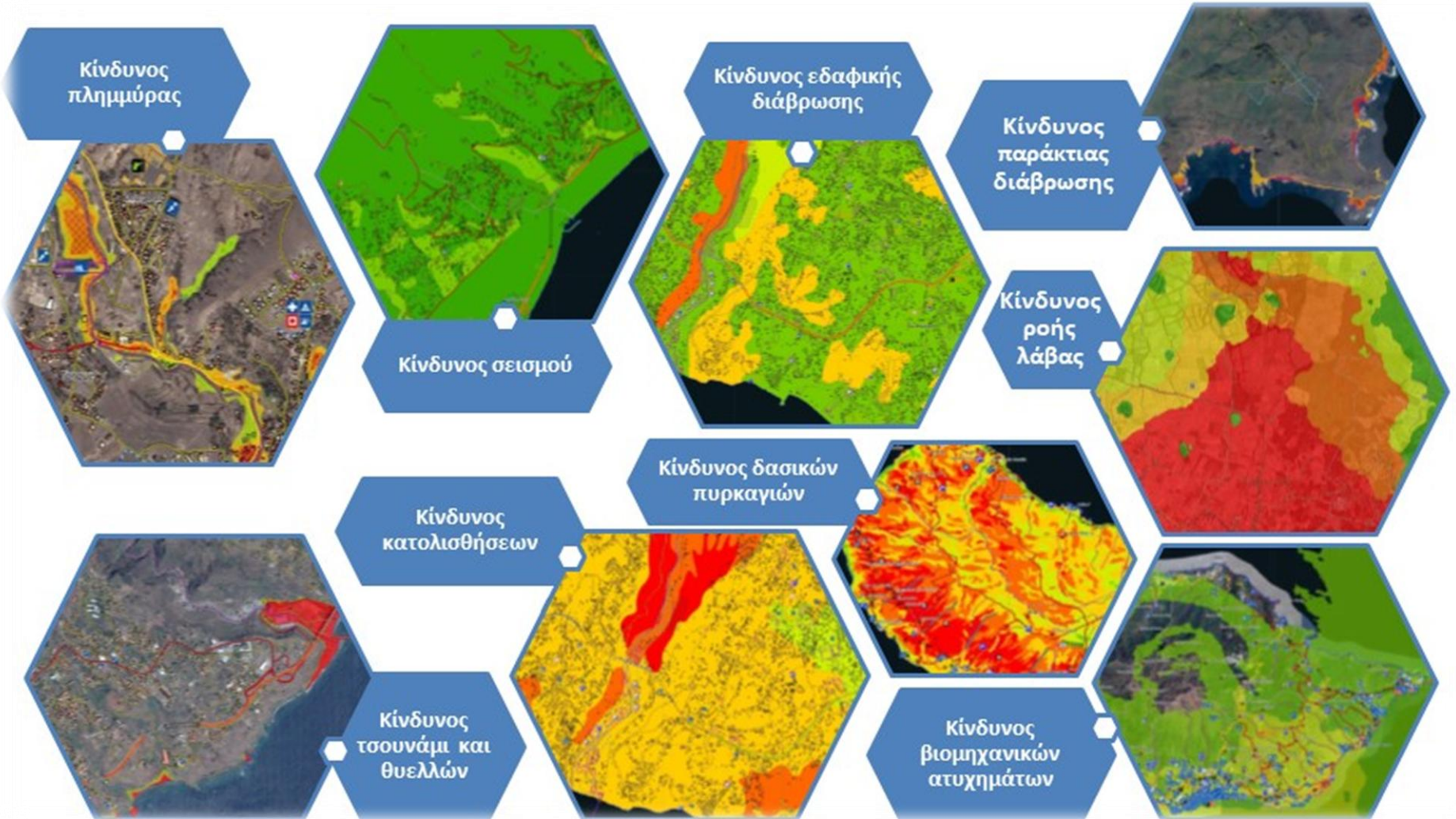
National Observatory of Athens

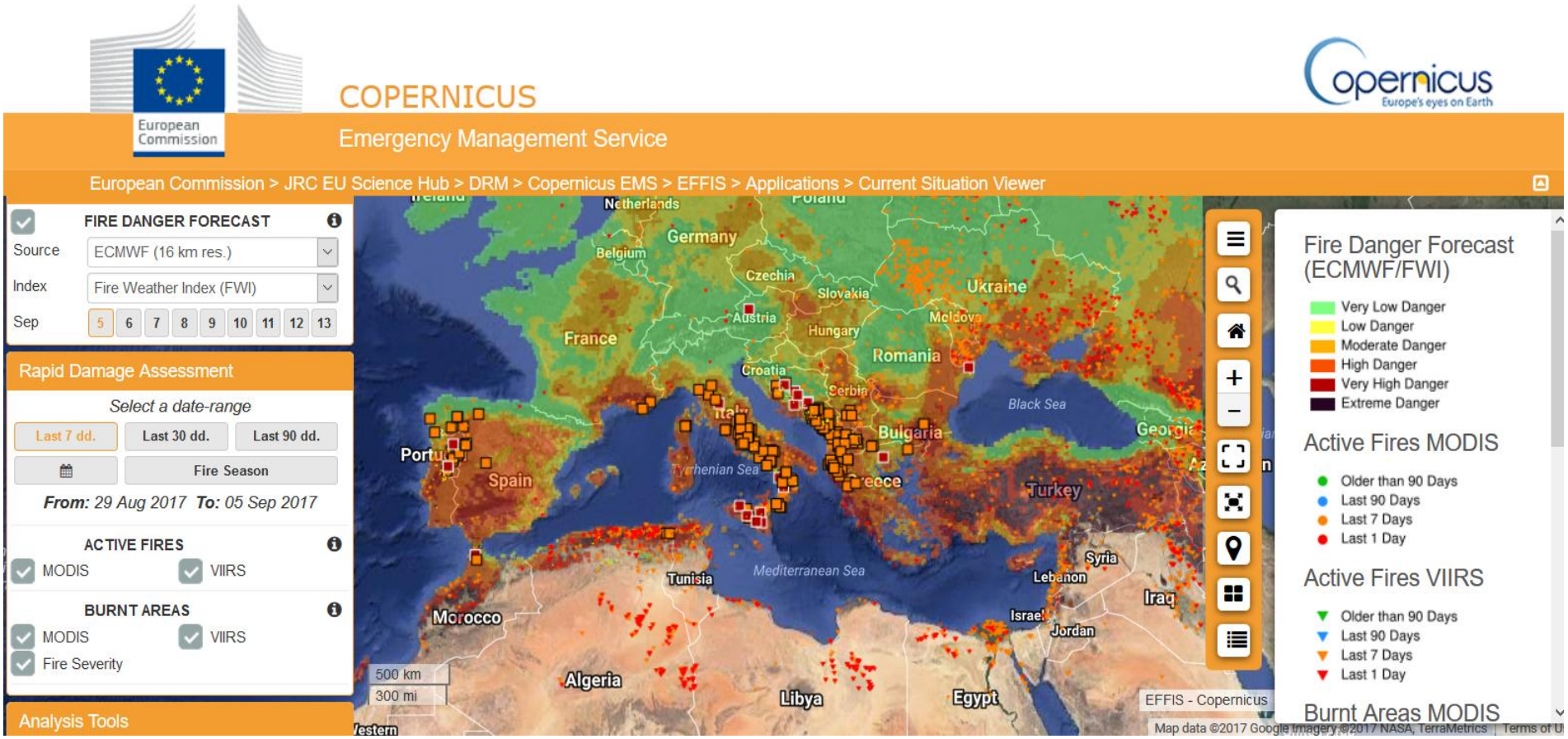
Activation of BEYOND in the Copernicus Emergency Management Service EMS
Prevention – Preparedness – Assessment – Response – Recovery

Models that produce thousands of estimates and maps at the critical time



European Operational Remote Sensing Center of Excellence BEYOND
National Observatory of Athens

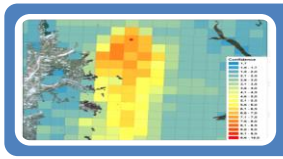
Activation of BEYOND in the framework of the European Fire Information System Program
Real time EFFIS – Collaboration NOA - DLR-e-GEOS-SERTIT



Area(s) of responsibility Europe, N. Africa, M. East, Balkans

European Operational Remote Sensing Center of Excellence BEYOND
National Observatory of Athens

FIREHUB: A SPACE BASED HUB OF FIRE MANAGEMENT SERVICES

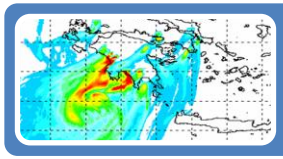


Early fire detection and real-time fire monitoring

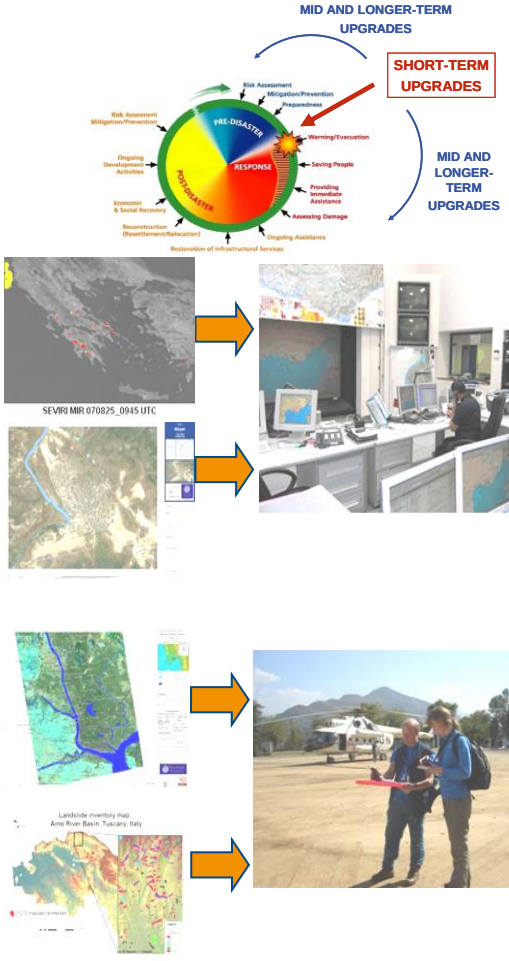
Rapid Burnt Scar and Fire Severity Mapping during crisis

Detailed Burnt Area Mapping and Damage Assessment

Diachronic Burnt Area Mapping and Damage Assessment

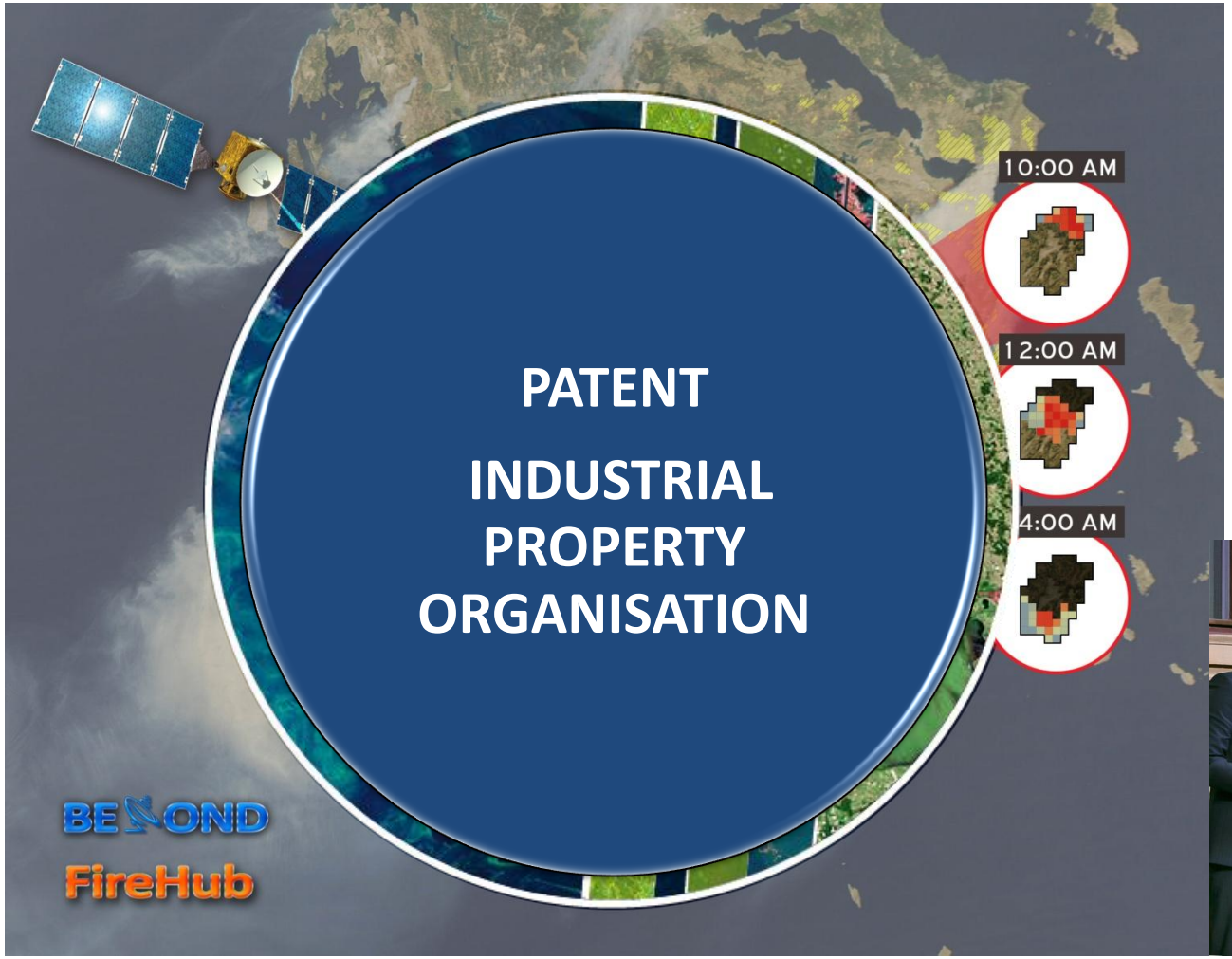


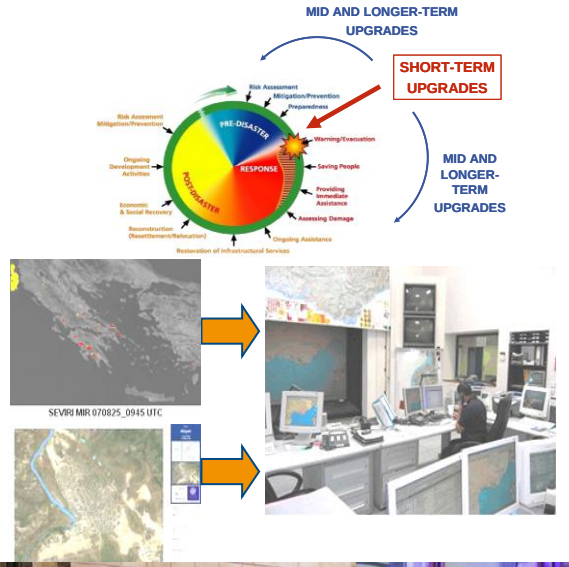
Hourly Forecasting of Fire Smoke Dispersion during crisis



http://ocean.space.noa.gr/FireHub

FIREHUB: A SPACE BASED HUB OF FIRE MANAGEMENT SERVICES



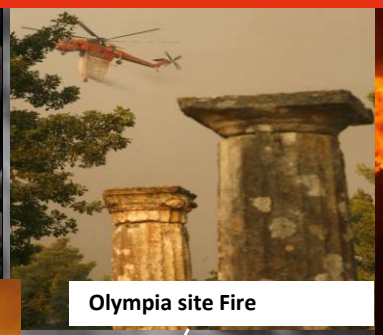


http://ocean.space.noa.gr/FireHub

European Operational Remote Sensing Center of Excellence BEYOND
National Observatory of Athens

Regional Real Time Fire Monitoring - NOA's MSG SEVIRI Station – Raw Resolution mode

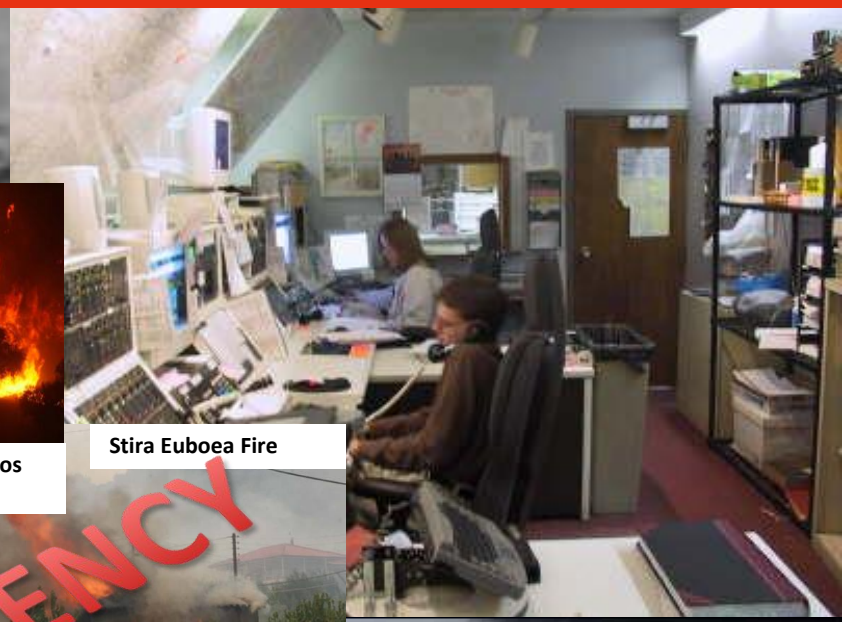
Zaharo Fire



Olympia site Fire

AliveriEuboea Fire

Korinthos Fire



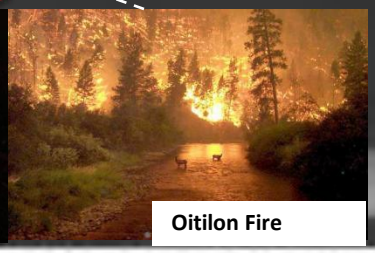
Stira Euboea Fire

Parnon Mt Fire

EMERGENCY

Taygetos Mt Fire

Megalopolis Fire



Oitilon Fire

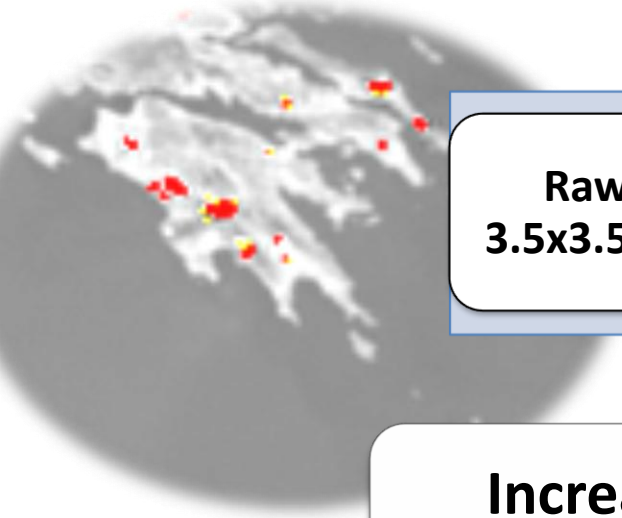
SEVIRI MIR 070823_1030 UTC

POTENTIAL FIRE

CONFIRMED FIRE

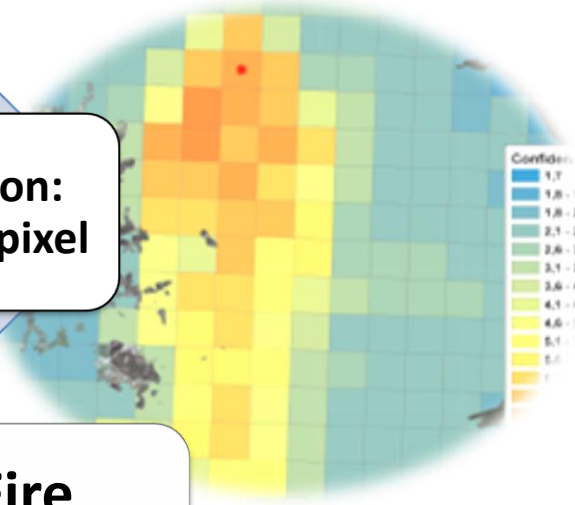
European Operational Remote Sensing Center of Excellence BEYOND
National Observatory of Athens

FIREHUB: INNOVATIVE EARLY DETECTION AND RT FIRE MONITORING



Raw resolution:
3.5x3.5 km wide pixel

Refined resolution:
0.5x0.5 km wide pixel



Increased Spatial Resolution of Fire Monitoring by 50 Times – (500mx500m)
– Multi Source Multi Resolution EO Data Fusion in RT

Meteo Data (Wind Forecasts direction, speed)

Detailed Fuel Maps & Historical Assessments of Fuel Vulnerability

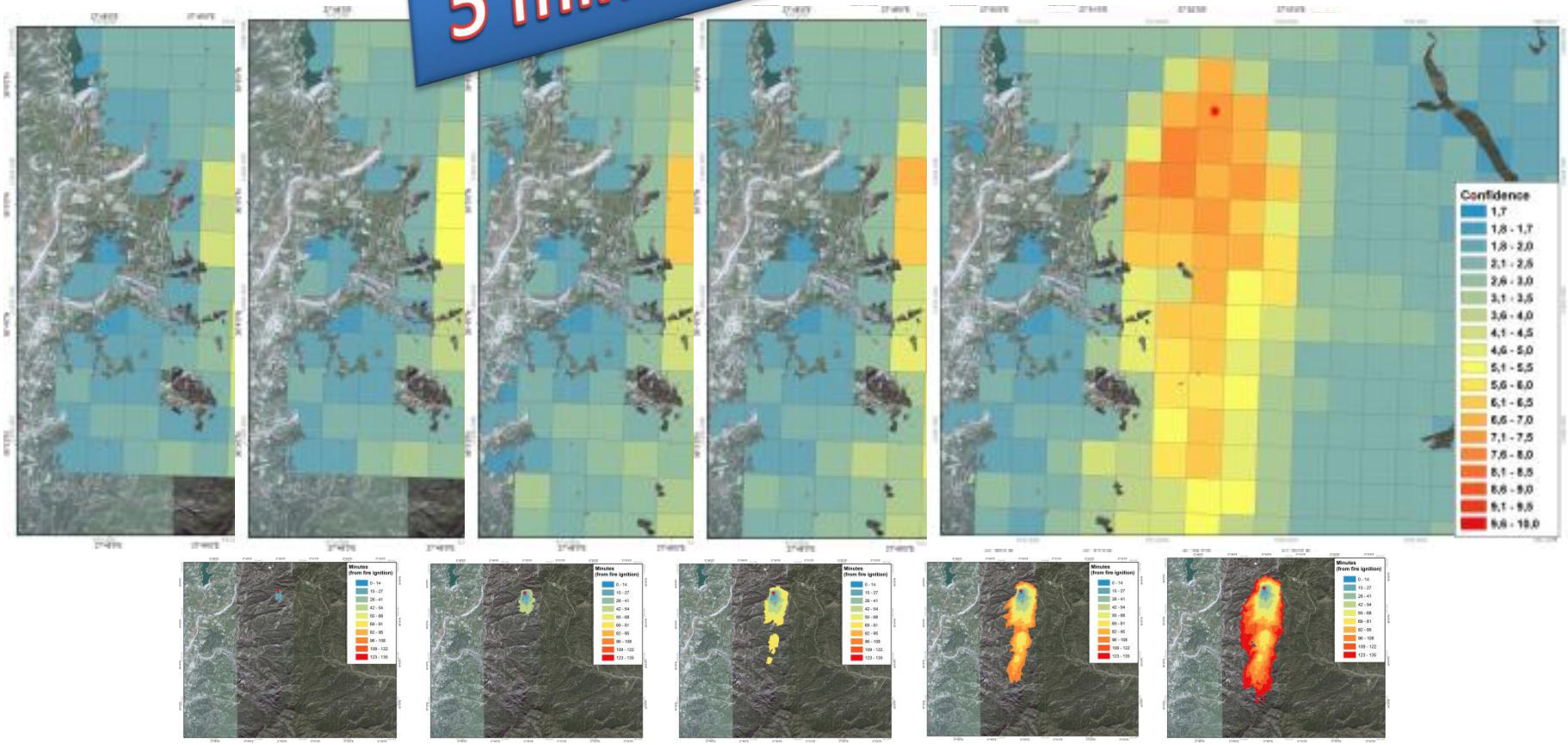
Geographic Aspects: Altitudinal Zones, Slope/Aspect

Fire Spread Modelling Assimilation with RT SEVIRI Observations

Results @ 150 minutes after fire ignition

+30’ → +35’ → +40’ → +45’ → +50’

5 minutes basis



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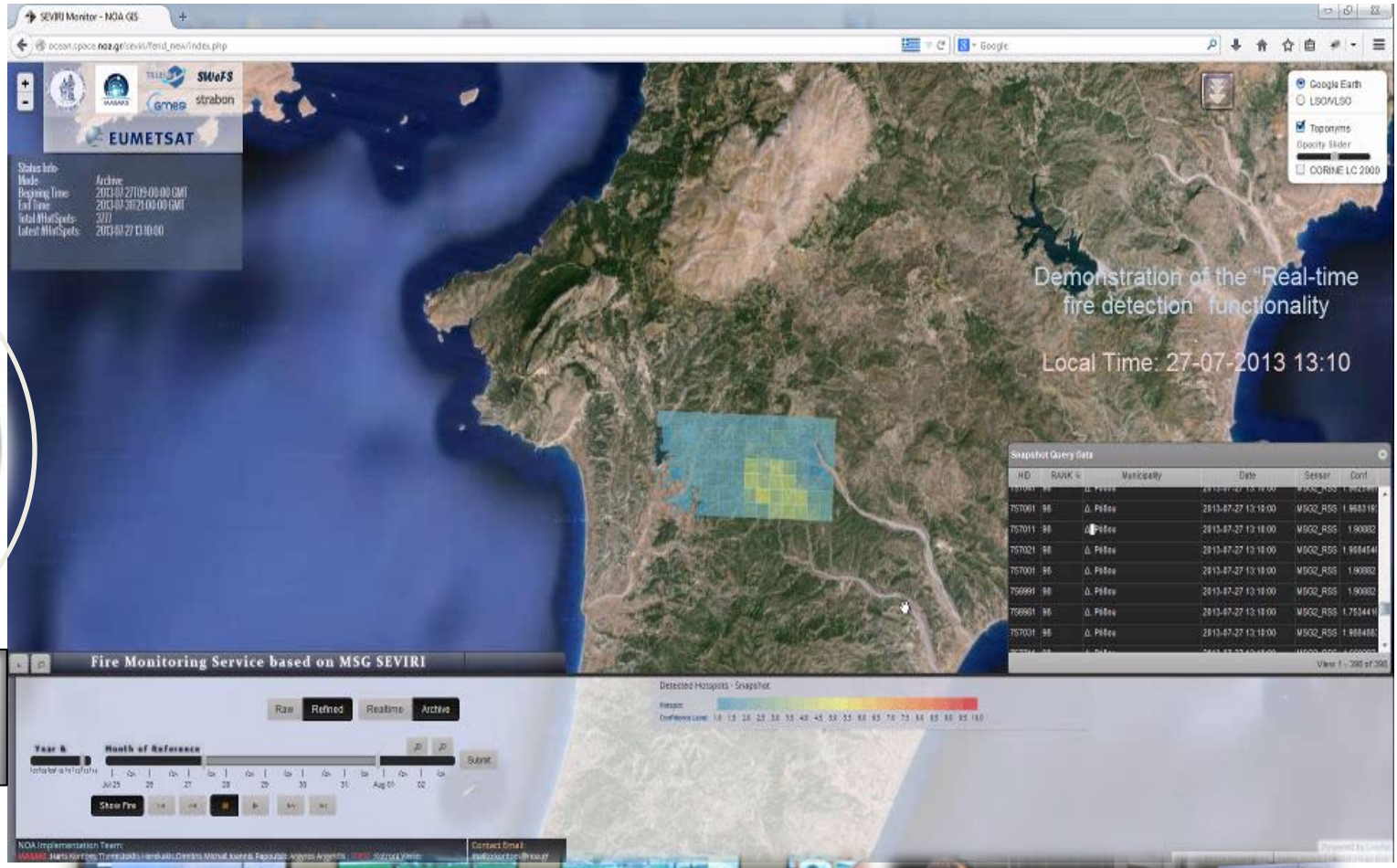
Rhodes Island
27/7/2013



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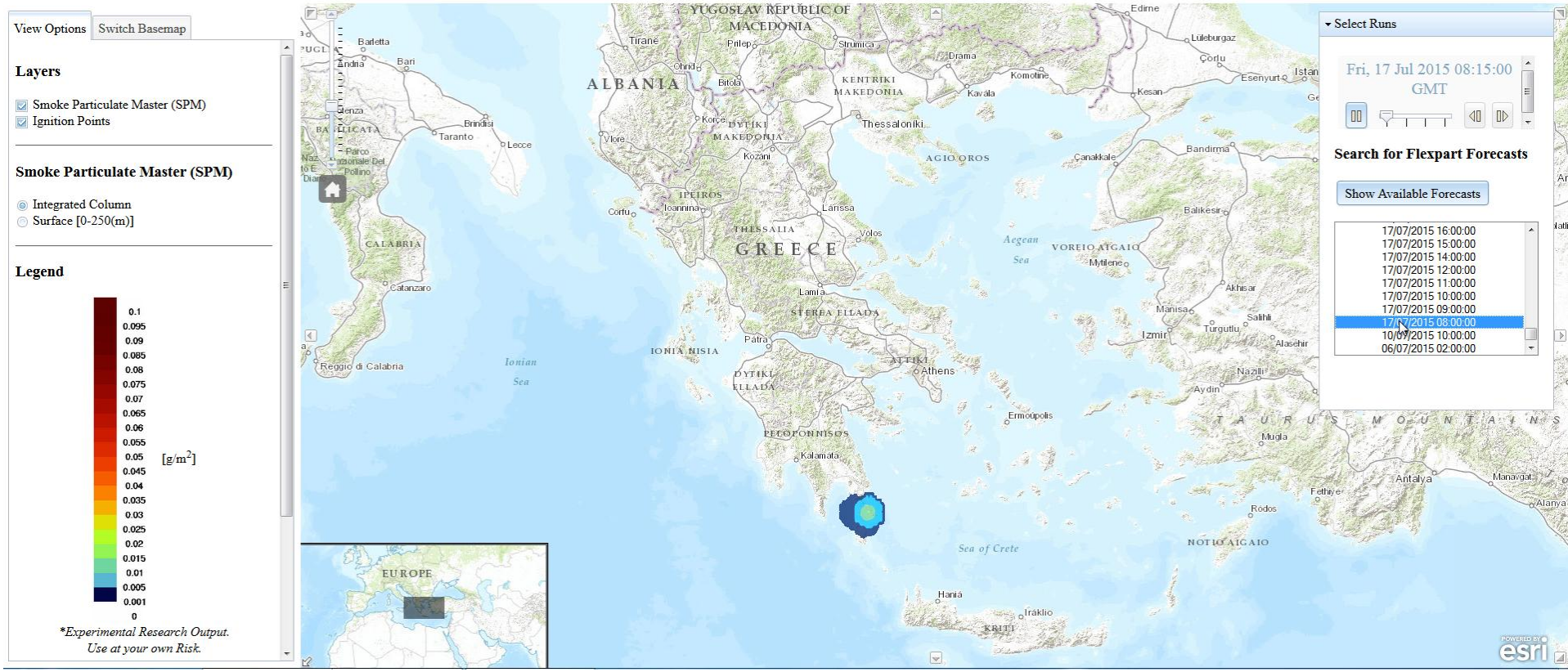
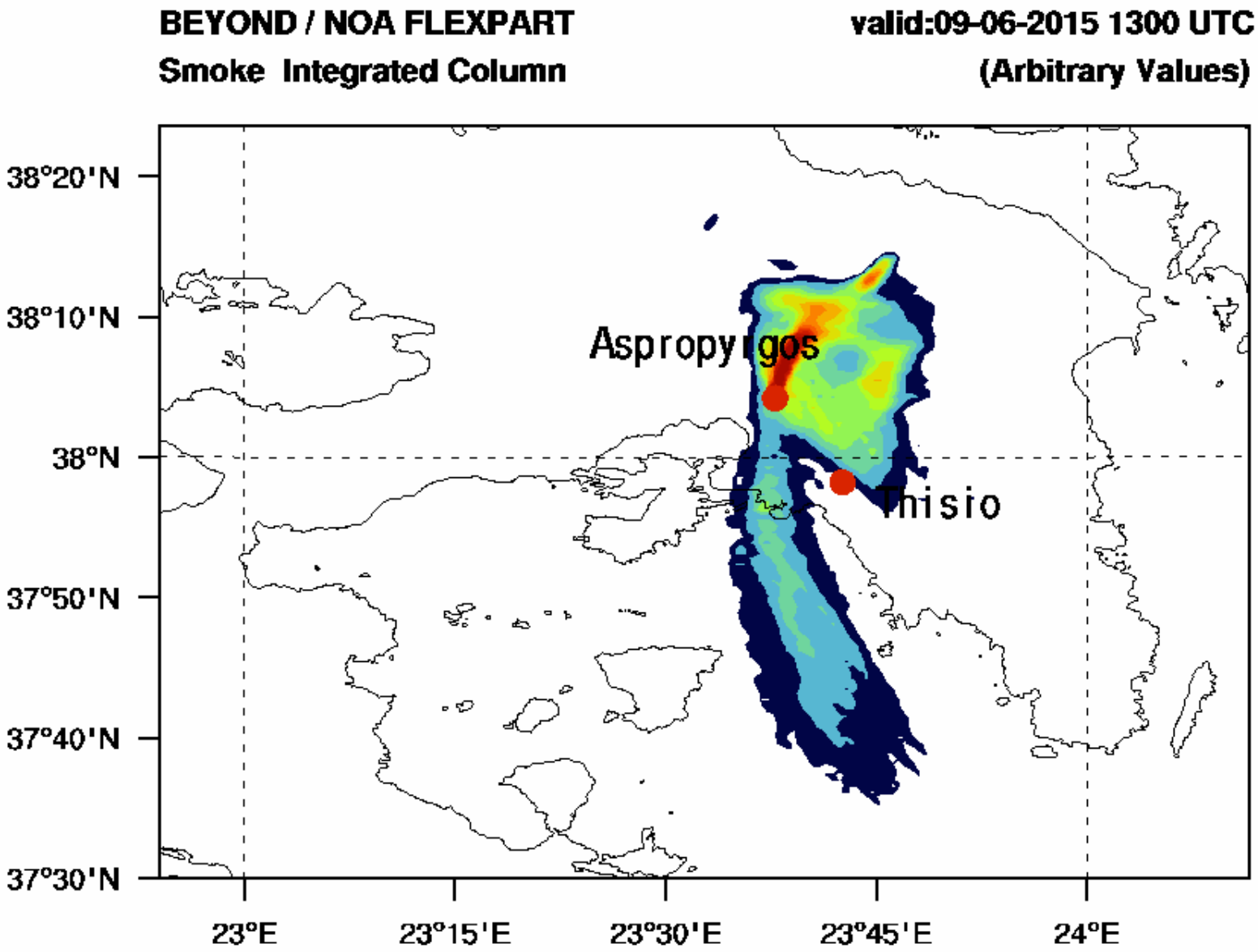
FireHub

Fire Smoke Dispersion Service
A FireHub Module



Spatial and temporal smoke dispersion of the smoke from wild fires


BEYOND / NOA FLEXPART
Smoke Integrated Column
valid:09-06-2015 1300 UTC
(Arbitrary Values)
38°20'N
38°10'N
38°N
37°50'N
37°40'N
37°30'N
23°E
23°15'E
23°30'E
23°45'E
24°E
Aspropyrgos
Thisio

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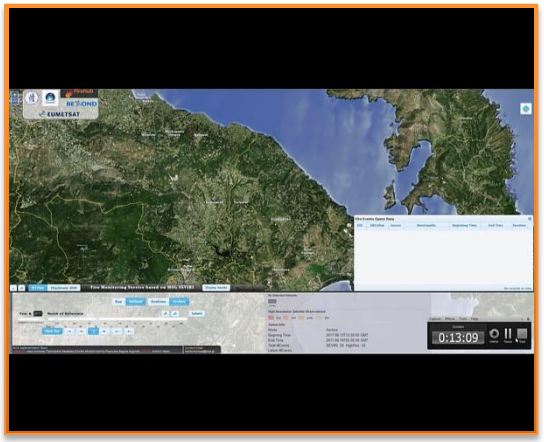
National Observatory of Athens

FireHub

First fire detection in 10’



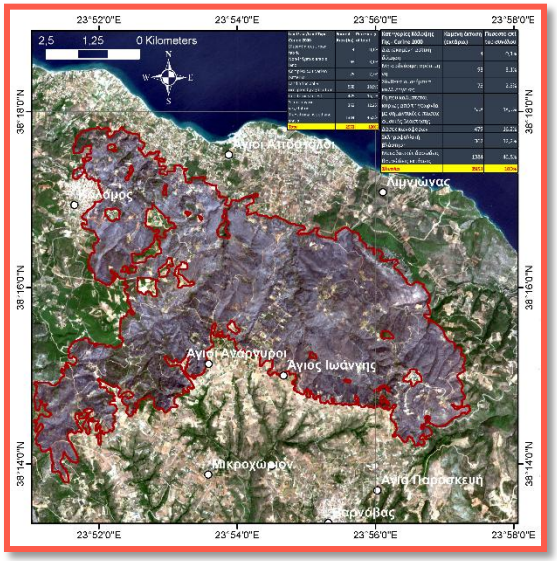
Meteosat SG –SEVIRI

Day #1
NPP-VIIRS
MR=375m
20170817 11:14

Day #2
MODIS-Terra
MR=250m
20170818_1055

Day#3
NPP-VIIRS
MR=375m
20170819_1057

Day #4 Sentinel-2 HR-10 m



P1 Detection - Fire Monitoring - Resolution 500 m/5 minute

P2 Rapid daily Mapping at Medium Resolution - 2-3 times /day

P3 Rapid Mapping at High Resolution/ 5 days

Detection of active sources of fire from FireHUB system

Burned area extent Medium resolution (250m)

Burned area extent High resolution (10m)

T0 minute

KALAMOS
13/08/2017
2953 hectare

T10 minutes

T1 Day

T2 Day

T3 Day

T4 Day

Beginning of fire

Burned area extent Medium resolution (375m)

Burned area extent Medium resolution (375m)

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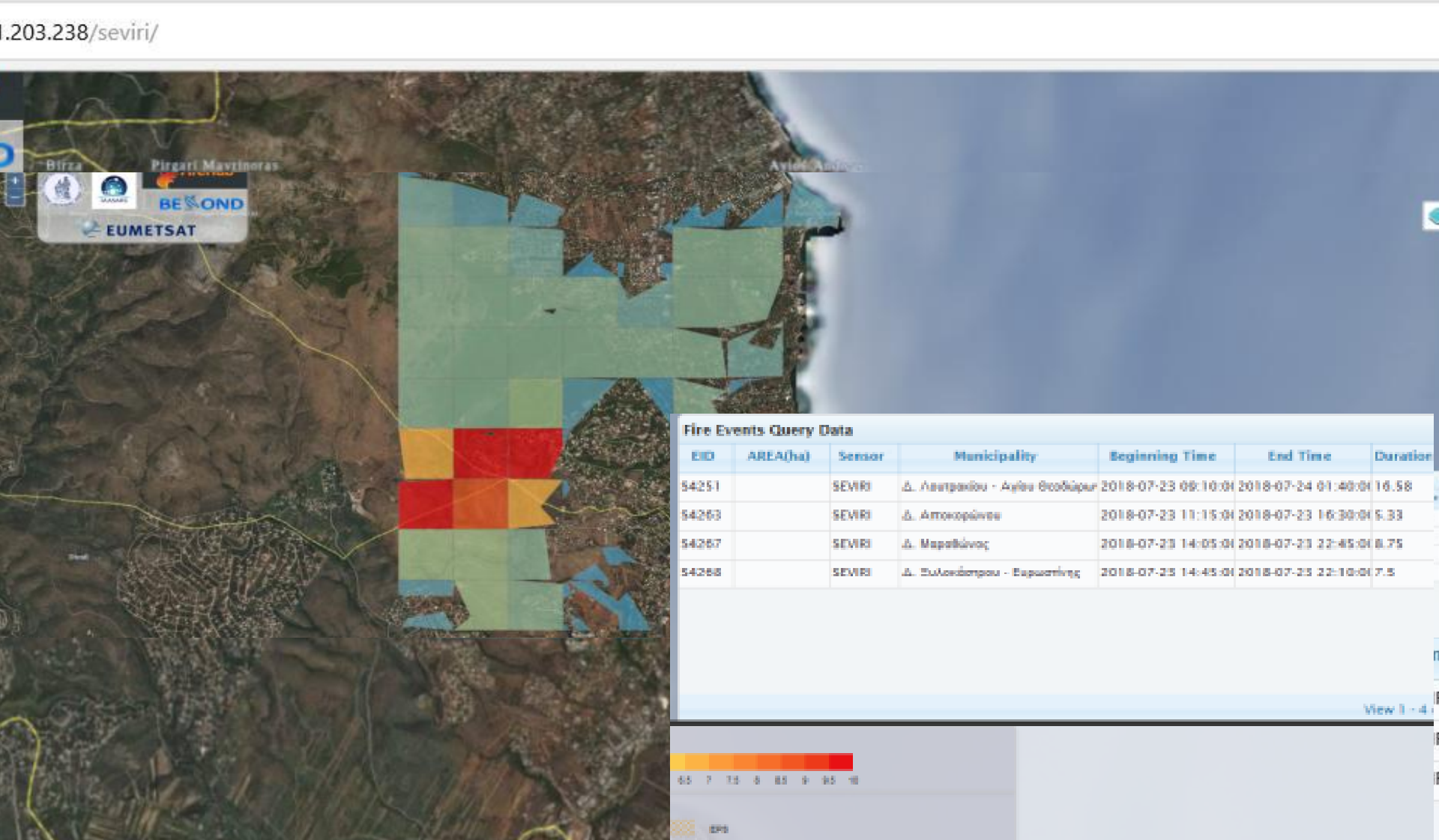
FireHub

FireHub

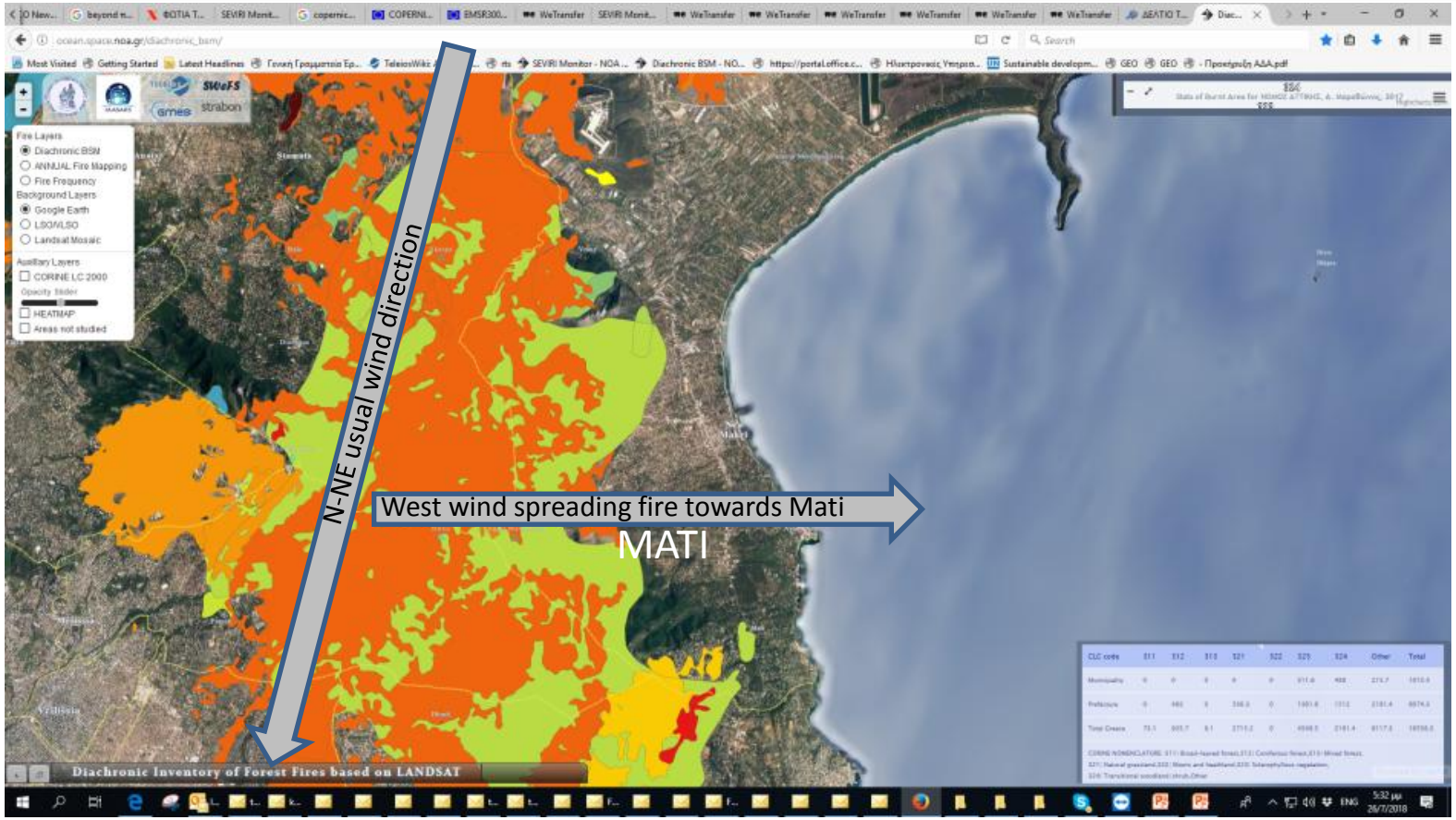
European Operational Remote Sensing Center of Excellence BEYOND
National Observatory of Athens

On 23/07/2018 at 17:05, FireHub detected source of fire in the Municipality of Marathon, above Mati.



European Operational Remote Sensing Center of Excellence BEYOND
National Observatory of Athens

FireHub



- This map shows the diachronic mapping of fire over the last 35 years in Attica. Different colours indicate fires in different years. Detailed information for each fire polygon can be found at http://ocean.space.noa.gr/diachronic_bsm/
- The site provides also information on the frequency of fire occurrence, therefore depicts areas around Athens that have been burned twice or three times over the years. The important element is that the fires over the years have a N-S distribution because of the usual N-NE winds affecting Athens (grey arrow). The black arrow shows the direction of the unusual wind pattern that facilitated the spread of the devastating fire towards Mati (the dramatically affected area-the circled one). Because of the non occurrence of fires towards Mati the last years, that is the undisturbed forest development in the area, and the high mixture of forested lands with the residential uses largely developed over the last years, resulted in the dramatic casualties in only a few hours.

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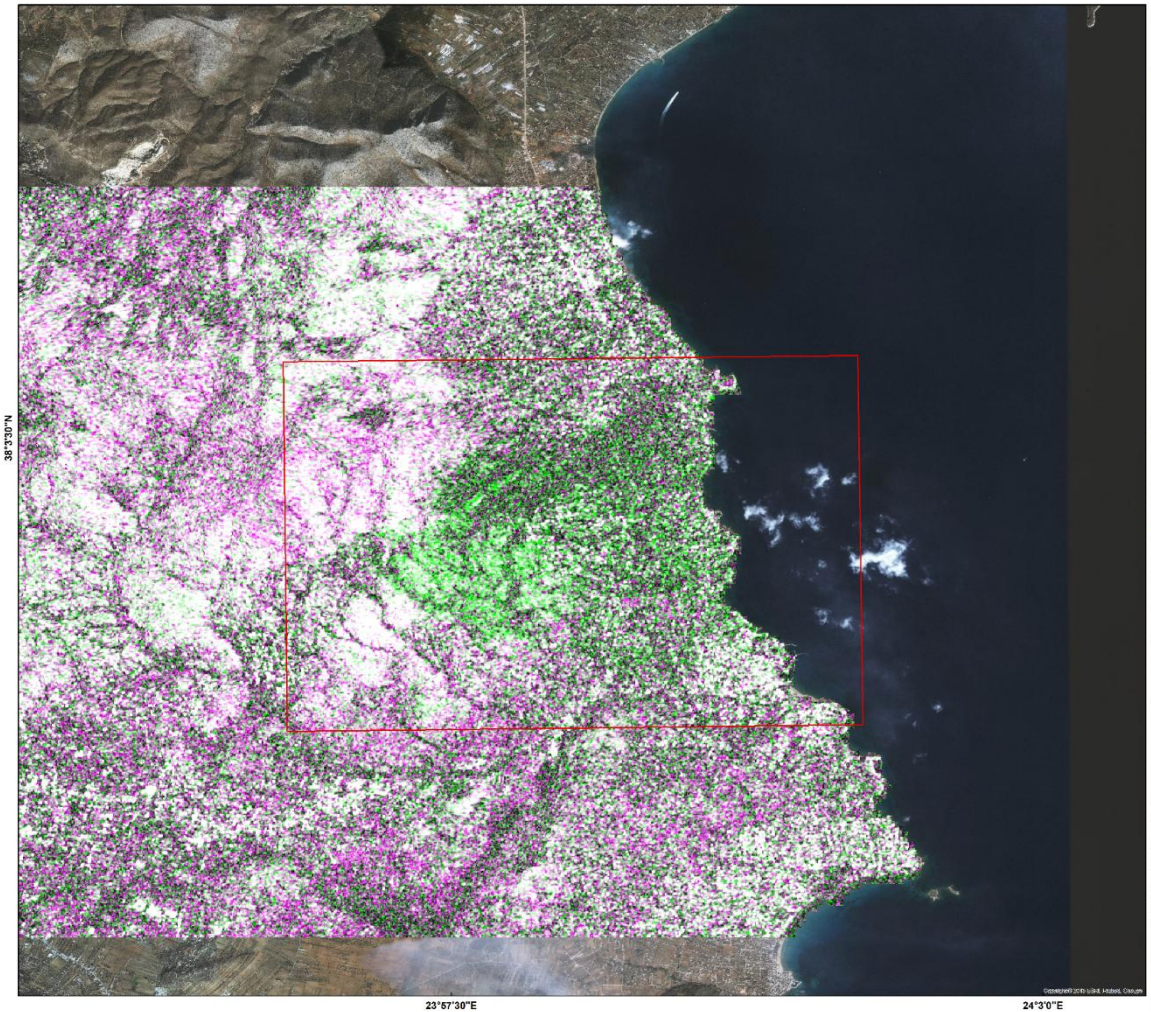
National Observatory of Athens

FireHub

Satellite SAR images Sentinel-1A acquisition date 12-7-2018 & 19-5-2018 (pre-event) and 24-7-2018 (post-event).



Μάτι (Ανατολική Αττική) Πρώτη εκτίμηση των καμμένων εκτάσεων με χρήση δορυφορικής τηλεπισκόπησης 24-07-2018

Ημερομηνία Παραγωγής: 25/07/2018

Χαρτογραφικές Πληροφορίες

1:32,847 Grid: WGS 1984 Coordinate System

Υπόμνημα

Περιοχή εκτίμησης καμμένων εκτάσεων

Sentinel-1A SLC (VV polarization)

RGB Pseudocolor

Red: Coherence_12-07-2018 & 24-07-2018 (μετά-γεγονότος)

Green: Coherence_12-07-2018 & 19-05-2018 (προ-γεγονότος)

Blue: Coherence_12-07-2018 & 24-07-2018 (μετά-γεγονότος)

Πληροφορίες Χάρτη

Ο χάρτης έχει δημιουργηθεί από το Κέντρο Αριστείας BEYOND του ΙΑΑΔΕΤ/ΕΑΑ. Ο σκοπός του προϊόντος αυτού είναι να δώσει μία πρώτη εκτίμηση για την επιφάνεια των καμμένων εκτάσεων της πυρκαγιάς που έλαβε χώρα στις 23 Ιουλίου 2018 στην ευρύτερη περιοχή γύρω από τον οικισμό Μάτι στην Ανατολική Αττική.

Πηγές Δεδομένων

Ένθετος χάρτης με βάση: ESRI Imagery World 2D, Πνευματικά δικαιώματα: © 2013 ESRI, i-cubed, GeoEye, Επεξεργασμένες Δορυφορικες Εικόνες Sentinel 1 SAR SLC (VV) που αποκτήθηκαν στις 19-05-2018, 12-07-2018 & 24-07-2018.

Παραγωγή Χάρτη

Χρησιμοποιήθηκαν δεδομένα Sentinel-1A SLC (Single Complex Look), κάθετης πόλωσης (VV) με καθοδική τροχιά λήψης, με ημερομηνίες λήψης 12-07-2018 & 19-05-2018 (προ-γεγονότος) και 24-07-2018 (μετά-γεγονότος). Η πρώτη εκτίμηση των καταστροφών υλοποιήθηκε εφαρμόζοντας την τεχνική της συμβολομετρικής συνάφειας σε δύο ζεύγη εικόνων, με το πρώτο ζεύγος να αφορά τις δύο προ-γεγονότος εικόνες (12-07-2018 & 19-05-2018) και το δεύτερο τις εικόνες μετά-γεγονότος (24-07-2018) και προ-γεγονότος (12-07-2018). Ειδικότερα, οι αλλαγές του τοπίου ανιχνεύονται μέσω της δημιουργίας μίας ψευδέχρωμης εικόνας και εντοπίζονται στις περιοχές που απεικονίζονται με πράσινο χρωματισμό.

Δημοσίευση

Το προϊόν διατίθεται μέσω της ιστοσελίδας του BEYOND στην ακόλουθη διεύθυνση URL: http://beyond-eocenter.eu/index.php/fires

Πλαίσιο

Ο χάρτης εκπονήθηκε από το Κέντρο Αριστείας BEYOND. Όλες οι γεωγραφικές πληροφορίες έχουν περιορισμούς λόγω της κλίμακας, της ανάλυσης και της ημερομηνίας των αρχικών δεδομένων.

Στοιχεία Επικοινωνίας

Δρ. Χάρης Κοντοές, Διευθυντής Ερευνών ΕΑΑ
E-mail: kontoes@noa.gr

BEYOND funded under: FP7-REGPOT-2012-2013-1

European Operational Remote Sensing Center of Excellence BEYOND
National Observatory of Athens

FireHub

Satellite image WORLDVIEW-3 very high spatial resolution (30 cm), sponsored by TotalView.

IAASARS

BEYOND FireHub

Μάτι (Ανατολική Αττική)
Λεπτομερής εκτίμηση των καμμένων εκτάσεων 26-07-2018

Ημερομηνία Παραγωγής: 27/07/2018

38°3'30"N

23°57'30"E

Χαρτογραφικές Πληροφορίες

0 0.25 0.5 1 1.5 2 Kilometers

1:15.000

Grid: WGS 1984 Coordinate System

Υπόμνημα

Περιοχή εκτίμησης καμμένων εκτάσεων 26-07-2018, συνολικής έκτασης της τάξης των 1260 ha

Πληροφορίες Χάρτη

Ο χάρτης έχει δημιουργηθεί από το Κέντρο Αριστείας BEYOND του ΙΑΑΔΕΤ/ΕΑΑ.
Ο σκοπός του προϊόντος αυτού είναι να δώσει την επικαιροποίηση της προηγούμενης εκτίμησης της επιφάνειας των καμμένων εκτάσεων της πυρκαγιάς που έλαβε χώρα στις 23 Ιουλίου 2018 στην ευρύτερη περιοχή γύρω από τον οικισμό Μάτι στην Ανατολική Αττική, η οποία βασίστηκε σε δορυφορικά δεδομένα υψηλής ανάλυσης.
Η νέα εκτίμηση είναι της τάξης των 1260 ha.

Πηγές Δεδομένων

Επεξεργασμένη Δορυφορική Εικόνα WORLDVIEW-3 πολύ υψηλής χωρικής ανάλυσης (30 εκ.) ημερομηνίας λήψης 26/07/2018, χορηγία της εταιρείας TotalView.

totalView

Παραγωγή Χάρτη

Πραγματοποιήθηκε φωτοερμηνεία της δορυφορικής εικόνας WORLDVIEW-3, η οποία ελήφθη 3 ημέρες μετά το γεγονός.
Η λεπτομερέστερη εκτιμώμενη έκταση των καμμένων περιοχών είναι της τάξης των 1260 ha.
Θα ακολουθήσουν ακριβέστερες εκτιμήσεις υπερυψηλής ανάλυσης με χρήση UAV.

Δημοσίευση

Το προϊόν διατίθεται μέσω της ιστοσελίδας του BEYOND στην ακόλουθη διεύθυνση URL: http://beyond-eocenter.eu/index.php/fires

Στοιχεία Επικοινωνίας

Δρ. Χάρης Κοντοές, Διευθυντής Ερευνών ΕΑΑ
E-mail: kontoes@noa.gr

BEYOND funded under: FP7-REGPOT-2012-2013-1

European Operational Remote Sensing Center of Excellence BEYOND
National Observatory of Athens

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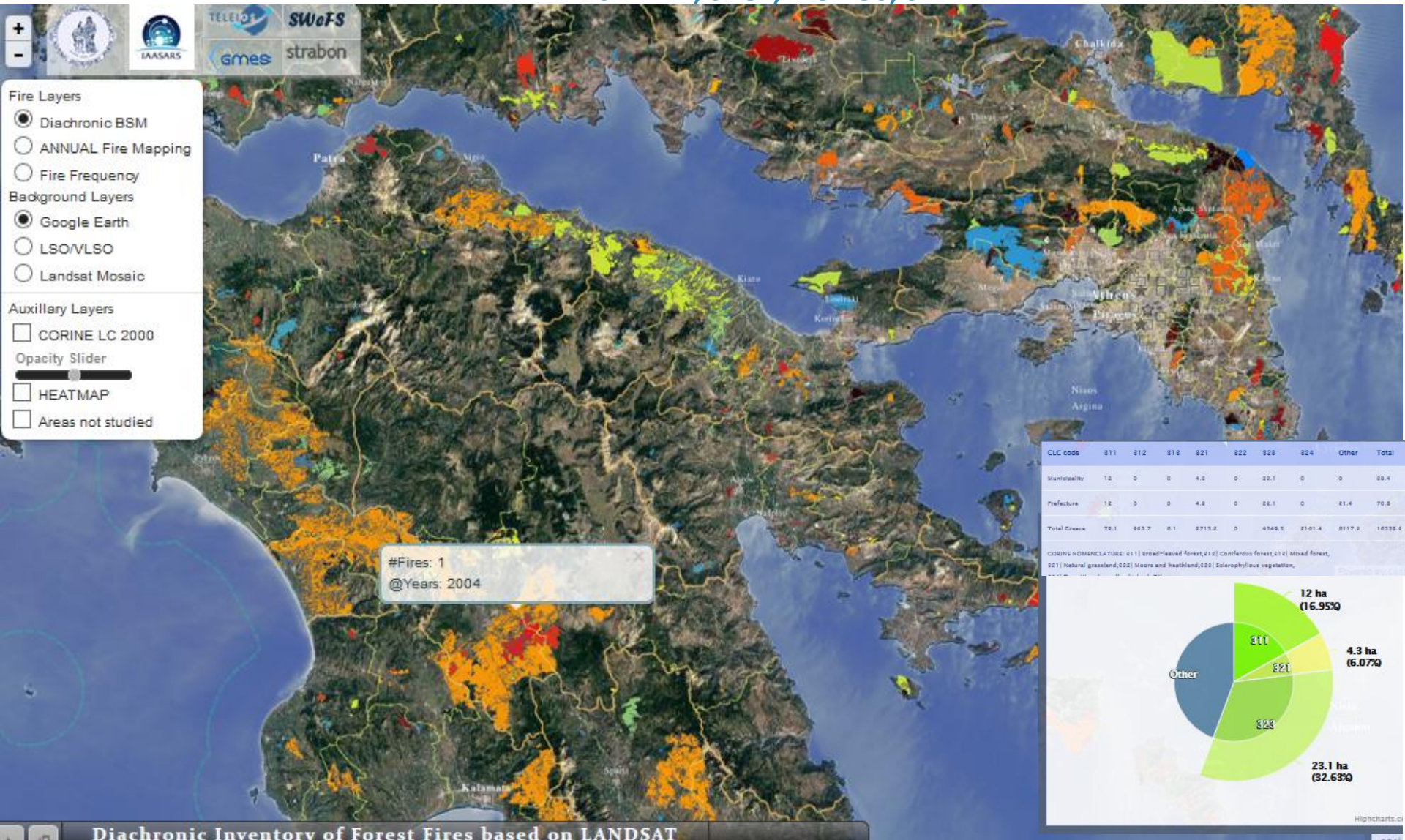
Orthographic map with detailed hazard assessment at building block level using Drones / UAV (Falcon type) very high spatial resolution (3,5 cm)
(DAEFK - YPOMEDI)

European Operational Remote Sensing Center of Excellence BEYOND
National Observatory of Athens

FireHub

DIACHRONIC MAPPING 1984-2017
~900 HIGH RESOLUTION SATELLITE IMAGES
LANDSAT TM, SPOT, IKONOS, SENTINEL-2



BEYOND

FireHub

European Operational Remote Sensing Center of Excellence BEYOND
National Observatory of Athens

DIACHRONIC MAPPING 1984-2017
A FEW THOUSANDS OF HIGH RESOLUTION SATELLITE IMAGES

BEYOND

FireHub

European Operational Remote Sensing Center of Excellence BEYOND
National Observatory of Athens

Fire Monitoring Service based on MSG SEVIRI of F.B.

ANALYSIS OF THE FLOOD EVENT 15/11/2017 IN WEST ATTICA USING SATELLITE REMOTE SENSING

FloodHub

BEYOND
www.beyond-eocenter.eu

IAADET

MANDRA – WEST ATTICA

15 November 2017

The 3rd worst flooding disaster in Attica History (based on the number of deaths)

ANALYSIS OF THE FLOOD EVENT 15/11/2017 IN WEST ATTICA USING SATELLITE REMOTE SENSING

FloodHub

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ΙΑΑΔΕΤ

Time of concentration:

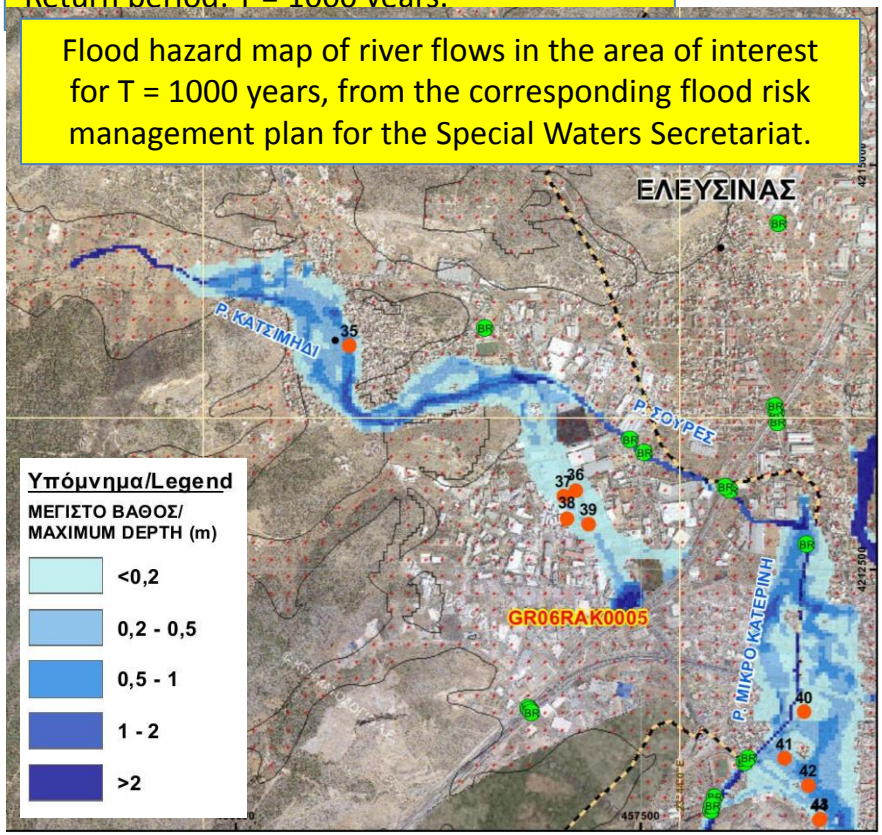
- 5h Giandotti (formula), as recommended by the specifications of hydraulic works (PD 696/1974),
- 3h after a decrease, as demonstrated in the framework of the project "DEUKALION".

Return period: T = 1000 years.

$$t_c = \frac{4\sqrt{A} + 1.5L}{0.8\sqrt{\Delta H}}$$

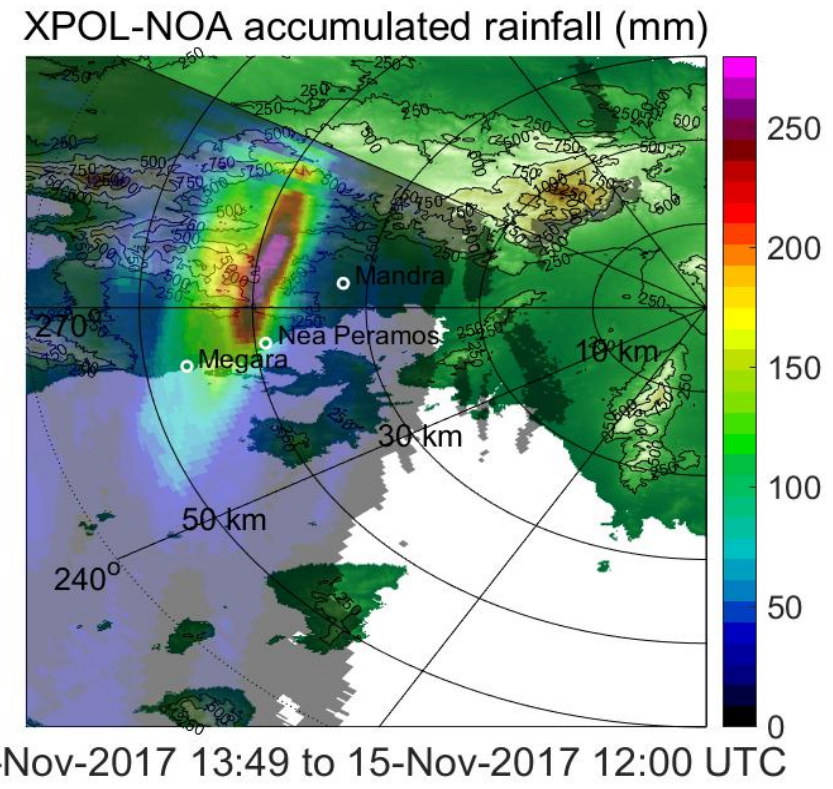
$$t_c(T) = tc\sqrt{i(5)/i(T)}$$

Flood hazard map of river flows in the area of interest for T = 1000 years, from the corresponding flood risk management plan for the Special Waters Secretariat.



Simulation of maximum flood extent

Total rainfall at the core of the event > 200 mm over a period of 6 h.



High resolution analysis (150 m) of the total rainfall from the XPOL meteorological radar (2 min time analysis) of the Institute for Environmental Research and Sustainable Development of the National Observatory of Athens.

ANALYSIS OF THE FLOOD EVENT 15/11/2017 IN WEST ATTICA USING SATELLITE REMOTE SENSING

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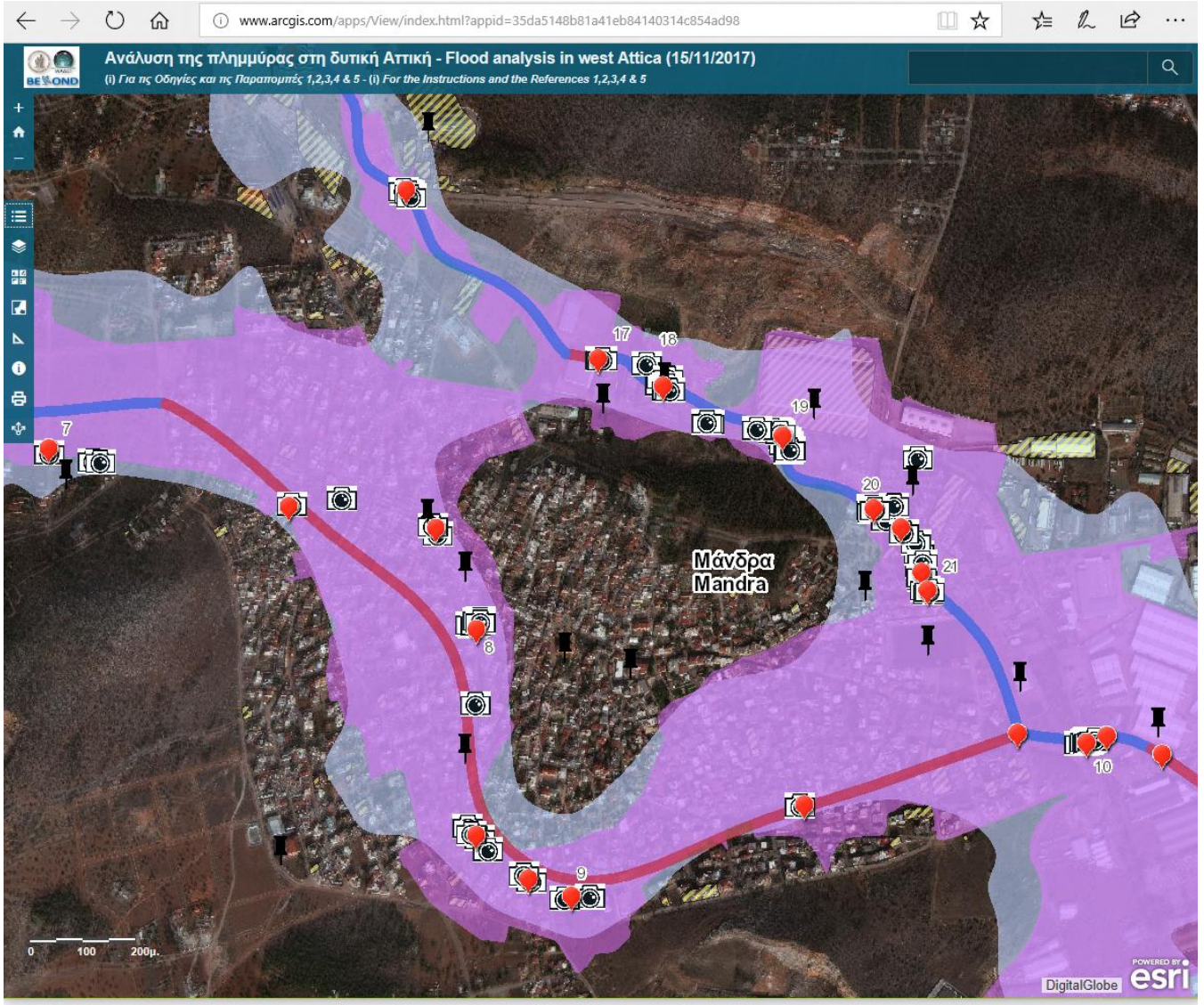
ΙΑΑΔΕΤ

Simulation of maximum flood extent

The result of the model appears to be well-approached by the flood extent mapping using satellite remote sensing, and furthermore depicts flooded areas upstream

The simulation is obviously affected by the level of precision of the input data and is subject to a series of assumptions, but it provides a first map of the maximum flood extent that is reasonably approaching the real scenario.



ANALYSIS OF THE FLOOD EVENT 15/11/2017 IN WEST ATTICA USING SATELLITE REMOTE SENSING

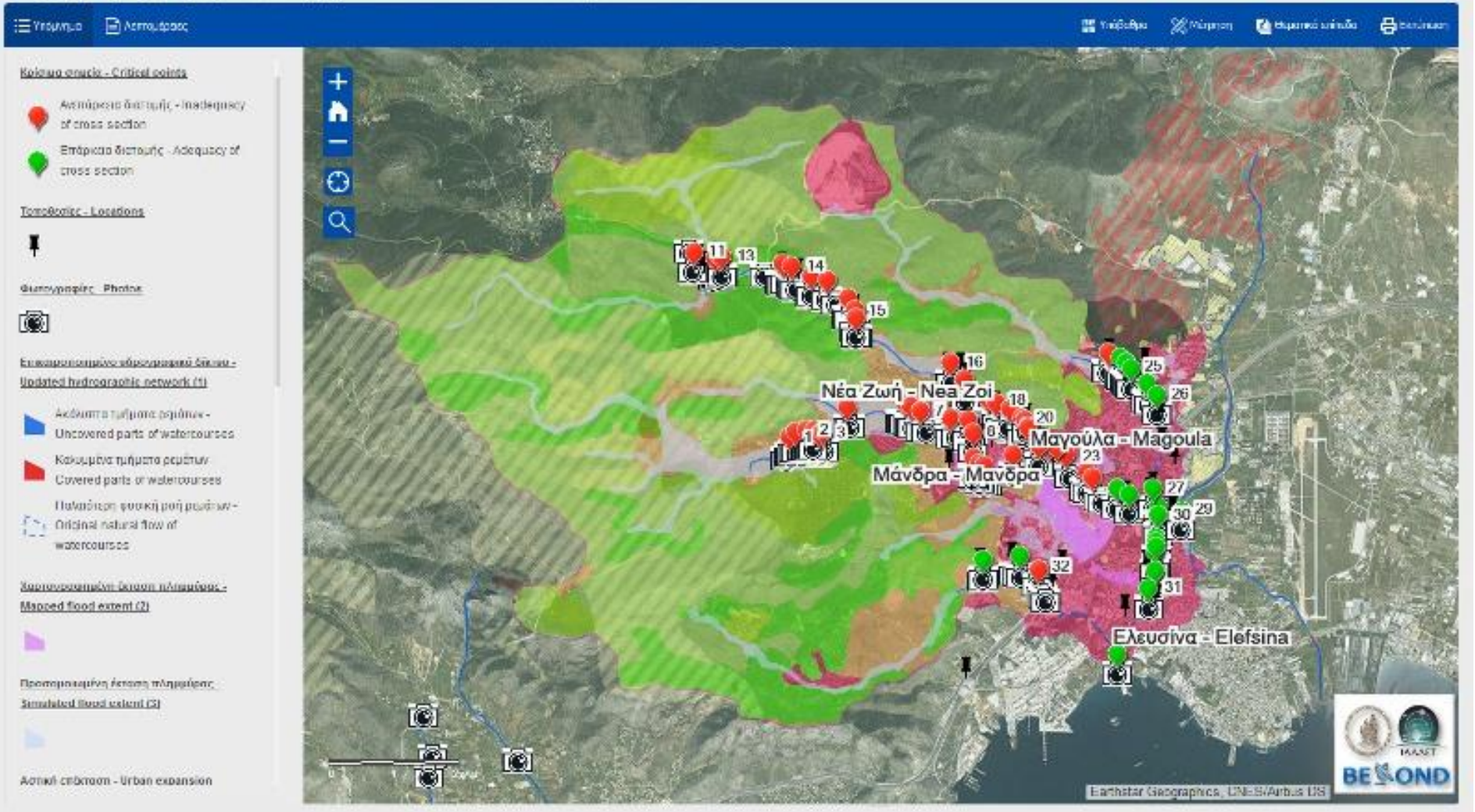
FloodHub

BEYOND
www.beyond-eocenter.eu

ΙΑΑΔΕΤ

ΕΘΝΙΚΟΝ ΑΣΤΕΡΟΣΚΟΠΕΙΟΝ ΑΘΗΝΩΝ
NATIONAL OBSERVATORY ATHENS

Interactive Web Application



ANALYSIS OF THE FLOOD EVENT 15/11/2017 IN WEST ATTICA USING SATELLITE REMOTE SENSING

FloodHub

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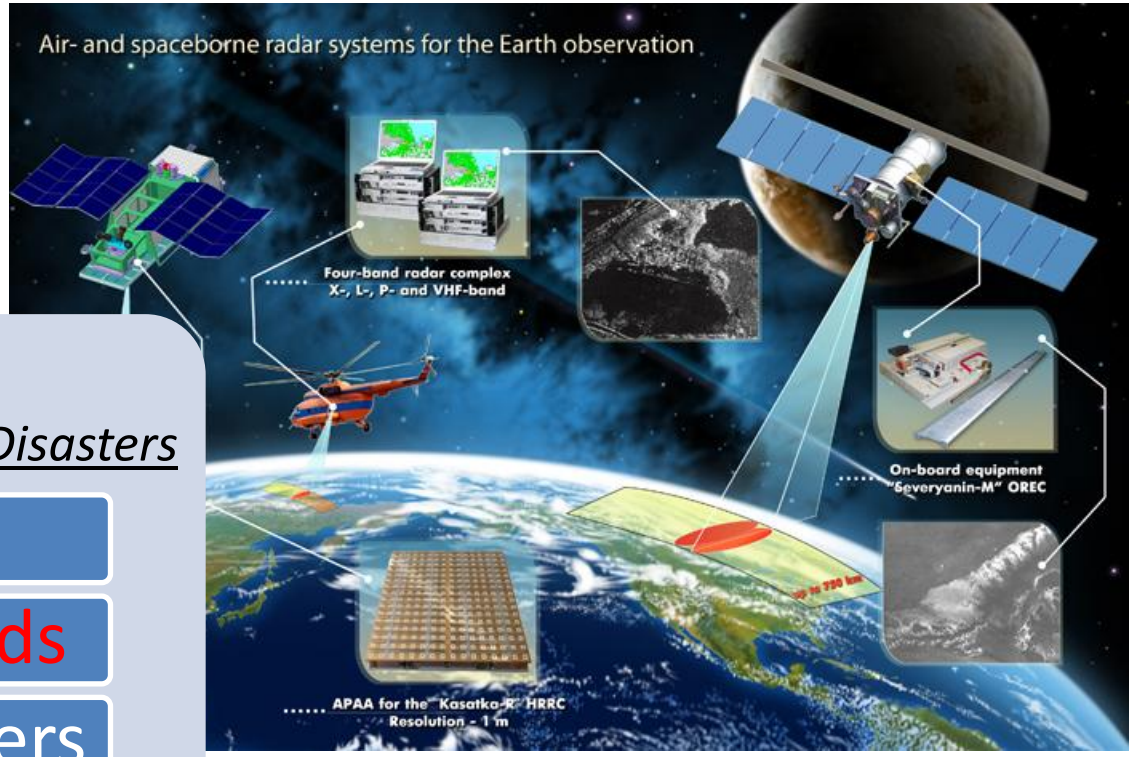
IAADET

Critical points and proposed measures

BEYOND geObservatory: Timely InSAR assessment of surface deformation due to geohazards



Centre of Excellence for

EO-based monitoring of Natural Disasters

- Fires & Floods
- Geophysical hazards
- Atmospheric disasters
- Urban environment

geObservatory | In a nutshell

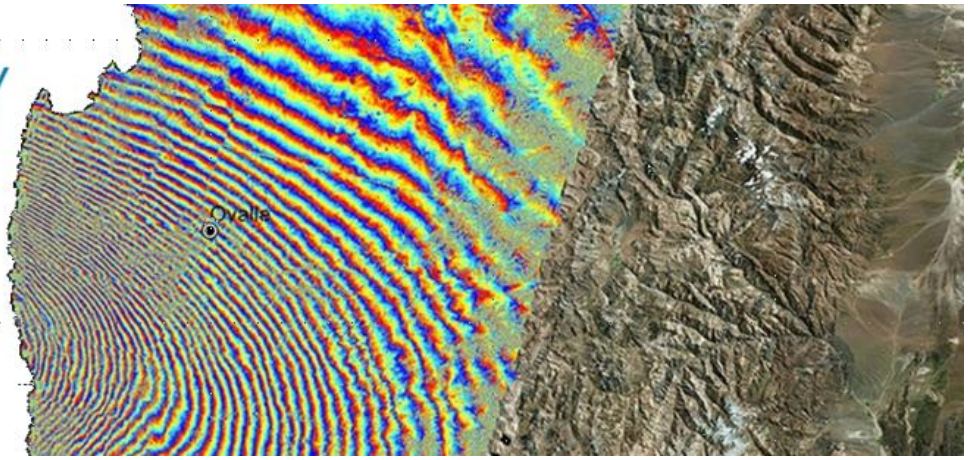
GeObservatory is activated in major geohazard events (earthquakes, volcanic activity, landslides,etc.) and automatically produces a series of Sentinel-1 based co-event interferograms (DInSAR) to map the surface deformation associated with the event.

http://beyond-eocenter.eu/geohub/

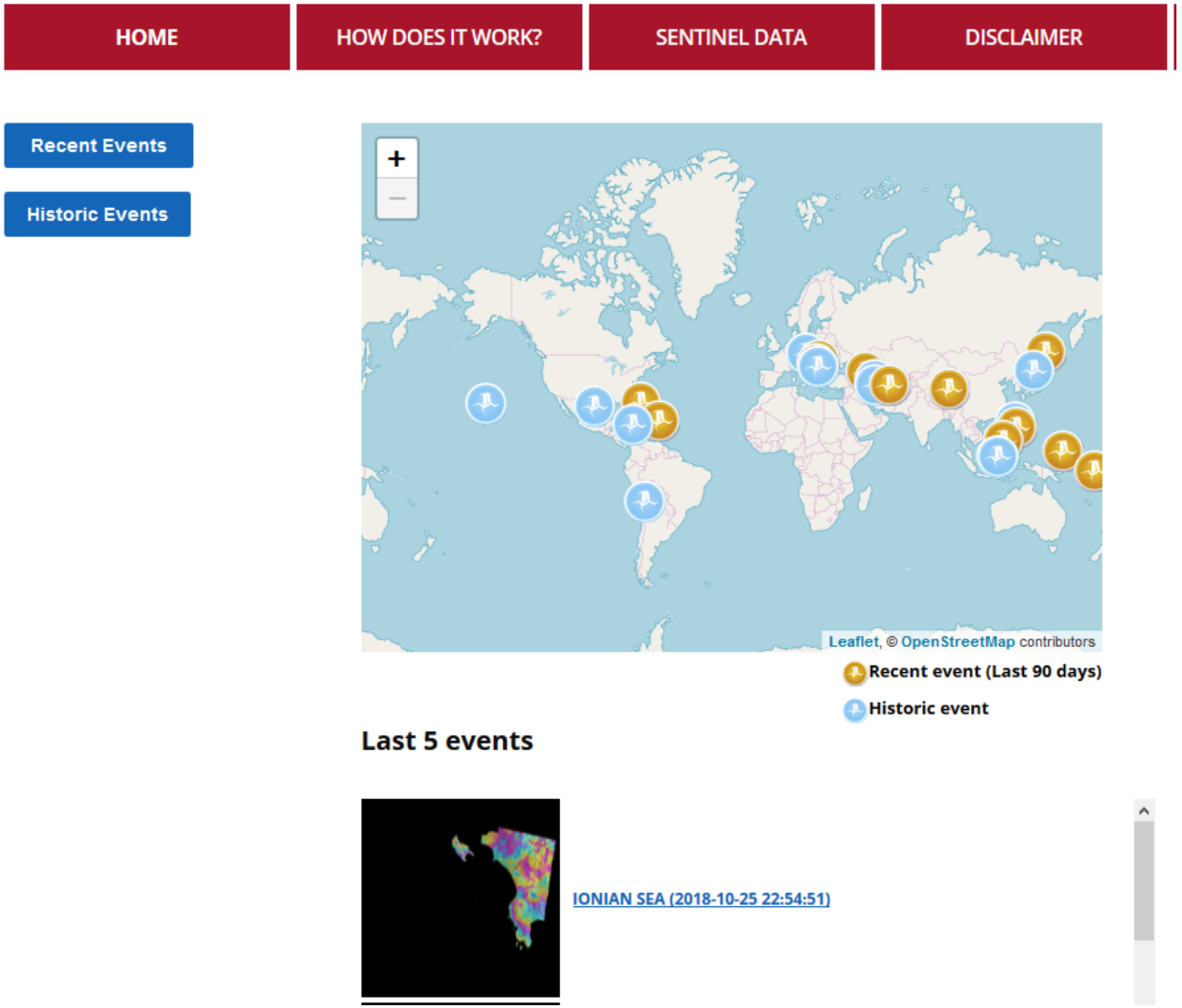
geObservatory

IAASARS

BEYOND

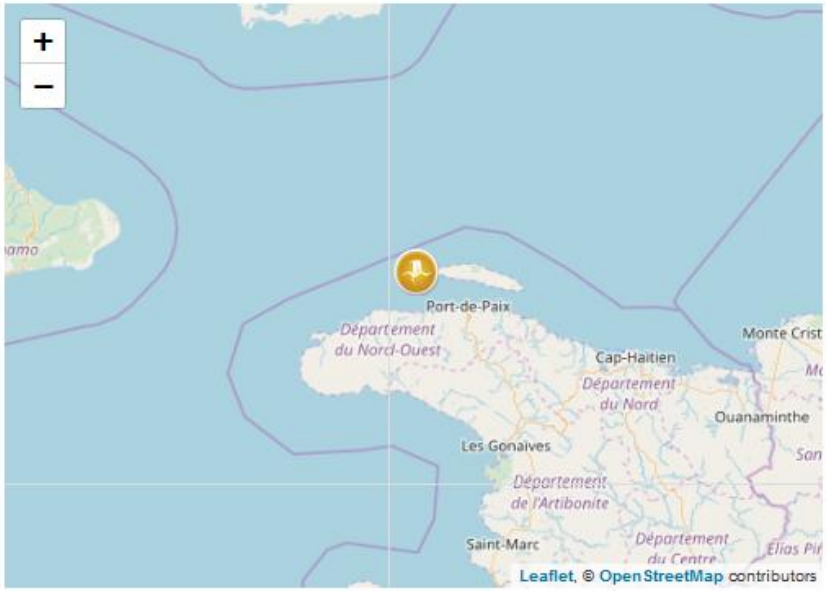


geObservatory | Application orchestrator

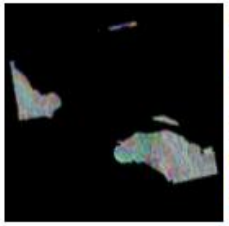


HAITI REGION (2018-10-07 00:11:48)

Earthquake location: HAITI REGION
Magnitude: 5.8
Depth: 10 km
Time: 2018-10-07 00:11:48
Coordinates: 19.98 , -73.03



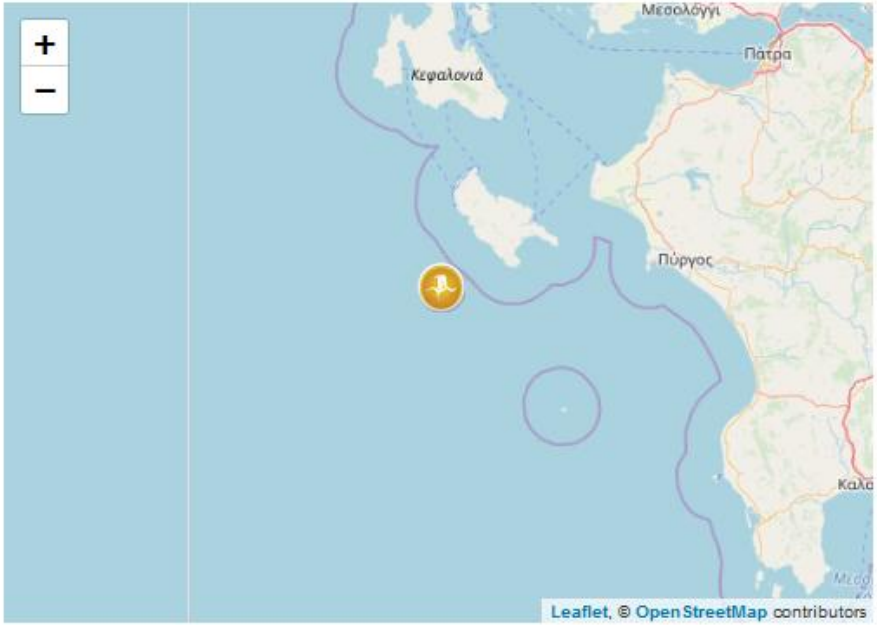
Interferograms



Type: co-seismic
Master: 2018-09-26 23:01:42
Slave: 2018-10-08 23:01:42
Orbit Number: 4
Mode: ASCENDING
Download (TIF) Download (Low Resolution) Preview

IONIAN SEA (2018-10-25 22:54:51)

Earthquake location: IONIAN SEA
Magnitude: 6.6
Depth: 10 km
Time: 2018-10-25 22:54:51
Coordinates: 37.52 , 20.57



Interferograms

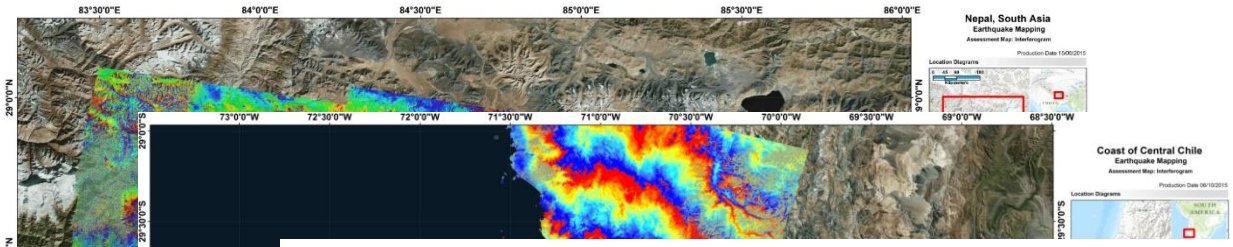
Type: co-seismic
Master: 2018-10-20 04:39:26
Slave: 2018-10-26 04:40:08
Orbit Number: 80
Mode: DESCENDING
Download (TIF) Download (Low Resolution) Preview

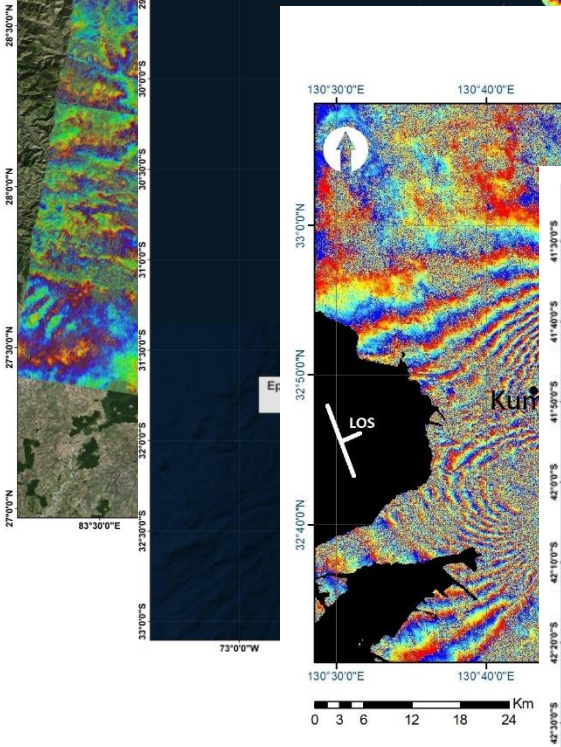
GeoHUB: Earthquake deformation mapping

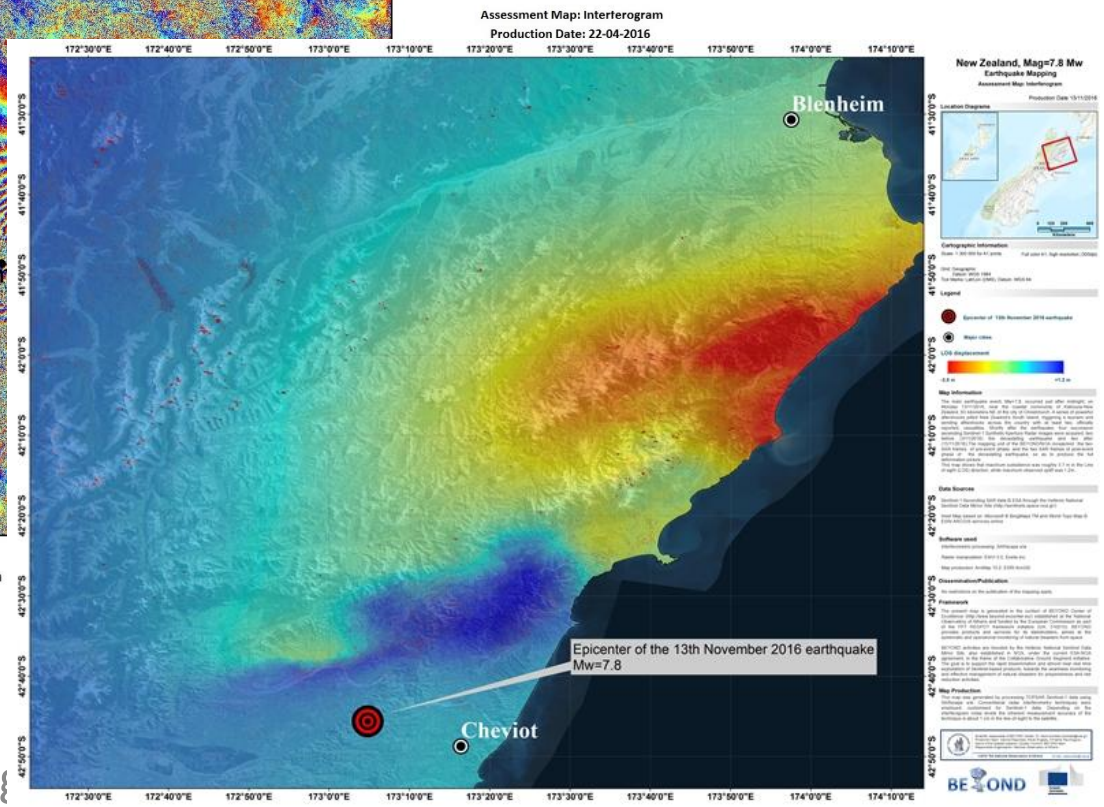
Data
- CollGS
- NOANET
- ENIGMA
- In-situ

Services
- Geodesy
- Modeling
- Hazard Ass.
- Large Proc.

Applications
- Tectonics
- Volcanoes
- Landslides
- Subsidence







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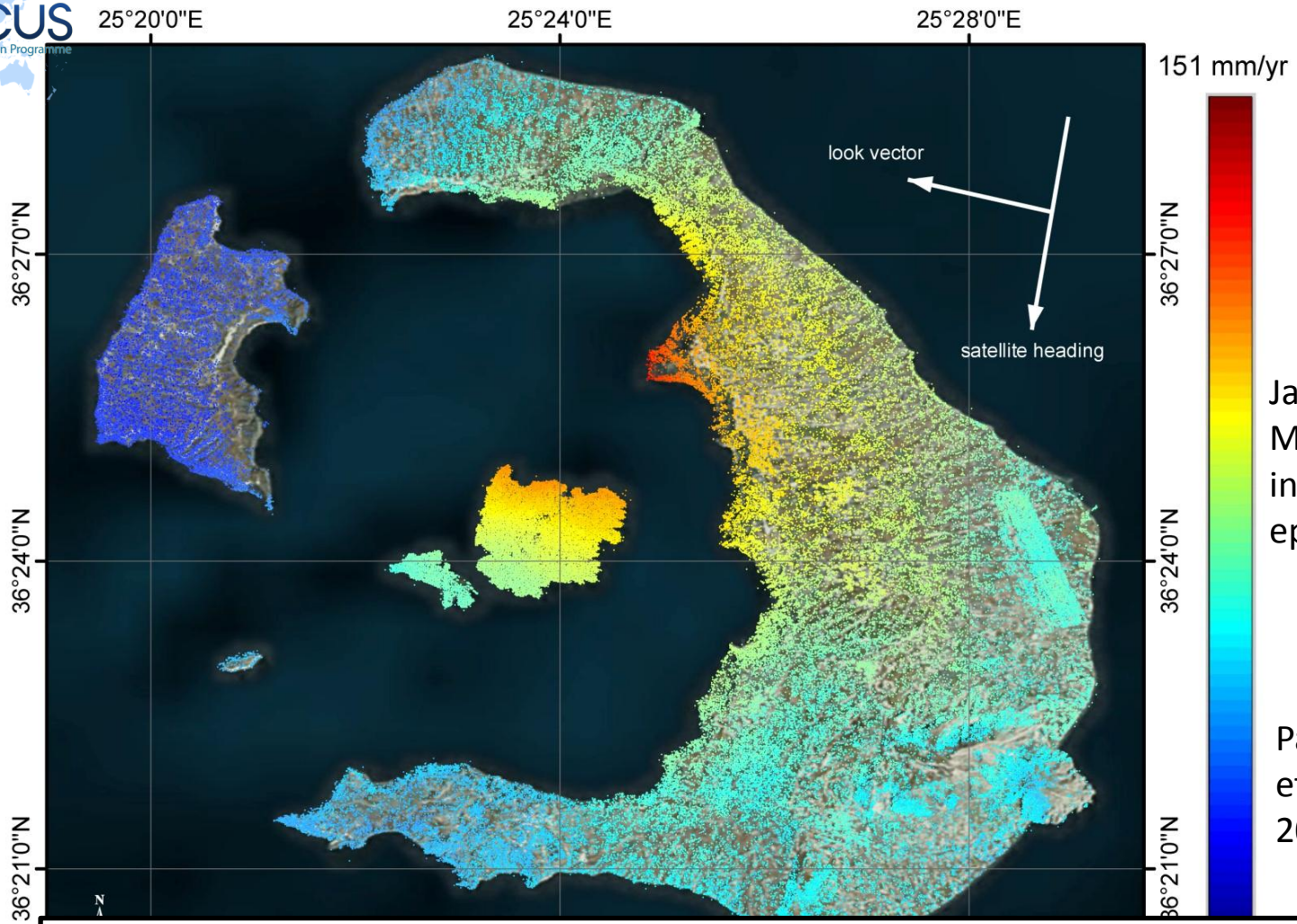

Jan. 2011 – Mar. 2012 inflation episode

Papoutsis et al., GRL 2013

GREEK CIVIL PROTECTION , GREECE
VELOCITY DEFORMATION VOLCANO SANTORINI mm/year

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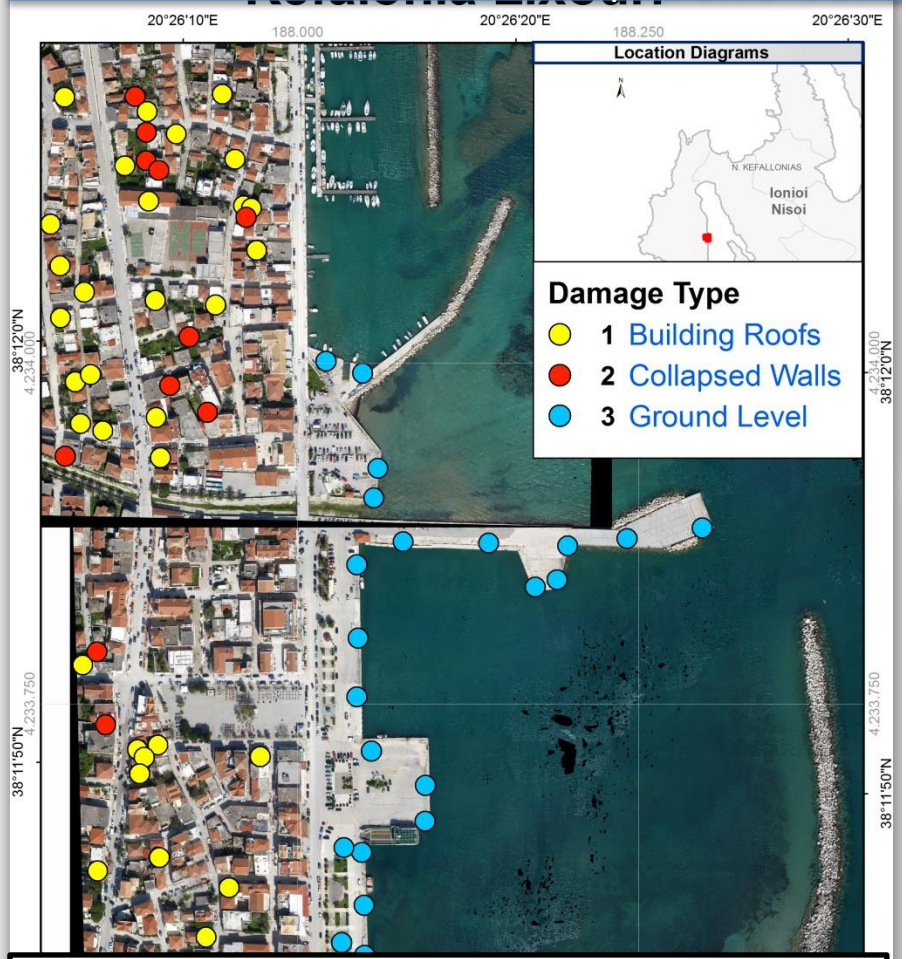
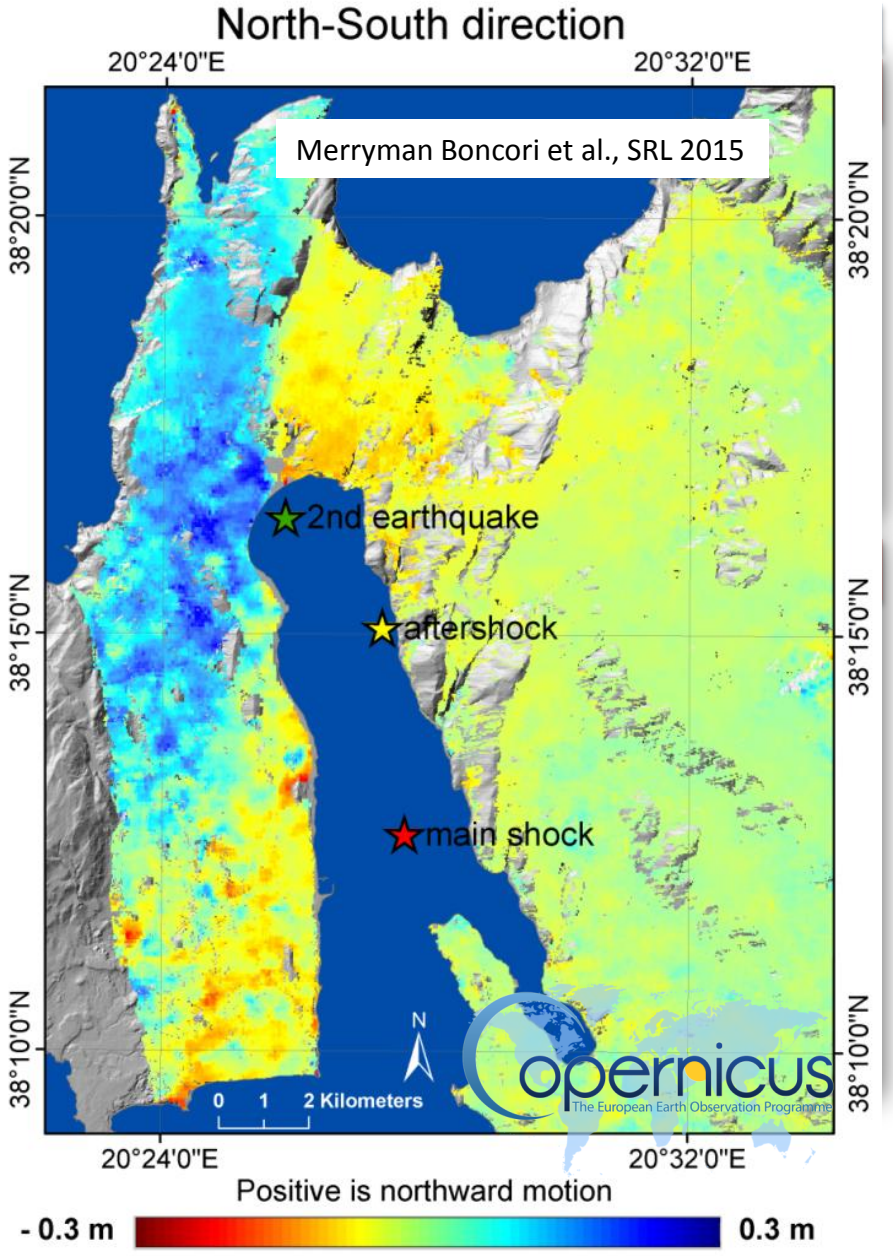
Cephalonia Island



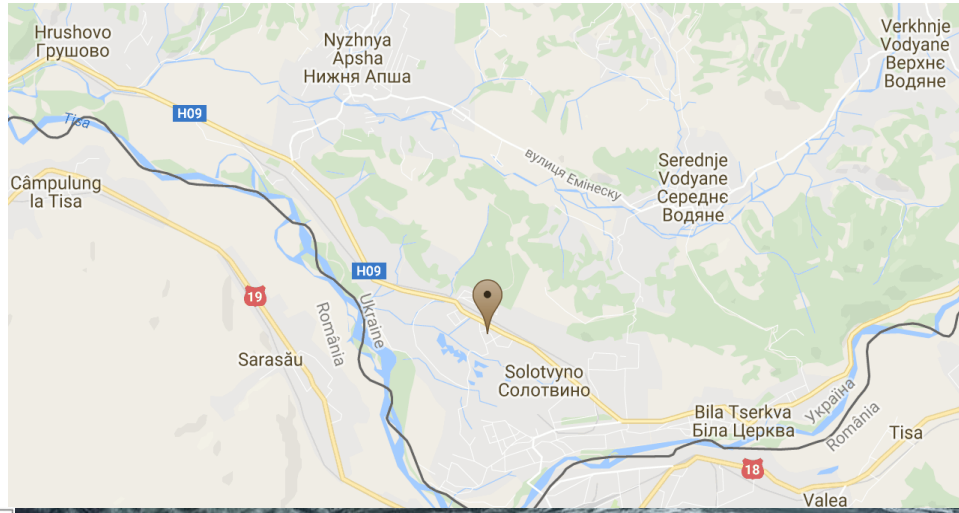
CIVIL PROTECTION OASP – NATIONAL CADASTRE & MAPPING AGENCY SA
LAND DEFORMATION AND FAULT PARAMETER ASSESSMENT

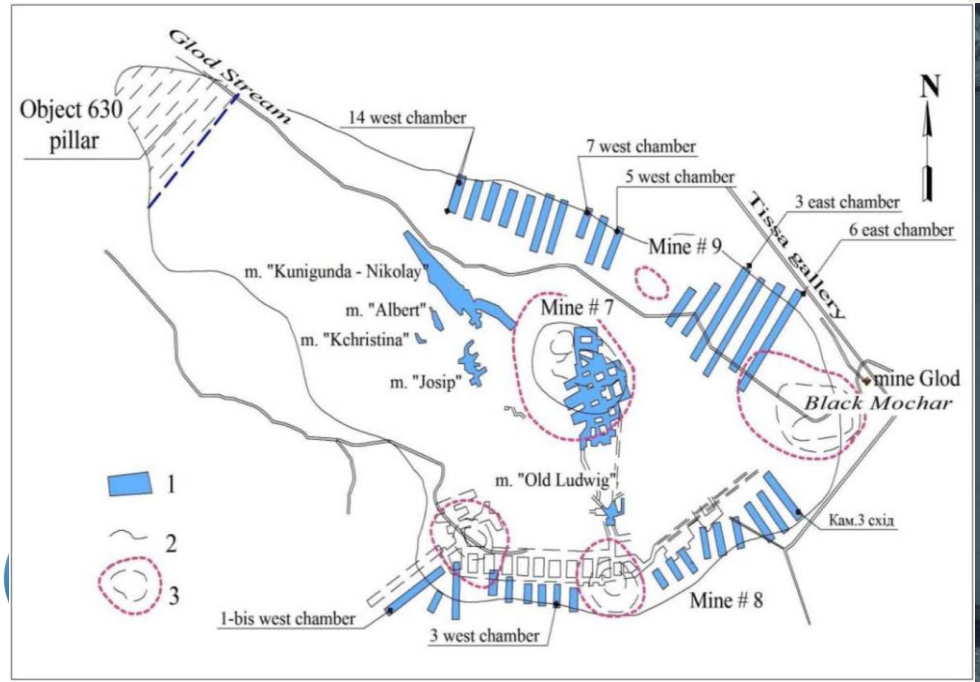


Copernicus EMS | Solotvyno activation, Ukraine

The location

Authorized User: National Directorate General for Disaster Management, Hungary





Copernicus EMS | Solotvyno activation, Ukraine

The problem!

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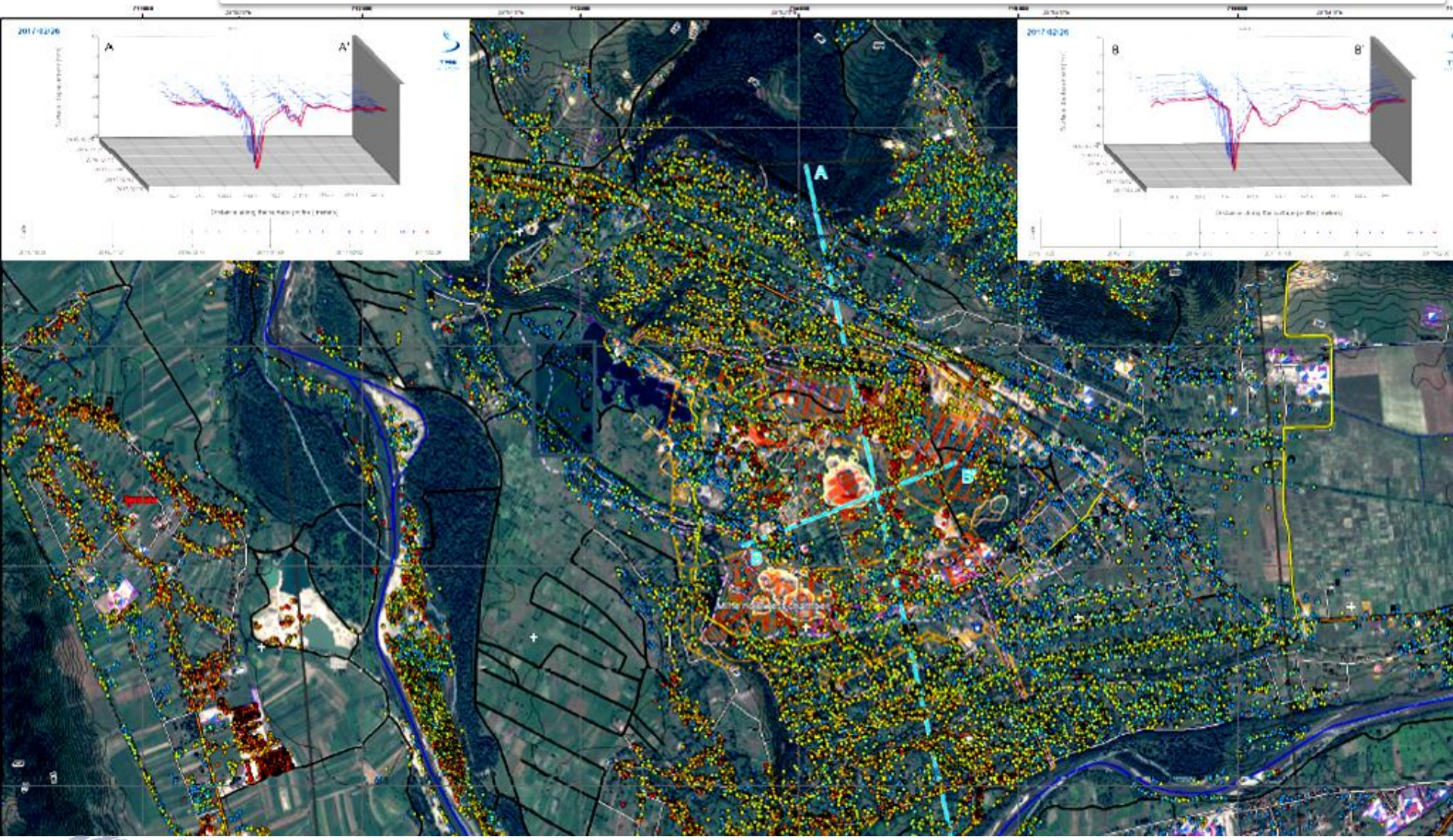
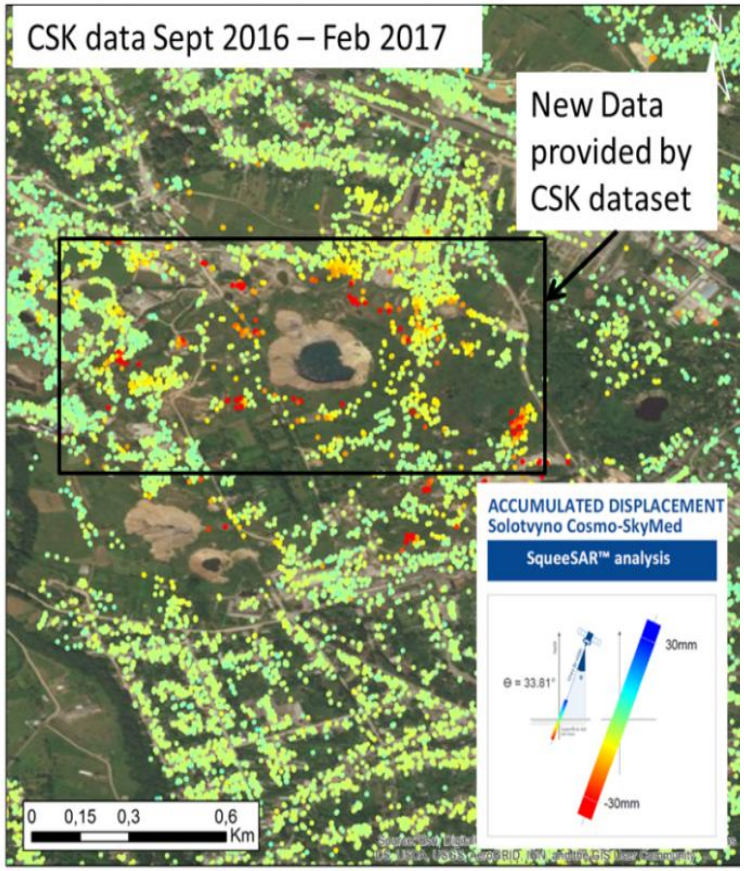
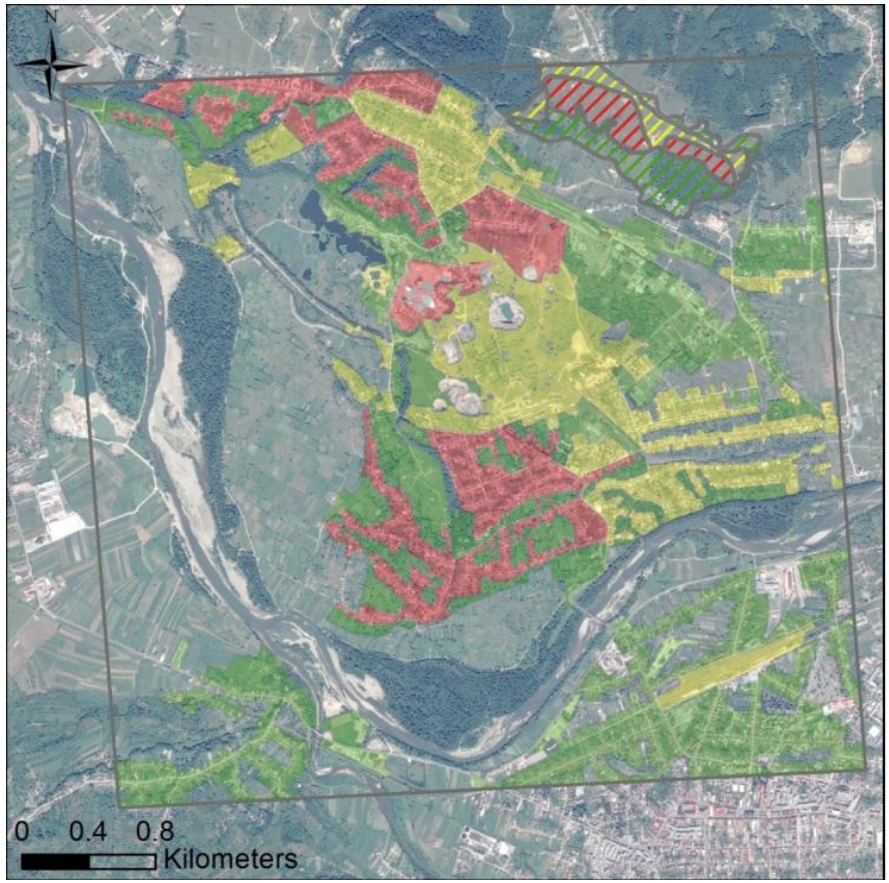


SOLOTVYNO – UKRAINE CIVIL PROTECTION VELOCITY DEFORMATION IN SALT MINES mm/year

Copernicus EMS | Solotvyno activation, Ukraine

The products:
Monitoring





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GeoHUB: Urban deformation monitoring

Thessaloniki

Svigkas et al., Engineering Geology 2016
Svigkas et al., Environmental Earth Sciences 2017

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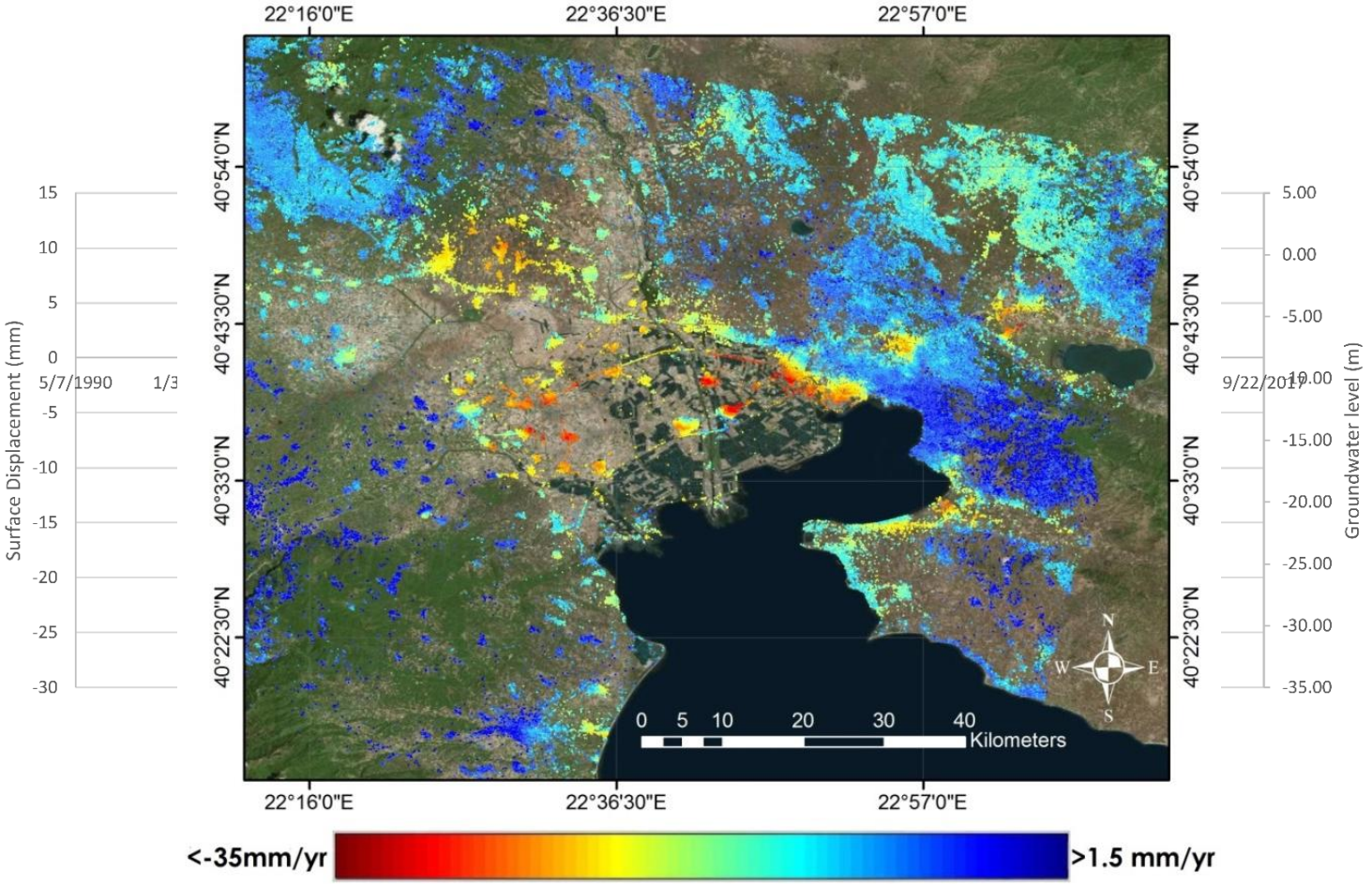

GeoHUB: Urban deformation monitoring

Volos

Kaskara et al., GRSG 2015

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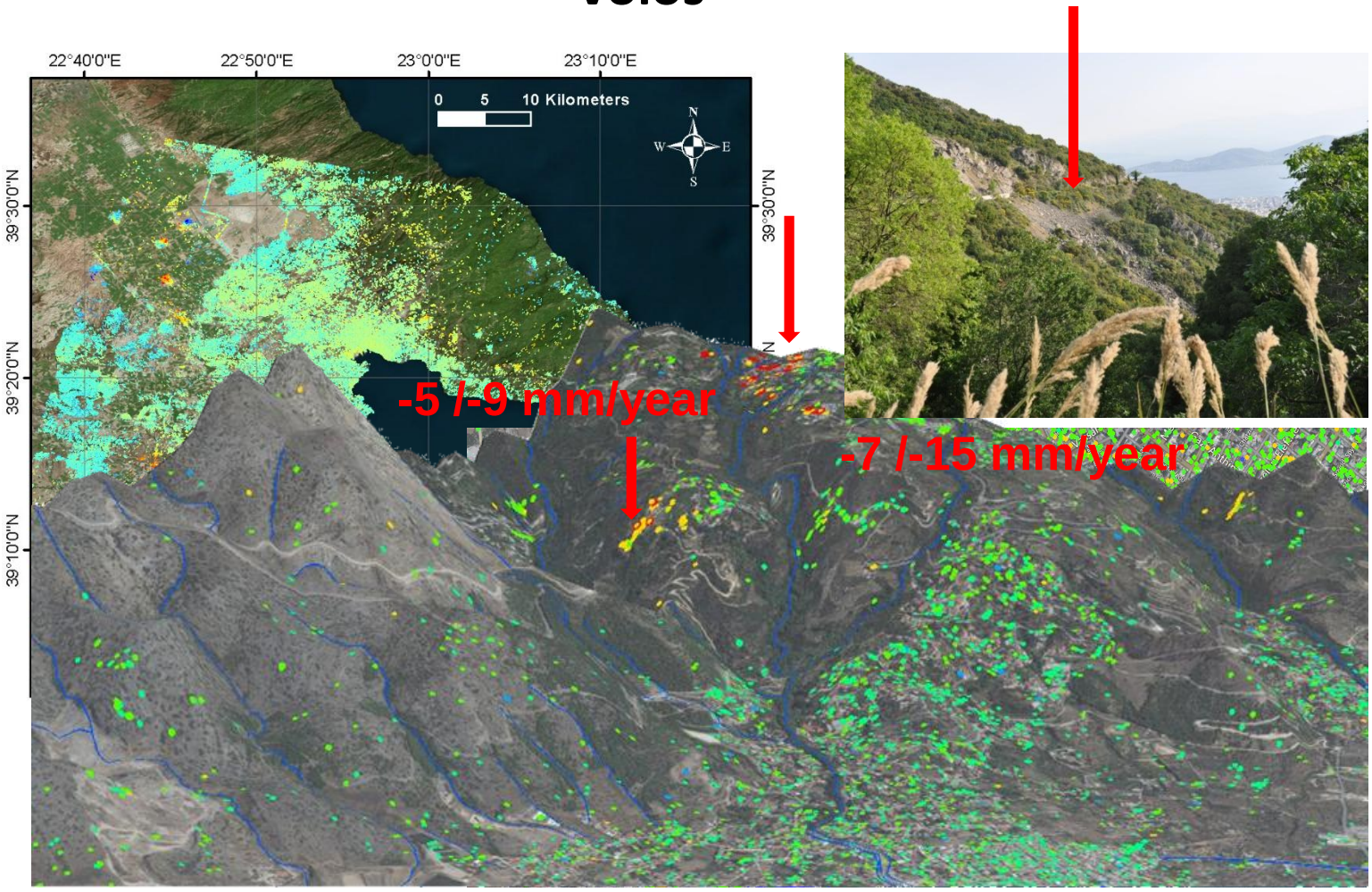
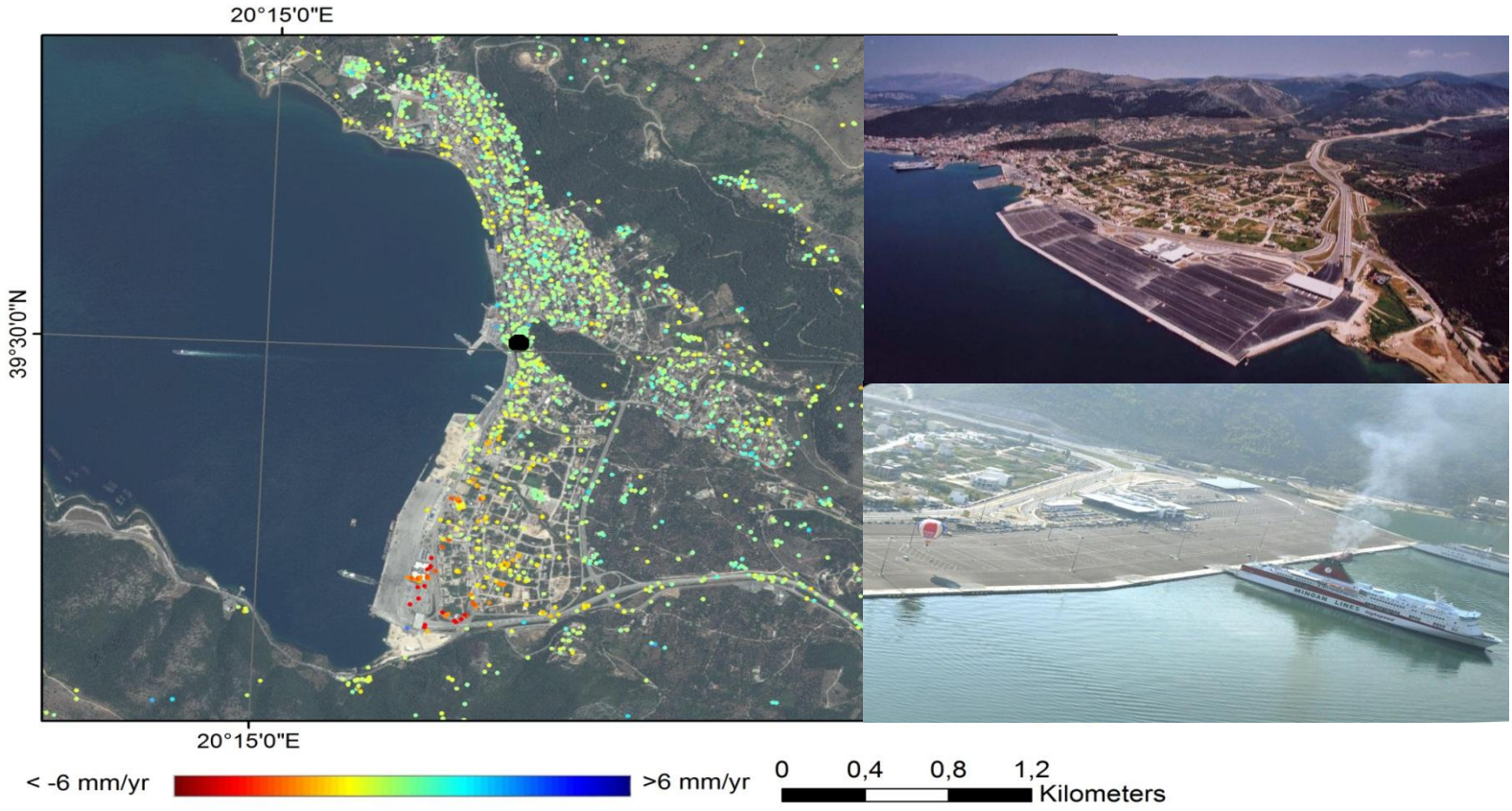


GeoHUB: Urban deformation monitoring

Igoumenitsa

Kaskara et al., GRSG 2015



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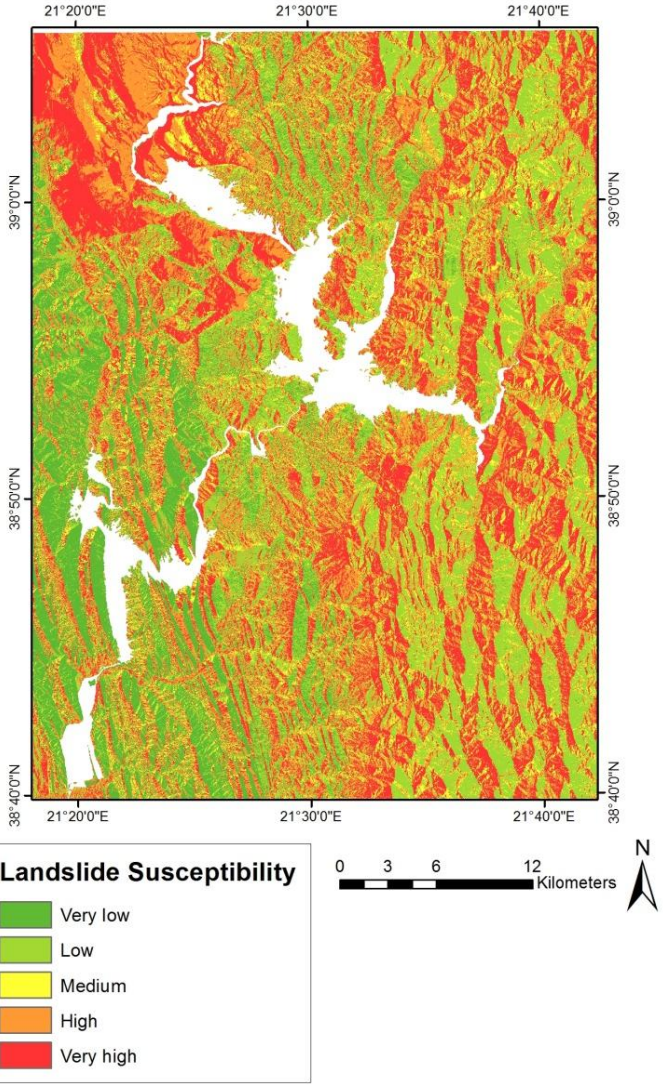
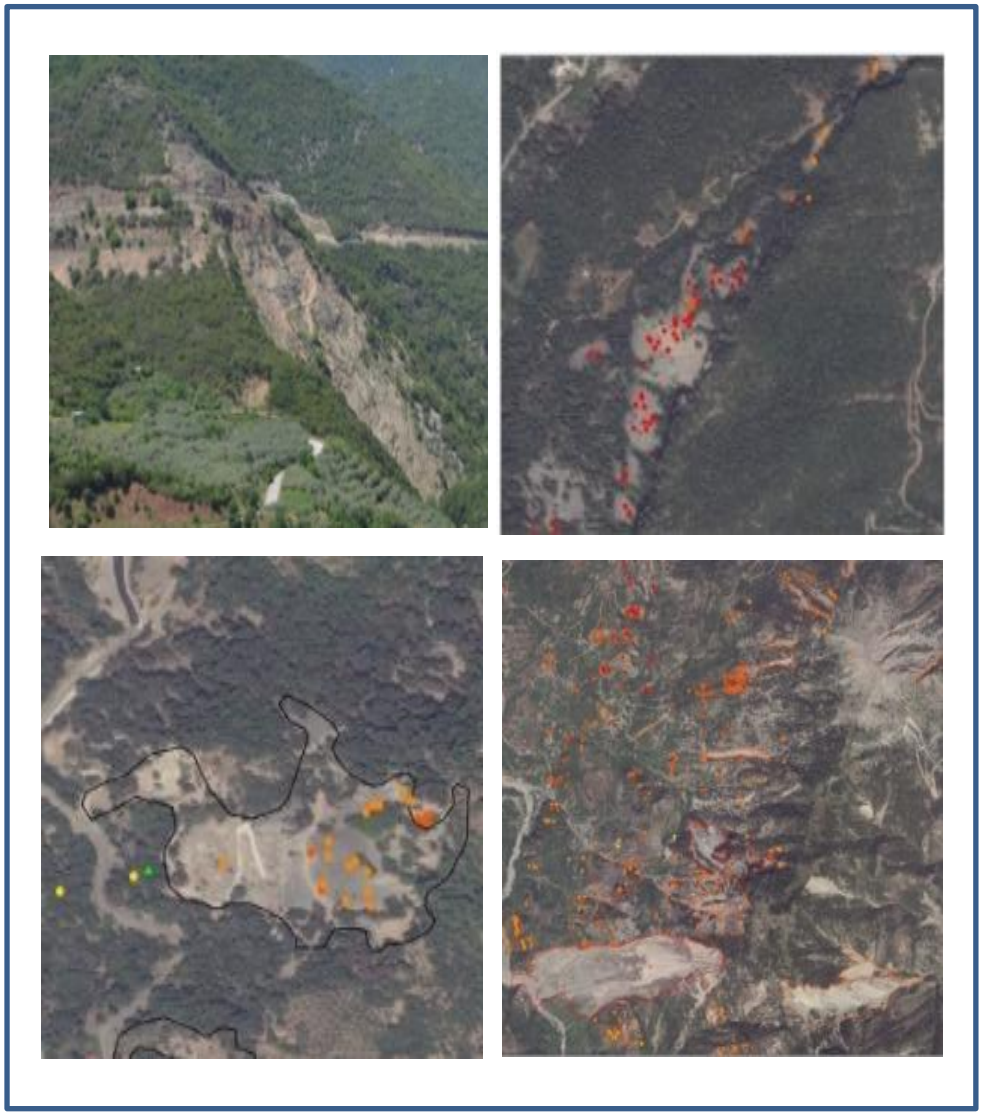
GeoHUB: Regional landslide susceptibility assessment

Landslide Susceptibility map





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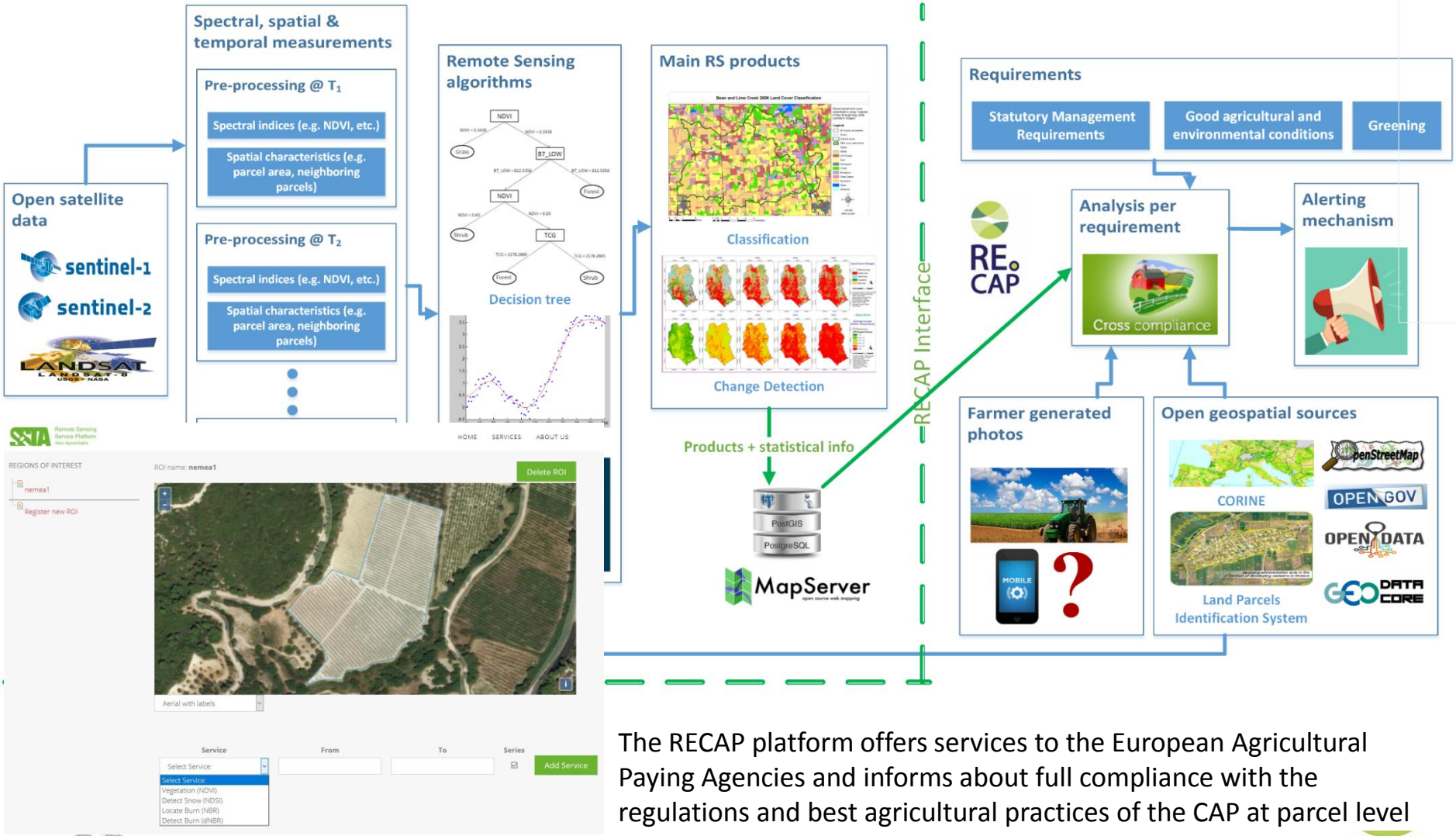

The RECAP platform offers services to the European Agricultural Paying Agencies and informs about full compliance with the regulations and best agricultural practices of the CAP at parcel level across Europe

- Live @ http://www.recap.space.noa.gr/

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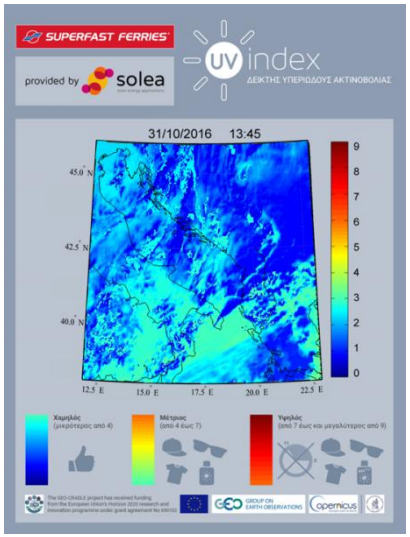
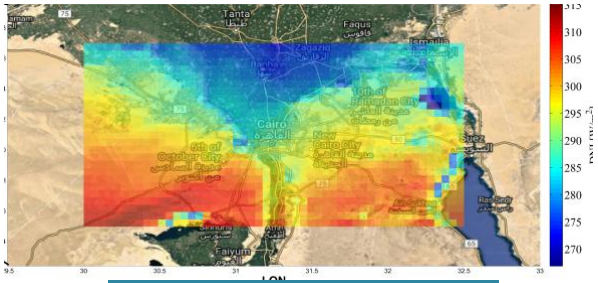
The SOLEA platform provides real-time services related to current as well as directly anticipated solar radiation potential and solar energy equivalent across Southeast Europe, North Africa, the Middle East and the Balkans

It also produces health-related radiation such as UV Index (melanoma), DNA damage, Vitamin D efficiency, agriculture (photosynthesis)

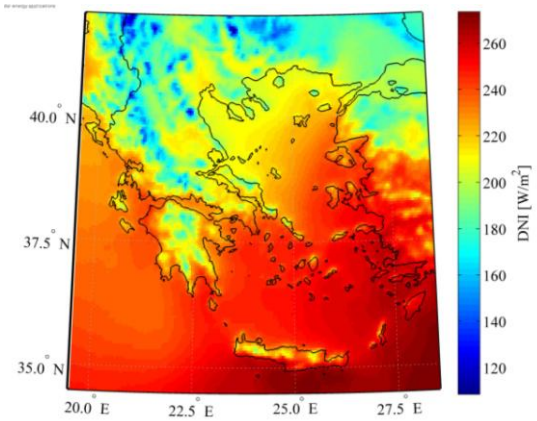


Solar radiation related products

Solar Atlases Energy Maps



Solar Energy now-casting



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- **Συντονισμός δικτύου 262 φορέων από 21 χώρες** της Ευρώπης και NAMEBA
- **Συντονισμός του Περιφερειακού Κέντρου Υποστήριξης Μεταφοράς Τεχνογνωσίας των Ηνωμένων Εθνών** (Regional Support Office, UN-Spider)
- **Ανάπτυξη και τήρηση πύλης (portal)** ελεύθερης πρόσβασης χρηστών σε **χιλιάδες γεωχωρικά δεδομένα** (Regional Data Hub – GEOSS Portal Gateway)
- **Διοργάνωση 16 διεθνών συνεδρίων ενημέρωσης και εκπαίδευσης νέων επιστημόνων και χρηστών (Capacity Building Regional Workshops**

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Master of Science in "Space Science Technologies and Application" NATIONAL OBSERVATORY OF ATHENS & UNIV. OF PELOPONNESE

Information

All courses in Athens, IAASARS National Observatory of Athens, Penteli

English

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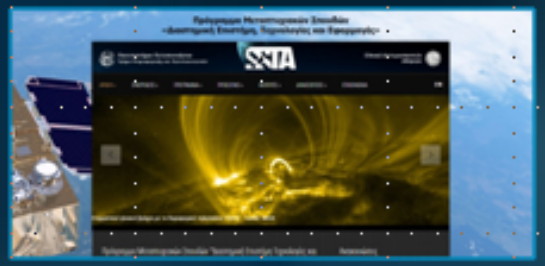

thank you!

http://www.beyond-eocenter.eu/index.php/ems

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