



Newsletter No. V November 2015

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ONE step... BEYOND Workshop

One of the main BEYOND dissemination events took place at ESA premises in Frascati, on October 15, 2015. The main goal of the Workshop was to demonstrate several of the demand driven services implemented by the BEYOND Center of Excellence (<http://beyond-eocenter.eu/>), that are delivered to institutional stakeholders, the scientific community, the end-users, and the general public, in compliance with the Copernicus, and GEO priorities. Concrete examples of applications and products, addressing the three thematic pillars of BEYOND, namely meteorological and human induced hazards, geo-hazards, and atmospheric disturbances and air quality hazards, were presented. The operational capacities of BEYOND were presented, and its complementarities with other scientific and research initiatives were identified. The workshop has elaborated the framework for exploiting new synergies, and forming sustainable collaborative networks at European and regional levels. A number of invited talks from esteemed EC, ESA, UN, NASA and GEO colleagues were given. The Workshop gave the opportunity to the invited scientists, practitioners, and end users, to express their opinion on the achieved service level maturity, and even more provide their views on the service evolution and needed research advancements in the domains of EO data exploitation and service delivery. For more info please visit the Workshop [website](#).



BEYOND Center of Excellence is hosted at the National Observatory of Athens (NOA) - Institute of Astronomy, Astrophysics, Space Applications and Remote Sensing (IAASARS). The operations of BEYOND officially started in June 2013, and will last for the next three years. The approved EC budget contribution for BEYOND is 2.305.650 Euros.

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[Eleni Christia - christia@noa.gr](mailto:christia@noa.gr)

BEYOND welcomes GEO-CRADLE at NOA



GEO-CRADLE: Coordinating and integrating state-of-the-art Earth Observation Activities in the regions of North Africa, Middle East, and Balkans and Developing Links with GEO related initiatives towards GEOSS.

The GEO-CRADLE consortium is led by the National Observatory of Athens as the Project Coordinator. The consortium comprises of 18 other regional institutions as partners, namely, Balkan Environment Center (sub-regional coordinator), Center for Environment and Development for

the Arab Region and Europe (sub-regional coordinator), Centre D'études Et De Recherches Detelecommunications, Tel Aviv University, Cyprus University of Technology, Turkiye Bilimsel Ve Teknolojik Arastirma Kurumu, Space Research and Technology Institute, National Institute of Research and Development for Optoelectronics, Ss. Cyril and Methodius University in Skopje, Instituti Per Ruajtjen E Natyres Shqiptare ShoQata, Institut Za Fiziku, Centro Internazionale in Monitoraggio Ambientale - Fondazione (CIMA), Idryma Iatroviologikon Ereunon Akademias Athinon, Inosens Doo Novi Sad, European Association of Remote Sensing Companies (EURISY), EuroGeoSurveys – (EGS), Schweizerisches Forschungsinstitut Fuer Hochgebirgsklima Und Medizin in Davos, and collaborative institutions located at the Region of Interest (RoI).

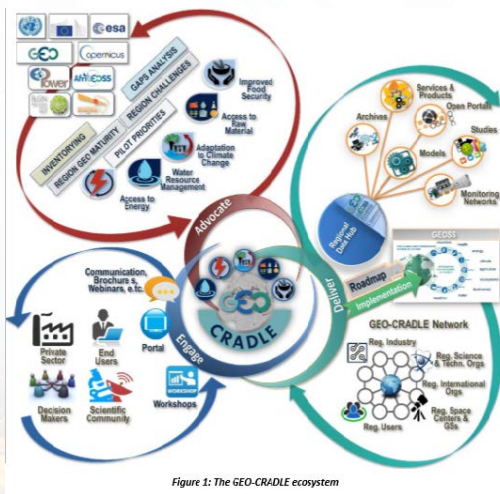


Figure 1: The GEO-CRADLE ecosystem

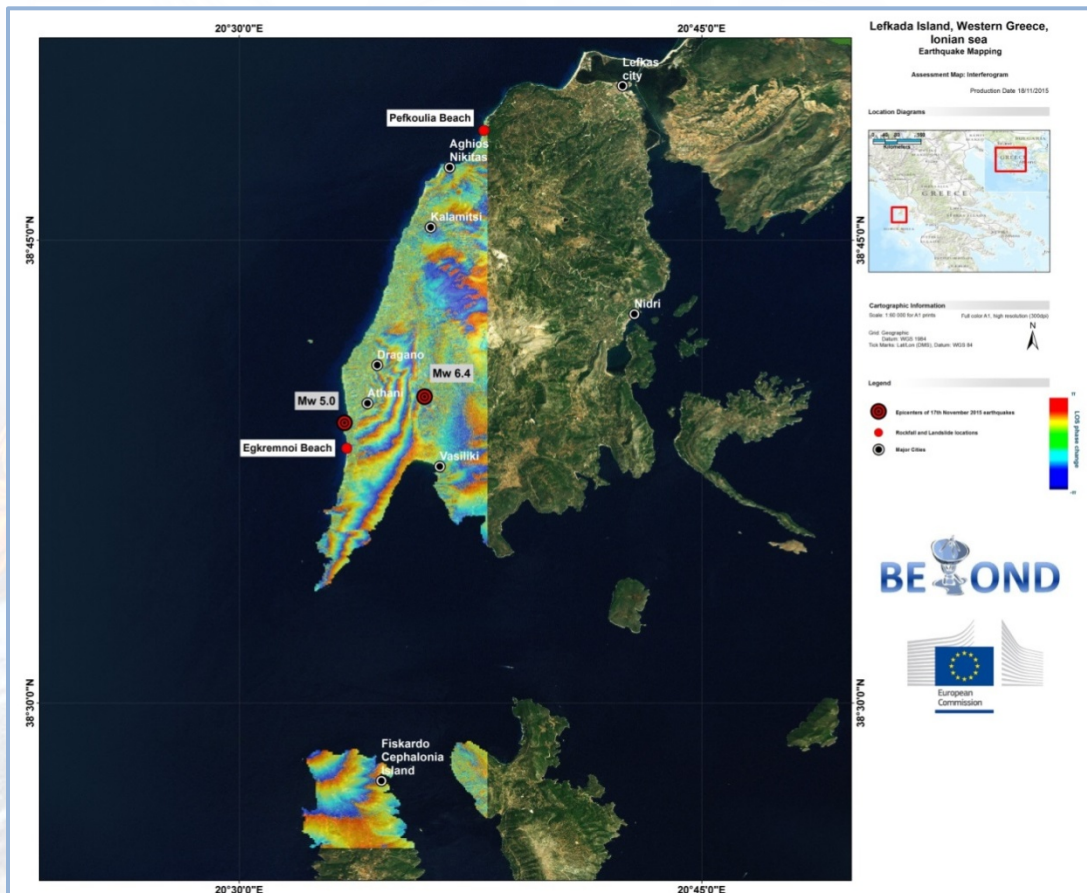
GEO-CRADLE brings together key players representing the whole (Balkans, N. Africa and M. East), the RoI, and the complete EO value chain with the overarching objective of establishing a multi-regional coordination network that will (i) support the effective integration of existing EO capacities, modelling and data exploitation skills, and past project experience, (ii) provide the interface for the engagement of the complete ecosystem of EO stakeholders, (iii) promote the concrete uptake of EO services and data in response to regional needs, relevant to climate change, improved food security, access to raw materials and energy, and (iv) contribute to the improved implementation of and participation in GEO, GEOSS, and Copernicus in the RoI.

GEO-CRADLE lays out an action plan that allows to define the region specific (G)EO Maturity Indicators and common priority needs. Through showcasing pilots, it demonstrates how the priorities can be tackled by the GEO-CRADLE Network, and provides the roadmap for the future implementation of GEOSS and Copernicus in the region, building on the so-called GEO-CRADLE Regional Data Hub, which abides by the GEOSS Data Sharing Principles. To maximize the impact of GEO-CRADLE activities, well-defined Communication, Dissemination and Stakeholder Engagement strategies will be implemented. For efficient project coordination, the project management is assisted by the active liaison with EC, GEO and UN initiatives, and a regional coordination structure. To receive more information about the GEO-CRADLE project, and until the official website of the project is ready, the interested persons may contact the Project Coordinator through email: kontoes@noa.gr.

Sentinel-1 based InSAR assessment of the November 17th, 2015 Lefkada Earthquake

History of the EQ event: On November 17, 2015, an earthquake of Mw 6.4 hit the island of Lefkada, located in the Ionian Sea. A second earthquake of Mw 5.0 successively followed. These events induced rock falls and landslides having as consequences two life losses and extensive damages to roads and buildings.

The operational capacities of BEYOND for the systematic large scale SAR monitoring, and InSAR processing, have been largely enhanced with the Near Real Time ingestion of Sentinel-1 (S-1) images that become available through the Hellenic Sentinel Data Hub, the so-called Greek Mirror Site (<http://sentinels.space.noa.gr>). The developed automations allowed the calculation in rush mode of the co-seismic interferograms and crustal deformations caused by the Lefkada EQ immediately after the first post-seismic S-1 image became available. Shortly after the events, BEYOND acquired and processed a set of S-1 TOPSAR scenes. The fringes of the preliminary interferometric results, revealed ground deformations of the order of ~20cm along the Line of Sight at the western part of Lefkada Island. As smaller deformation field is also apparent at the northern part of Cephalonia Island. The current seismicity at the Ionian Islands is an ongoing process, and the BEYOND Center of Excellence is watching over the phenomenon using continuous acquisitions of S-1. Further analysis and exploitation of very high spatial resolution satellite data such as CosmoSkyMed, TerraSAR-X, and ALOS-PALSAR will be carried out in the next period towards detailed monitoring, mapping, and assessment of the phenomenon in collaboration with the European Space Agency through the CEOS DRM Seismic Pilot activation.



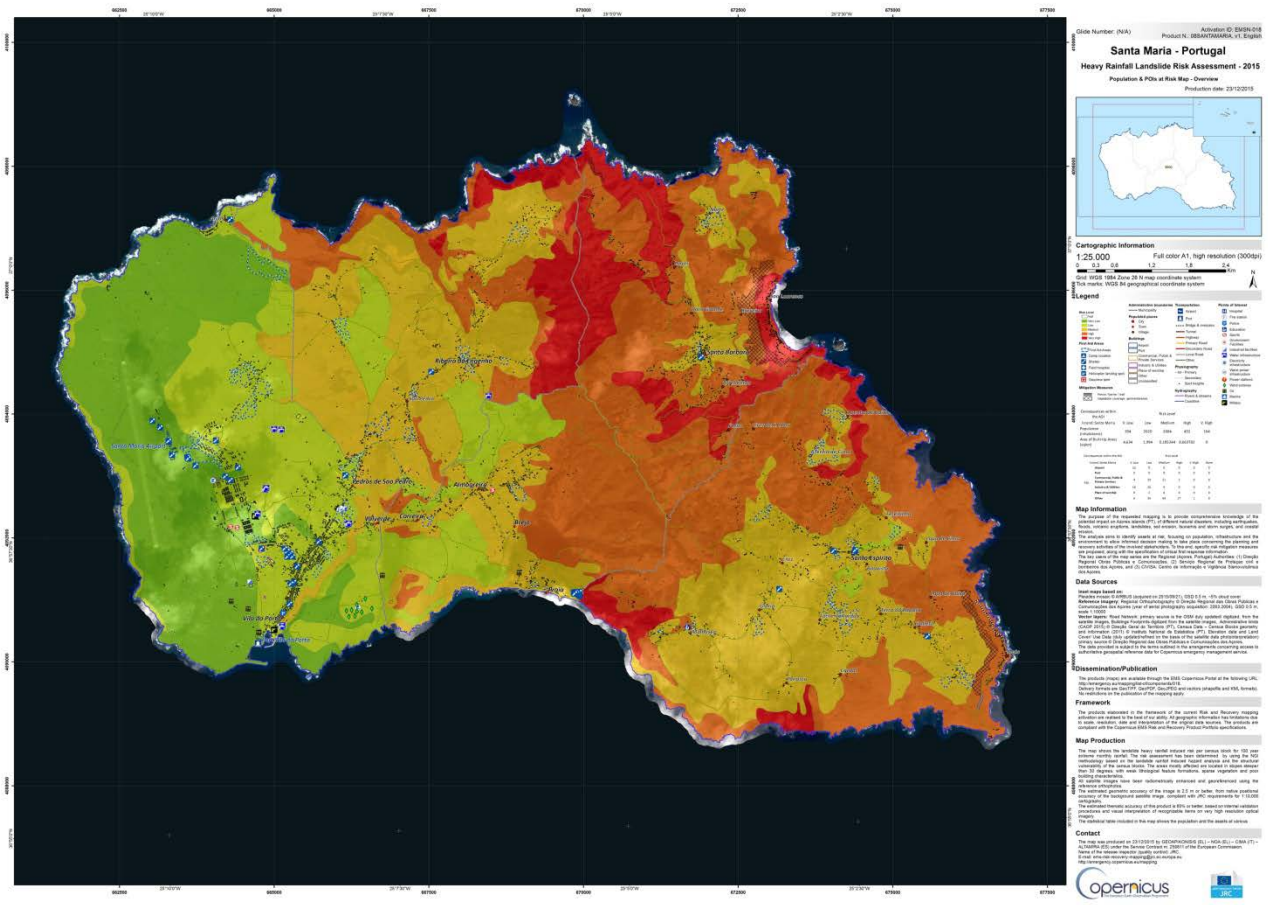


EMS Risk & Recovery Activation in Azores Archipelago

The BEYOND group, has been actively involved together with partners Geoapikonisis SA, Altamira SA, and CIMA Foundation in the EMSN-018 activation launched in the framework of the EMS Risk & Recovery Activity of the Copernicus Workprogram.

The activation covers the entire geographic area of the Azores island complex. It concerns the assessment of different hazard, vulnerability, and risk products for a range of hazardous phenomena. A number of validated methodologies have been applied to generate a series of maps relevant to seismic hazard, seismic vulnerability, and risk over the main populated areas, as well as the assessment of the flash flood, tsunami, storm surges, landslide, lava flow, soil and coastal erosion hazards, and their impacts in the urban environment and natural ecosystems spread out in the Azores Archipelago. The study has resulted in the production of hundreds of 1:10000-scale maps depicting the above mentioned hazards, vulnerability, and risk factors. It also produced updated Land Use/Land Cover and large scale reference maps in the study area using VHR satellite imagery of 0.5m spatial resolution.

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Activation ID: EMSN-018, Santa Maria-Portugal, Heavy Rainfall Landslide Risk Assessment-2015



Disaster HUB



DisasterHub, a recent mobile application developed in BEYOND for enabling crowd generated data fusion in Earth Observation disaster management has been selected among the top apps of the second MYGEOSS open competition; there were over 40 applications and all of high caliber. The selecting panel was composed of members of staff of the European Commission, European Environment Agency, European Space Agency, the private sector (OGC and EpsilonItalia), and the European Network of Living Labs and the European Citizen Science Association. As a result of the selection, an offer to support the development of the proposed application through an Expert Contract for a maximum of 30 days of work equivalent to 13,500 Euros is made.

MoU with UNSPIDER

A cooperation agreement is under finalisation between the United Nations Office for Outer Space Affairs, the National Observatory of Athens (the hosting organisation), and the BEYOND Center of Excellence, for the establishment of a UN-SPIDER Regional Support Office in Athens, Greece.

The parties have agreed to collaborate on the following:

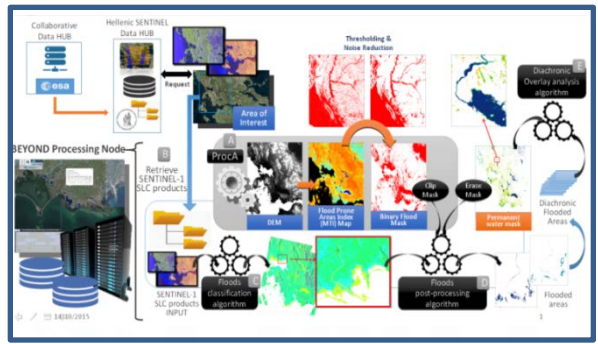
- Access to and promotion of the use of space-based resources for disaster management and emergency response.
- Undertake capacity building initiatives for the promotion of space-based information technology for disaster management and emergency response.
- Develop and enrich the UN-SPIDER Knowledge Portal with products, reference materials, practices, data sources, tools, and services.
- Examine future funding opportunities for common project development.
- Elaborate integrated space-based applications using Earth Observation and Global Navigation Satellite Systems for disaster management and emergency response.
- Undertake common outreach activities at national, regional and global level.
- Resource sharing concerning skills, monitoring capacities, and data.
- Other areas of collaboration within the mandate of the UN-SPIDER programme or with potential connections with the broader mandate of UNOOSA.



FloodHub: Floods Monitoring Service

FloodHub is a new service of BEYOND, which is currently under validation. The FloodHub tool allows the systematic monitoring and mapping of all the flood events over the Greek territory in Near Real Time. The production is based on the processing of Sentinel-1 SLC images of IW swath mode, that become available from the Hellenic Sentinel Data Hub (the Greek Mirror Site) (<http://sentinels.space.noa.gr>). Floodhub is the first fully automated Coll GS application running in Greece. The first runs refer to the hydrological basins of Arachthos & Acheloos rivers in the western Greece, that are high risk flood areas according to the Hellenic Special Secretariat for Water Management. Flood monitoring in those areas is also highly prioritised by the Public Power Corporation S.A. that owns and operates the main hydroelectric plants in the area. Up to now hundreds of Sentinel-1 SLC images corresponding to the full hydrological year of 2014-2015, have been processed.

The FloodHub Architecture



Contact Persons:

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TREASURE: Thermal Risk rEDuction -Actions and tools for SECURE cities



As a continuation of thermal environment activities, a new project is now funded. Appraisal and quantification of spatially distributed heat wave risk currently and in the future are required to develop innovative tools and services for the subsequent design of targeted measures and strategies. TREASURE- for the first time- integrates the expertise of epidemiologists, climatologists, Earth Observation scientists and IT developers into intelligent heat wave risk assessments for authorities and personalised tools for citizens all in accordance to Hyogo and UNISDR international initiatives. The approach will be applied and tested originally on two Mediterranean cities with different characteristics, and will set the grounds for application to any other European city together with the development of urban heat wave resilience strategies.



TREASURE
Thermal Risk Reduction Actions & Tools for Secure Cities
treasure.eu-project-sites.com

Continuous Monitoring of Urban Temperatures from Space
1km | 5min

National Observatory of Athens
Institute for Astronomy, Astrophysics, Space Applications and Remote Sensing

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BEYOND

Building a Centre of Excellence for EO-based monitoring of Natural Disasters



New geophysical products service based on data from the ENIGMA magnetometer array



Contact: Dr. Georgios Balasis - gbalasis@noa.gr

The National Observatory of Athens (NOA) currently operates ENIGMA (Hellenic GeoMagnetic Array), an array of 3 ground-based magnetometer stations in the areas of Trikala (Klokotos), Attiki (Dionysos) and Lakonia (Velies).

The ENIGMA network is used within the framework of BEYOND in an attempt to address the issue of earthquake predictability by studying electromagnetic signals attributed to the coupled lithosphere-atmosphere-ionosphere system as one of the most promising potential pre-seismic transients.

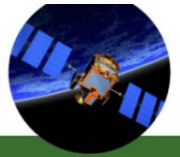
Since Fall 2015 BEYOND offers a new service of geophysical products (station magnetograms and geomagnetic pulsation wavelet power spectra) based on data from the ENIGMA magnetometer array.

Remote Sensing Special Issue: Thermal Urban Remote Sensing to Understand and Monitor Urban Climates

For about four decades, thermal infrared (TIR) remote sensing has been a promising source of information concerning surface urban heat island (SUHI) intensity and its spatial distribution. However, operational thermal monitoring of urban areas remains elusive. The urban remote sensing and the urban climatology community are invited to contribute to this Special Issue, which focuses on multi-temporal analyses of remote sensing data as well as remote sensing-modeling interfaces.

Deadline: **Sunday 31 March 2016**

Co-guest Editor: Iphigenia Keramitsoglou, ik@noa.gr



The Application of Thermal Urban Remote Sensing to Understand and Monitor Urban Climates

Guest Editors:
Dr. Benjamin Bechtel
University of Hamburg, Germany
Dr. Iphigenia Keramitsoglou
Institute for Astronomy, Astrophysics, Space Applications & Remote Sensing, National Observatory of Athens, Greece

Dr. Simone Kotthaus
University of Reading, UK
Dr. James A. Voogt
Western University, Canada

Dr. Klemen Zakšek
University of Hamburg, Germany

Deadline for manuscript submissions:
31 January 2016

Special issue website:
rdp.com/thermosensing/srui2016



Dear Colleagues,

Both the urban remote sensing and the urban climatology community are invited to contribute to this Special Issue, which focuses on multi-temporal analyses of remote sensing data as well as remote sensing-modeling interfaces. We invite you to submit articles concerning your recent research with respect to the following topics:

- Validation of UEB models via remote sensing LST;
- Assimilation and other possible uses of satellite-derived LST in urban canopy schemes;
- Downscaling / disaggregation of LST data over urban areas;
- Parametrization of urban air temperatures from remote sensing data;
- Application of the LCZ concept in remote sensing SUHI studies;
- Derivation of surface parameters for urban canopy models;
- Urban surface structure and its linkage to thermal anisotropy and emissivity;
- Multi-temporal SUHI analysis that use large datasets;
- Diurnal and / or seasonal evolution of the SUHI;
- Operational retrieval of urban temperatures and high-level services;

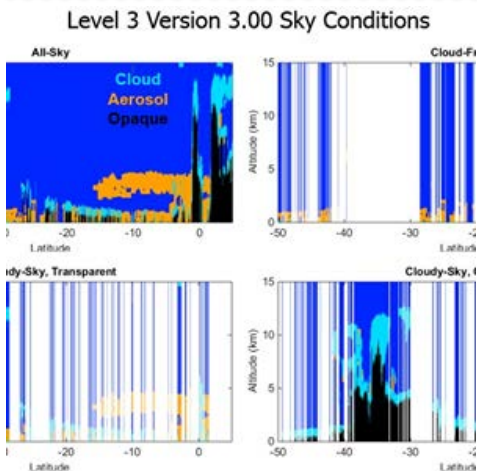
Urban climate session of the Mapping Urban Areas from Space conference -ESA



Dr. Iphigenia Keramitsoglou was member of the scientific committee and chair in the urban climate session of the Mapping Urban Areas from Space conference that was held in Frascati, Rome at the premises of ESA on 4-5 November, 2015. The European Space Agency organised, in the context of the Data User Element (DUE) of the Earth Observation Envelope Programme (EOEP), a conference on Mapping Urban Areas from Space – MUAS 2015. The purpose of this conference was to provide scientists and data users with the opportunity to present first-hand and up-to-date results from their on-going research and application development activities by using data from past and current Satellites.

Member of the Scientific Committee – Session
Chair: Iphigenia Keramitsoglou - ik@noa.gr

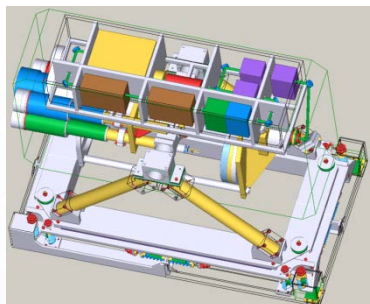
NASA acknowledges the BEYOND developments on the CALIPSO pure dust product



NASA announced the new version of the CALIPSO Level 3 climatological product for single aerosol species. The revised calculation method acknowledges the BEYOND developments on the CALIPSO pure dust product and follows the suggestions given in Amiridis et al. (2013).

Read more on [CALIPSO: Data User's Guide - Data Quality Statement - Lidar Level 3 Aerosol Profile Monthly Product Version 3.00](#)

Exploitation Atmospheric Activities in BEYOND



MULTIPLY: Development of a European HSRL airborne facility

Funding body: ESA

Short Description: MULTIPLY aims to develop the first multi-wavelength airborne High Spectral Resolution Lidar (HSRL) in Europe. It will be used for the validation of the lidar Earth Explorers ADM-Aeolus and EarthCARE.

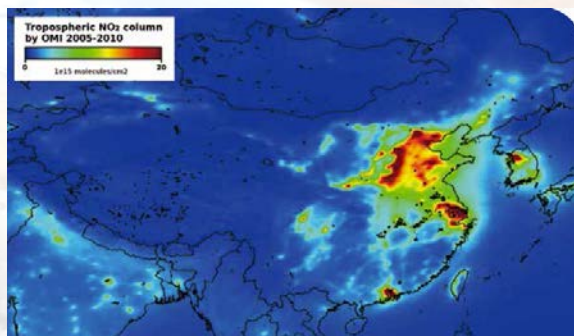
NOA's role: Partner – Responsible for the Performance Estimator development

MarcoPolo: Monitoring and Assessment of Regional Air Quality in China using space Observations

Funding body: EU – FP7 - SPACE

Short Description: In the MarcoPolo project the focus is placed on emission estimates from space and the refinement of these emission estimates by spatial downscaling and by source sector apportionment. A wide range of data is used from various satellite instruments. From these satellite data, emission estimates are made for anthropogenic and biogenic sources, on both regional and urban scale.

With various state-of-the-art techniques, up-to-date emission inventories will be created. By combining these emission data with known information from the ground, a new emission database for MarcoPolo will be constructed. The new emission inventory is input to air quality models and is expected to improve the existing air quality modelling and forecasts considerably. We demonstrate the resulting air quality information by running models.



iSPEX: European citizens measure air pollution with their smartphones.



Due to the celebration of International Year of Light 2015, the National Observatory of Athens (NOA) participated in the European iSPEX project organized by Leiden University sponsored by UNESCO. iSPEX is the first Europe-wide citizen science campaign. From 1 September to 15 October 2015, thousands of citizens in major European cities measured air pollution with their smartphone, Athens was one of the European participating cities. In total 5386 measurements have been made in this period. NOA distributed to Athenian citizens almost 250 small devices that were attached to smartphones to turn them into optical sensors.

These add-ons are “spectropolarimeters” that, in combination with the phone’s camera, sensors, computing and communications capabilities can be used to measure tiny particles in our atmosphere. These particles can be of natural origin, such as sea salt or tiny ash particles from forest fires or volcanic eruptions, through human-made soot particles produced by traffic and industry, and contribute to air pollution and its impacts on our environment and health in an as-yet poorly understood way. For example, they form one of the largest uncertainties in our current estimates of climate change.

The application of iSPEX is two-fold:

- It enables crowd-sourced measurements of tiny atmospheric particles, also known as aerosols, at locations and times that are not covered by current air pollution monitoring efforts.
- It makes atmospheric science accessible to everyone, by active participation in scientific measurements.

The iSPEX app instructs participants to scan the cloud-free sky while the phone’s built-in camera takes pictures through the add-on. Each picture taken through the iSPEX add-on contains information on both the spectrum and the linear polarization of the sunlight. The measurements taken using the phone camera can provide unique information about the properties of the particles in the air, including the amount of particles, their size distribution and the type of particles. This type of measurement is crucial in assessing the impacts of atmospheric aerosols on environment and health.

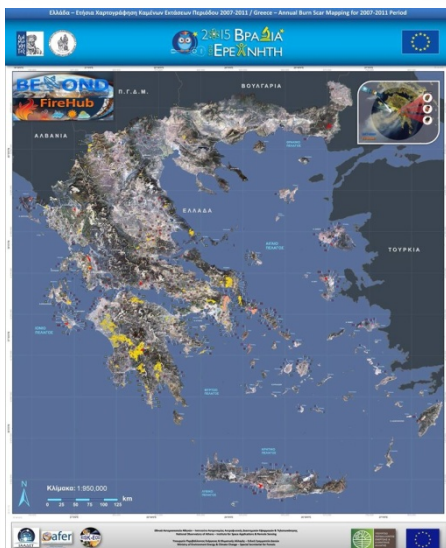
With the advent of smartphones and the development of iSPEX, citizens can now contribute to these crucial measurements and together form a flexible network that can deliver measurements from cities across Europe, even where no specialized equipment is available, and at any daylight hour — under cloud-free conditions. The active involvement of citizens in an important and real scientific experiment, pioneering a new form of citizen science where participants carry out complex, simultaneous mass-measurements, is the most important aspect of this project.



NOA through iSPEX campaign aims to form a network of thousands of people all over Greece that perform iSPEX measurements, enhance environmental consciousness of citizens, improve atmospheric models and related services provided by NOA and calibrate satellite data of BEYOND. In total, the iSPEX project was successfully completed. Citizens in Athens showed great interest which resulted to a large number of measurements that were finally received.

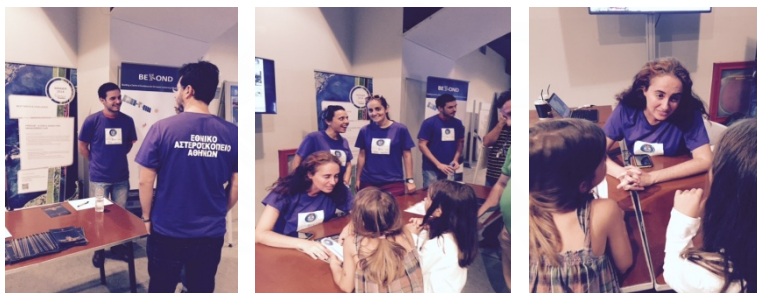
For more information visit: <http://beyond-ispex.gr/>

BEYOND at Researcher's Night 2015



The poster of BEYOND at Researcher's Night 2015

BEYOND team participated the "European Researchers' Night: exploring science, having fun", 25 September 2015, at the Foundation of the Hellenic World.



BEYOND team in action

EUROPEAN SPACE CENTRE FOR THE EARTH'S ENVIRONMENTAL MONITORING "BEYOND"

In the framework of BEYOND, a video dedicated to BEYOND services is produced in order to promote the aspect of BEYOND to the general Public. The video was produced from the Academic and Research Excellence of the Ministry of Education, Research and Religious Affairs.

This Video has already been presented in several conferences and exhibitions for the general public, for example at the Researcher's Night 2015, a special event of the NOA open to the general Public, as well as at Thessaloniki International Trade Fair 2015. In order to maximize the promotional effectiveness of BEYOND the video, originally produced in Greek language is subtitled in English.

The video is available at:

Youtube:

https://www.youtube.com/watch?t=1&v=8x_7T7_z0o0

BEYOND SITE

http://beyond-eocenter.eu/index.php/multimedia#vbVideo_3495710162

Academic and Research Excellence Initiative

<http://excellence.minedu.gov.gr/en/listing/492-beyond>



BEYOND Public Outreach



Journals

- P. Sismanidis, I. Keramitsoglou, and C.T. Kiranoudis. 2015. **“Evaluating the Operational Retrieval and Downscaling of Urban Land Surface Temperatures”**. IEEE Geoscience and Remote Sensing Letters 12(6): 1312-1316. doi: 10.1109/LGRS.2015.2397450
- P. Sismanidis, I. Keramitsoglou, and C.T. Kiranoudis. (2015). **A satellite-based system for continuous monitoring of Surface Urban Heat Islands**. Urban Climate (In Press)
- P.I. Raptis, S. Kazadzis, K. Eleftheratos, P. Kosmopoulos, V. Amiridis, C. Helmis & C. Zerefos (2015) Total ozone column measurements using an ultraviolet multi-filter radiometer, International Journal of Remote Sensing, 36:17, 4469-4482, DOI: 10.1080/01431161.2015.1083631, [Link](#)
- S. Solomos, V. Amiridis, P. Zanis, E. Gerasopoulos, F.I. Sofiou, T. Herekakis, J. Brioude, A. Stohl, R.A. Kahn, C. Kontoes (2015), **Smoke dispersion modeling over complex terrain using high resolution meteorological data and satellite observations – The FireHub platform**, Atmospheric Environment, Volume 119, October 2015, Pages 348–361, doi:10.1016/j.atmosenv.2015.08.066, <http://www.sciencedirect.com/science/article/pii/S1352231015303113>



Presentations - Conference Proceedings

- I. Keramitsoglou, Chris T. Kiranoudis, and P. Sismanidis. **Continuous Thermal Monitoring of Cities from Space in Mapping Urban Areas from Space Conference**, Frascati, Rome, Italy, **November 4 – 5, 2015**
- L. Fita, E. Flaounas, **FF: The water budget and precipitation efficiency of the Mediane occurring in December 2005**, 9th HyMeX Workshop, P2.13, Mikonos, Greece, **21-25 Sept. 2015**, [[Abstract](#)], [[Poster](#)]
- Haris Kontoes, **BEYOND Center of Excellence for EO-based monitoring of natural disasters in South-Eastern Europe**, SciNetNatHazPrev - Open Seminar entitled "Contribution on Preventing Natural Disasters", Thessaloniki, **30 October 2015**, OASP-ITSAK, [[Presentation](#)], [[Open Seminar Agenda](#)]
- Haris Kontoes, **BEYOND Center of Excellence for EO-based monitoring of natural disasters in South-Eastern Europe**, SciNetNatHazPrev - Open Seminar entitled "Contribution on Preventing Natural Disasters", Xanthi, **6th October 2015**, Democritus University of Thrace, [[Presentation](#)], [[Open Seminar Agenda](#)]



Public Media Articles - Interviews

- BEYOND on UN-SPIDER Knowledge Portal, <http://www.un-spider.org>, **July, 2015**, [Article](#)
- Maria Kaskara, **Radar interferometry techniques for estimating deformation in Western Crete, Greece, for the period 1992-2001**, psdatm.gr, **July-August-September 2015**, [[Article](#)]
- Lefkada moved 36 cm, ethnos.gr, **Friday, November 20, 2015**, [Link](#)



National Observatory of Athens



Institute for Astronomy, Astrophysics,
Space Applications & Remote Sensing



FP7-Regpot-2012-23-1



BEYOND

Building a Centre of Excellence
for EO-based monitoring of Natural Disasters

Newsletter

BE OND e-Newsletter

BEYOND aims to maintain and expand the existing state-of-the-art interdisciplinary research potential, by Building a Centre of Excellence for Earth Observation based monitoring of Natural Disasters in south-eastern Europe, with a prospect to increase its access range to the wider Mediterranean region through the integrated cooperation with twinning organizations .



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WWW: <http://www.noa.gr>

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

ACTIVITY: 4.1

Unlocking and developing the research potential of research entities established in the EU's Convergence regions and Outermost regions.

CALL IDENTIFIER:

Integration of research entities from the EU's Convergence and Outermost regions in the ERA and enhancement of their innovation potential.

Project GA number: 316210
Total Budget: 2305650 €
Duration: 3 years (2013-2016)
EU Project Officer: Ms Ralitsa Atanasova
Email: Ralitsa.ATANASOVA@ec.europa.eu

Credits:

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<http://BEYOND-EOCenter.eu>