



EXTENDED CURRICULUM VITAE

Charalampos (Haris) Kontoes, Ph.D.

Researcher Director IAASARS/NOA
Ph.D in Remote Sensing NTUA
Surveying Engineering NTUA

e-mail: kontoes@noa.gr

URL: <http://members.noa.gr/kontoes/>

Table of Contents

1.	CURRICULUM VITAE SUMMARY	3
1.1	SCIENTIFIC/PROFESSIONAL ACTIVITY.....	3
1.1.1	RESEARCH POSITIONS.....	3
1.1.2	OTHER KEY POSITIONS.....	3
1.1.3	SUMMARY OF RESEARCH ACTIVITIES	3
1.2	ESTABLISHMENT AND OPERATION OF THE EUROPEAN CENTRE BEYOND	4
1.2.1	BEYOND CENTRE - INTERNATIONAL ACTIVITY - THEMATIC AREAS	4
1.2.2	BEYOND CENTER - ENSURING RESEARCH FUNDS	5
1.2.3	BEYOND CENTER - INTERNATIONAL DISTINCTIONS - RESEARCH & SERVICES.....	5
1.3	CREATION AND OPERATION OF NATIONAL INFRASTRUCTURES FOR SATELLITE REMOTE SENSING 5	
1.4	MANAGEMENT OF A LARGE RESEARCH GROUP - RESEARCH PROJECTS.....	6
1.5	IN CHARGE OF SPACE POLICY FORMATION POSITIONS.....	6
1.6	CONTRIBUTION TO THE COORDINATION OF SPACE PROGRAMS COPERNICUS/GEO	7
1.7	ADMINISTRATIVE EXPERIENCE	7
1.7.1	BOARD OF DIRECTORS OF THE NATIONAL OBSERVATORY OF ATHENS	7
1.7.2	SCIENTIFIC COUNCIL OF THE INSTITUTE (IAASARS) - NOA.....	7
1.7.3	IN CHARGE OF THE CENTER OF EXCELLENCE BEYOND	7
1.8	SCIENTIFIC WRITINGS – PUBLICITY – CITATIONS (H INDEX).....	8
1.9	ORGANIZATION OF SCIENTIFIC CONFERENCES AND WORKSHOPS	8
1.10	TEACHING	9
1.11	SCHOLARSHIPS – DISTINCTIONS – PATENTS	9
1.12	UNIVERSITY DIPLOMAS - BASIC AND POSTGRADUATE EDUCATION	9
1.12.1	ADDITIONAL TITLES OF POSTGRADUATE SPECIALIZATION.....	9
1.12.2	SEMINARS - CONTINUING TRAINING.....	9
1.13	OTHER PROFESSIONAL EMPLOYMENT.....	10
1.14	FOREIGN LANGUAGES.....	10
1.15	MEMBER OF CHAMBERS - ASSOCIATIONS.....	10
1.16	OTHER PERSONAL INFORMATION	10
2.	SCIENTIFIC, RESEARCH, EDUCATIONAL, DEVELOPMENT PROJECTS	11
2.1	COORDINATION OF RESEARCH PROJECTS	11
2.1.1	PROJECTS WITH IMPACT ON EMBLEMATIC EUROPEAN ACTIONS (GEO&COPERNICUS)	11
2.2	EUROPE'S STRATEGIC PRIORITY PROJECTS IN THE EARTH OBSERVATION SECTOR.....	30

2.3	PROJECTS OF SPECIMENING EUROPEAN BUSINESS ACTIVITIES GEO & COPERNICUS	42
2.4	BUILDING EARTH OBSERVATION INFRASTRUCTURE FACILITIES AT NOA	62
3.	CONDUCTING STUDIES FOR PROJECTS AS RURAL AND SURVEYING ENGINEER OF NTUA.....	63
3.1	STUDIES FOR SATELLITE REMOTE SENSING APPLICATIONS.....	63
3.2	STUDIES FOR DIGITAL PHOTOGRAMMETRY & GIS APPLICATIONS.....	63
4.	EDUCATIONAL WORK – THESES / Ph.D. SUPERVISING - OUTREACH	65
4.1	TEACHING - EDUCATIONAL FUNCTION.....	65
4.2	OTHER LECTURES - POPULARIZATION OF SCIENCE - SEMINARS	66
5.	ORGANISATION OF SCIENTIFIC CONFERENCES AND WORKSHOPS	67
5.1	FULLY RESPONSIBLE - COORDINATION OF ORGANISING CONFERENCES	67
5.2	MEMBER OF ORGANISING/SCIENTIFIC COMMITTEES OF CONFERENCES	68
6.	PARTICIPATION IN INTERNATIONAL & NATIONAL SCIENTIFIC CONFERENCES	69
6.1	INTERNATIONAL SCIENTIFIC CONFERENCES.....	69
6.2	NATIONAL SCIENTIFIC CONFERENCES.....	74
7.	SCIENTIFIC PUBLICATIONS, TECHNICAL REPORTS, PRESS & MEDIA ARTICLES	75
7.3	PUBLICATIONS IN PEER REVIEWED INTERNATIONAL JOURNALS	75
7.4	PUBLICATIONS - PRESENTATIONS IN INTERNATIONAL CONFERENCES & WORKSHOPS.....	80
7.5	GREEK SCIENTIFIC CONFERENCES WITH PROCEEDINGS AND ANNOUNCEMENTS	92
7.6	ARTICLES IN PRESS AND PUBLIC MEDIA - TECHNICAL REPORTS.....	94
8.	ANNEX I: BEYOND FIREHUB PATTENT	98
9.	ANNEX I: BEYOND Activities.....	99
10.	ANNEX III: BEYOND COPERNICUS EMSN METHODOLOGIES.....	113

1. CURRICULUM VITAE SUMMARY



Curriculum Vitae Summary Dr Charalampos (Haris) KONTOES

Research Director of NOA (kontoes@noa.gr)

Phd In Satellite Remote Sensing

Institute for Astronomy & Astrophysics, Space
Applications and Remote Sensing

National Observatory of Athens

1.1 SCIENTIFIC/PROFESSIONAL ACTIVITY



1.1.1 RESEARCH POSITIONS

Dr Charalampos (Haris) Kontoes holds the title as NOA Researcher during the last 20 years at various research levels such as:

2010 up to present: **Research Director of NOA** - Satellite Remote Sensing sector, Institute for Astronomy & Astrophysics, Space Applications and Remote Sensing of the National Observatory of Athens (**IAASARS/NOA**)

2003-2010: **Senior Researcher IAASARS/NOA** – Satellite Remote Sensing Sector

2000-2003: **Associate Researcher IAASARS/NOA**

1997-2003: **Assistant Researcher IAASARS/NOA**



1.1.2 OTHER KEY POSITIONS

Member of the National Council of Space Policy in Greece within the framework of operations of the Hellenic Space Organization (ELDO)

National Delegate of the H2020 SPACE Program Committee - EC DG ENTR

National Delegate of the Copernicus Integrated Ground Segment (IGS)

Member of the National Committee of International Union of Geodesy and Geophysics (IUGG)

National Contact Point for the Exchange of National Data in the Group on Earth Observation (GEO)



1.1.3 SUMMARY OF RESEARCH ACTIVITIES

Dr Haris Kontoes holds the position of **Research Director at the Institute for Astronomy, Astrophysics, Space Applications and Remote Sensing of the National Observatory of Athens**. He received his doctorate diploma (PhD) in Remote Sensing of Environment from the National Technical University of Athens (1992). He completed his doctoral thesis, as **grant holder of the European Commission** at the Institute for Space Applications (Environmental Mapping Team) of the **EU Joint Research Center (JRC)** in ISPRA, Italy.

Since 1992, he has been assuming responsibilities as Scientific Director – Coordinator for a large number of Operational and Research and Innovation Actions in Earth Observation, in the framework of National and European Competitive Financing Instruments (ESA EU Optional Programs, EU / FP6- FP7-H2020, EU / Copernicus - GMES). **His research work focused** on the exploitation of satellite technology combined with **advanced big data modeling techniques using Copernicus satellites**, as well as many other operational and

scientific Earth Observation satellite missions.

A large part of his research activity was devoted to the **development of IT solutions** for the analysis of image data and the extraction of new scientific environmental information (e.g. **big data analytics, multi-source data fusion, data mining, pattern recognition, machine learning and neural nets**). He proposed prototype research solutions that have **long led to the provision of pre-operational and operational solutions** for timely assessment, monitoring and management of **natural risks** associated with **climate change** (e.g. fires, floods, storms), **geo-hazards** (earthquakes, volcanoes, landslides, soil/coastal erosion), **atmospheric disturbances** (spreading toxic gases, pollutants, smoke), as well as **activating decision-making procedures/systems** for the protection of citizens from natural hazards. He has developed extensive research in the field of satellite remote sensing, which is directly related to the management and protection of **natural resources and assets** (water, ecosystems), and to the **optimal exploitation of agricultural land and the protection of food** in line with priorities of the **Common Agricultural Policy and Best Environmental Practices** it establishes. An important part of his research activity deals with the use of large volumes of remote sensing data of Copernicus satellite missions, as well as other space missions (e.g. NASA, NOAA, etc.) in order to **develop improved real-time energy efficiency estimation models**, maximizing the use of **alternative forms of energy**.

1.2 ESTABLISHMENT AND OPERATION OF THE EUROPEAN CENTRE BEYOND

In 2013, he took the initiative to submit a proposal for establishing a large scale EO infrastructure within the competitive framework of the EU FP7-REGPOT-2012-2013-1 program. The proposal was successfully evaluated and was commissioned to establish and operate at NOA, the **European Center of Excellence BEYOND for the Earth Observation based Monitoring of the Environment and the Disasters** (<http://www.beyond-eocenter.eu/>). He received a **total funding of 2.3MEuros** and coordinated all actions for the development of satellite remote sensing research and infrastructures at the premises of NOA in the context of BEYOND. He is currently **leading a large multidisciplinary research team of 35 scientists**, whose funding is fully ensured by the operation of the BEYOND Center of Excellence in the context of international competition programs.



1.2.1 BEYOND CENTRE - INTERNATIONAL ACTIVITY - THEMATIC AREAS

The Center BEYOND, has a **well-accepted and validated recognition** in the provision of research and operational services in the framework of the **European Union's Global Monitoring for Environment and Security Program** namely Copernicus (former GMES), and to the **European Space Agency (ESA)**. The emphasis of the Center's activity is on **Emergency Response (Copernicus/Emergency Management Support)**, monitoring and protection of the **Marine and Atmospheric Environment**, as well as applications of **Agriculture, Renewable Energy, and Climate Change** and its impact on quality of citizens' life (e.g. natural disasters).

Dr. Haris Kontoes designed the BEYOND sub-systems as FireHub, FloodHub, and GeoHub for real-time delivery of space based services, for early detection, continuous monitoring, and management of natural disasters, the monitoring of active forest fires, flood events and seismic/volcanic risks, as well as damage assessments in rush and off-line mode. These services are **routinely** used by many environmental and civil protection organizations in Greece, and worldwide including EU bodies, namely the **European Forest Fire Information System/EFFIS**, the **Global Fire Monitoring Center (GFMC)**, the **European Copernicus/EMS Program**, in a large number of **Civil Protection Authorities** in Europe, Africa, Latin America, Asia, and authorities as the **Fire Brigade Body** in Greece, the **Directorate and Natural Environment Protection (Ministry of Environment)**, the **Public Forestry Services**, the **Directorate for Planning and Disaster Response of the General Secretariat of Civil Protection**, the **Department for Natural Disasters Recovery (Min of Infrastructure and Transport)**, etc.

Indicatively and only over the period **2016-2018** the BEYOND Center has been activated through the **Copernicus EMS program from more than 13 Civil Protection Authorities around the world**, in order to address timely risk assessments across a wide range of natural disasters such as **earthquakes, volcanoes,**

landslides, slope and coastal erosion, fires, floods, toxic gas emissions, smoke dispersion and industrial accidents.

The **BEYOND Center** has been selected by the EU to offer real-time satellite based active fire detection and fire-damage assessment services (**FireHub**) for the needs of the **European Forest Fire Information System (EFFIS)**.



1.2.2 BEYOND CENTER - ENSURING RESEARCH FUNDS

The **BEYOND Center** has been funded from competitive programs (EU, ESA, National Programs), as well as from International Funding Organisations amounting 1.2-1.5 million Euros per year. At the same time, it supports with its infrastructure and research, the activity of other researchers in the country, providing an additional equal inflow of research funds at IAASARS/NOA.



1.2.3 BEYOND CENTER - INTERNATIONAL DISTINCTIONS - RESEARCH & SERVICES

The operation of the **BEYOND Center** contributes to the production of innovative research. It has supported the production of scientific publications in peer reviewed journals and articles in international conferences with several citation references. More specifically, this activity has already produced a number of 56 scientific publications in journals and 132 international conference proceedings.

The 1st prize as the **Best Challenge Service among over 70 competitive proposals**, brought international recognition (**Copernicus Masters 2014 - Best Service Challenge Award**), for the **FireHub** services. Dr Haris Kontoes is the owner of the patent no. 20150100061 issued by the **Industrial Property Organization to protect the copyright of the FireHub service** and Mr. Themistocles Herekakis, the co-developer of the **FireHub** information system, is the co-owner.

The role assignment of the **UN-SPIDER Regional Support Officer**, in the area of the Southeast Europe, Middle East and the Balkans, to **BEYOND Center's** research projects and disaster management services, was a significant recognition.

The aim is to assist the transfer of know-how, capacity building and training of the competent authorities, as well as the provision of natural disaster management services.

1.3 CREATION AND OPERATION OF NATIONAL INFRASTRUCTURES FOR SATELLITE REMOTE SENSING

Dr. Charalampos (Haris) Kontoes in his capacity as coordinator of **BEYOND Center** has also been responsible for the installation and uninterrupted operation of national infrastructures for the systematic reception, management and redistribution of real-time Earth Observation data acquired by satellites and in-situ monitoring networks.

The coverage and usage of the **EO monitoring infrastructure** is international. It covers observational needs of a wide research decision making and community across the **Southeast Europe, North Africa, Middle East and the Balkans**. It includes:

1. **The Hellenic Mirror Site** (<https://sentinels.space.noa.gr/>) providing near real-time satellite data to the international research community and the private sector, from the Sentinels (S-1, S-2, S-3, S-5P) (Copernicus missions). The infrastructure is empowered by GRNET SA, the Greek partner of the GEANT network.
2. **IntHub, DIASHub, and CollHub (International, DIAS, and Collaborative Data Hubs)**, operated by the **BEYOND Center for the purposes of ESA**. They manage real-time distribution to more than 15Tbytes of Sentinels data per day, to the Worldwide Space Agencies (NASA, NOAA, USGS, GA), DIAS platforms, and National Collaborative Data Hubs (Mirror Sites). The infrastructure is empowered by GRNET SA, the

Greek partner of the GEANT network.

3. **An X-/L-band acquisition antenna for real-time satellite data reception from missions EOS (AQUA, TERRA)/NASA, SUOMI-NPP/NASA, NOAA/AVHRR, METOP, FY, and corresponding archiving facility.** The range of reception is the whole of **Southeast Europe, North Africa, Middle East and the Balkans.**
4. **Satellite acquisition antenna (DVB-2) and archiving facility for the real time reception of data from EUMETSAT missions (MSG1, MSG2, MSG3).**
5. Advanced **PollyXT atmospheric lidar ground system**, and a mobile unit **lidar system EMORAL.**
6. A High Performing Processing Unit consisting of **severs with high computing power**, and a **300TBytes archive.** The unit is devoted for satellite data processing, and services provision by operating the processing chains namely **FireHub, FloodHub, GeoHub of the BEYOND Center.**
7. **Unmanned aerial platforms (UAVs, Drones)**, long-distance fixed-wing **SendeFly e-Bee** and **ATLAS eight copter** for lifting multiple load carriers (~5kgr).

1.4 MANAGEMENT OF A LARGE RESEARCH GROUP - RESEARCH PROJECTS

1. Dr. Haris Kontoes has been assuming the **scientific responsibility to manage a significant number of research projects** with an internationally recognized social and scientific impact, while **leading an interdisciplinary research team of more than 35 staff members with international presence, consisting of 17 Master level graduates, 7 Ph.D. and post-doctoral and the remaining staff being of the level of the first university diploma and administrative staff.** The team is actively involving researchers from the other research institutes of NOA. In addition to his career, he has approximately trained 70 young researchers / engineers who have significant careers in Greece and abroad.
2. **The funding of the research team is fully ensured by competitive research funds through the implementation of EU, ESA, and International Funding Organizations (WB, EIB) projects, as well as national research and infrastructure support programs (e.g. KRIPIS/ELIDEK).** The implementation of the research projects is hosted at the BEYOND Center for Excellence.
3. He has been the **Scientific Responsible for more than 32 research projects and a number of engineering studies reaching an approximate total budget of 11.000.000 Euros.**
4. He has been **Scientific Responsible for implementing 5 big Infrastructure projects of a total budget of 3.205.000 Euros.**
5. **During his tenure as a Research Director, Dr Haris Kontoes has been receiving funding from research activity at a rate of 1.2-1.5 M Euros per year.** The aforementioned funding ensures the full financing of the research staff and the cost for maintenance the EO infrastructure of the BEYOND Center.

1.5 IN CHARGE OF SPACE POLICY FORMATION POSITIONS

Over the period **1995-2001 he assumed the role of Executive Secretary of the Space Research and Technology Committee of the General Secretariat for Research and Technology.** During this period, the first substantial recording of the Greek scientific skills and assets on space issues was made. Under the supervision of the Space Committee, he has undertaken the task of conducting a study for the **Greek National Strategy in the Fields of Earth Observation and Monitoring the Earth.** He was responsible for coordinating and organizing workshops and conferences, exploring national priorities in applications and satellite technology, and coordinating the writing of the Greek National Space Strategy paper, which has been a key platform for discussions with ESA for the participation of Greece as full member of ESA.

After nominations of the General Secretariat for Research and Technology, he also assumed:

1. **2001-2003: National representative of the GMES Steering Committee.** The Committee was appointed by the EU and the ESA to develop the strategy and the priorities for the **Global Monitoring for the Environment and Security Program (Copernicus/ former GMES).**
2. **2001-2003: Deputy National Representative in the European Commission's JSSAG Joint-Space Strategy Advisory Group.**
3. **2002-2004: Nominated as National Representative of ESA's (European Space Agency) PBEO-Program**

Board for Earth Observation. His main responsibilities were the formulation of space strategy and relevant work programs for the development of future satellite systems, research and application priorities in the field of **Earth Observation**.

4. **2014-present: National Representative of the EC Space Committee of Space FP7 and Space H2020 programs of the European Commission.** His responsibility is to develop a **European Strategy and Work Programs on Space Research, Earth Observation Applications, Copernicus, Space Technology, Space Navigation, and Satellite Surveillance and Tracking (SST)**. As a national representative, he has taken initiatives and **has supported a number of national meetings and workshops** organized by the GSRT in order to inform the Greek scientific community on the possibilities offered through Space FP7/Space H2020 in the development of Space Research in Greece.
5. **2016-present: National Representative of the Copernicus Integrated GS (IGS) Task Force.**
6. **2016-present: National Focal Point for data exchange within the governments and members of GEO.**
7. **2017-present: Member of the National Committee of the International Union of Geodesy and Geophysics (IUGG).**
8. **2018-present: Member of National Space Policy Council under the operations of the Hellenic Space Organization (ELO).**

1.6 CONTRIBUTION TO THE COORDINATION OF SPACE PROGRAMS COPERNICUS/GEO

He has been entrusted by the EU (through the GEO-CRADLE project - www.geocradle.eu) to **coordinate the implementation of the Copernicus and GEO/GEOSS Space programs in the countries of North Africa, Middle East and the Balkans**. Within this framework, **he has set up and coordinated a network of 262 research and professional entities** which are active in more than 22 countries over the three regions. Among his responsibilities is to **assist the networking and transferring the know-how** in Earth Observation matters, as well as to **educate the stakeholders** in the exploitation of Sentinels/Copernicus EO data. Lastly, he coordinates the **submission to the EU of the roadmap** for the implementation of the Copernicus and GEO/GEOSS programs on the basis of the recognized priorities and needs of the countries in North Africa, the Middle East and the Balkans.

1.7 ADMINISTRATIVE EXPERIENCE



1.7.1 BOARD OF DIRECTORS OF THE NATIONAL OBSERVATORY OF ATHENS

2013-2017: Member of the Advisory Board of NOA, representing the Research Community of NOA.

2011-2013: Deputy Director of the Astronomy, Astrophysics, Space Applications and Remote Sensing Institute of the National Observatory of Athens.



1.7.2 SCIENTIFIC COUNCIL OF THE INSTITUTE (IAASARS) - NOA

2004-2008: Chairman of the Scientific Advisory Council of the Institute of Astronomy, Astrophysics, Space Applications and Remote Sensing National Observatory of Athens.

2016-present: Deputy Chairman of the Scientific Council of the Institute of Astronomy, Astrophysics, Space Applications and Remote Sensing National Observatory of Athens.



1.7.3 IN CHARGE OF THE CENTER OF EXCELLENCE BEYOND

He has the full scientific responsibility for the **activities** related to: a) the **management of the BEYOND Center's development**, b) the **financial and investment priorities** of the Center (amounting to a budget of

7.000.000 EUR since the start of the operation of the Center - 2013), c) the **proper operation, maintenance, and upgrading of the infrastructure** (total investment cost of infrastructure of approx. **1.500.000 Euros**), d) **the design and exploitation of the research and innovation** produced by the Center's activity, as well as e) **the management of the Center's staff** (>35 scientists from various areas of expertise/ fields).

1.8 SCIENTIFIC WRITINGS – PUBLICITY – CITATIONS (H INDEX)

Dr Haris Kontoes **has published 56** scientific articles in peer reviewed journals and chapters in books. He has **contributed to/participated in more than 152** scientific articles, in international and national conferences with proceedings and workshops. He has also published a large number of technical reports for the needs of various Ministerial Organisations and Decision Making Bodies in Greece and abroad. He participated in and presented his research work in **132 conferences internationally with a total number of publications/announcements of the order of more than 152**. He has received over **30 invitations as a keynote speaker**.

He has published a **very large number, of more than 65 popular articles in the printed press, blogs**, as well as in **social media** (Facebook, twitter, LinkedIn), publishing the results of the most important societal impact research and operational activity of the BEYOND Center (e.g. wild fires of 2007, 2009, 2017 in Greece, the flood events in Attica, the Aspropyrgos toxic emissions, the unrest of the Santorini volcano, and many major disasters worldwide).

According to the **academic data base, Google Scholar reports, there about 1100 references** in Dr. Haris Kontoes' publications. Correspondingly, in the **Google Scholar** academic data base appears to have **h-index = 20 and i-index = 28**.

He has been reviewer of scientific journals (e.g. IJPRS, IJRS, SENSORS, IEEE Geoscience and RS).

He has been evaluator of proposals submitted to the European Community, as well as in the framework of National Calls for Research (GSRT).

1.9 ORGANIZATION OF SCIENTIFIC CONFERENCES AND WORKSHOPS

Dr Haris Kontoes **has contributed in the organization of 36 international conferences. Actually he was in charge for the coordination of the organizing and scientific committees, undertaking fully the responsibility for 25 conferences held in abroad (ESA, EGU, UN, EU, Africa, M. East). He has also been member of the organizing /scientific committees in 11 other international conferences.** Furthermore, he is a member of the organising committee of the 44th COSPAR SCIENTIFIC ASSEMBLY 2022, **proposed to take place in Athens, Greece, July 2022**.

The conferences were related to **developments in space research, as well as space applications in topics as natural disaster management and environmental protection. Publicity was also given to the activities of the European Center BEYOND. Co-ordination** of scientific communities and users were also supported, in the wider region of Southeast Europe, North Africa, Middle East and the Balkans through the GEO-CRADLE coordination action under the scientific responsibility of Dr Haris Kontoes. **Know-how has been transferred and participants were informed on how to participate in and exploit** the EU/ESA Copernicus and GEO/GEOSS programs. In several of these conferences, the **European research and business potential, as well as the stakeholders' priorities/needs were captured, the research community was connected to the business community**, and possibilities were explored for exploiting the research results in the production of innovative value added products and space based services.

Dr Haris Kontoes **participates in the organizing committee that claims the organization of the 44th COSPAR International Conference in 2022 in Athens**.

1.10 TEACHING

Professor and member of the **Special Inter-Institutional Committee of the Master's Degree program "SPACE SCIENCE TECHNOLOGIES AND APPLICATIONS"** co-organized by the IAASARS/NOA and the Department of Informatics and Telecommunications of the University of Peloponnesus. **Teaching supervisor of the course "Fundamentals of remote sensing", and co-teaching of courses "Space Applications" and "Advanced Space Applications"**.

Supervisor of **12 diploma thesis**, including 7 from the postgraduate program "SPACE SCIENCE TECHNOLOGIES AND APPLICATIONS", and 5 more students from other universities at postgraduate and undergraduate level of studies (NTUA, Agricultural University, Technological Educational Institute, etc.).

Participation in **7 doctoral dissertations committees** of Greek and foreign universities (NTUA, IPGP, etc.). **He has given series of lectures in several academic classes** (NTUA, University of Western Attica, and Fire Brigade Academy). Continuing educational programs (Mobility Program, TCG, etc.) and popularization of knowledge (Hellenic World, French Institute, Space Expo, etc.).

1.11 SCHOLARSHIPS – DISTINCTIONS – PATENTS

(1988-1992), Grant holder of the **European Communities for PhD dissertation** at the Joint Research Center of the European Communities (JRC-ISPRA).

(2014) **First Prize for Best Challenge Service - Copernicus Masters**. Distinction among over 70 proposals submitted worldwide. **Prize of 40K Euro (in-kind)**.

(2016) **FireHub** service has been granted a patent diploma by the Industrial Property Organization. **Patent Title: " Method that detects areas of active fire hotspots in real time, calculates the most probable starting point and assesses the fire probability indicators, using satellite images and fuel data"**, **Publication Number: WO2016132161 A1; Application number: PCT/GR2016/000005. Inventors: Charalampos KONTOES, Themistocles CHAIKAKIS; Publication date: Aug 25, 2016** (Source: [Google Patents](#)).

(2012) **Third prize for best research work presented** in the 11th International Conference "Semantic Web" - 3rd research paper prize in the [11th International Semantic Web Conference](#).

1.12 UNIVERSITY DIPLOMAS - BASIC AND POSTGRADUATE EDUCATION

1. (1992) **Ph.D. in Satellite Remote Sensing of the Environment** (European Commission Grant - Joint Research Center of the European Union (JRC) - National Technical University of Athens)
2. (1987) **Diplôme d' Etudes Approfondies (DEA)** in Rural and Urban Geography (Paris VI)
3. (1985) **Diploma of Rural and Surveying Engineer** in National Technical University of Athens

1.12.1 ADDITIONAL TITLES OF POSTGRADUATE SPECIALIZATION

1. **University PARIS VI-JUSSIEU**, Institut de Programmation, Diploma "Maitrise Informatique" (1986-1987).
2. **University ECOLE DES HAUTES ETUDES EN SCIENCES SOCIALES**, Faculty Centre d' Analyse et de Mathematiques Sociales, "Teledetection, Espaces et Societes" (1986-1987), Specialization Diploma in Thematic Cartography.

1.12.2 SEMINARS - CONTINUING TRAINING

1. (1999) **CENTRE NATIONAL D' ETUDES SPATIALES**: Toulouse Space Centre, Series of lectures on Differential Interferometry of SAR data: Principles and use of specialized software (DIAPASON) (1999).
2. (1987-1991) **Joint Research Center (JRC)**: Series of lectures on "Satellite Remote Sensing for Ecosystem

Monitoring", "Visual Spectrometry: Principles and Applications", "Applied Satellite Remote Sensing in Agricultural Production and Agricultural Statistics Assessment on an Extended Geographic Scale" (1987-1991).

3. (1990) **EGIS FOUNDATION UTRECHT, University Faculty of Geographical Sciences**: Lecture series on Geographic Information Systems "GIS for environmental assessment".

1.13 OTHER PROFESSIONAL EMPLOYMENT

1. (1993-1997) **Surveying Engineer (Teaching Registry No. 44270)**. Responsible for the implementation and technical management of satellite Remote Sensing, Digital Cartography and Geographic Information Systems projects, through assignment of competitions to Public and International Organizations. Collaboration with consulting companies.
2. (1993-1995) **Application engineer** of the multinational company Intergraph Hellas S.A. Responsible for technical support of applications and promotion of business plans and products of the company in the sector of Geographic Information Systems, Remote Sensing and Digital Photogrammetry.
3. (1991-1992) **Assistant Researcher** under project contract of the Maritime Applications Laboratory of the Joint Research Center of the European Communities (Marine Environment Group/JRC-ISPRA).
4. (1987-1988) **Assistant Researcher** under project contract of the Image Processing and Environmental Mapping Unit of the Joint Research Center of the European Communities (LIP-Environmental Mapping and Modeling Development Group/JRC-ISPRA).
5. (1984-1985) **Assistant of the Geodesy Laboratory** of the Department of Rural and Surveying Engineering – Class of Large Geodetic Exercises.

1.14 FOREIGN LANGUAGES

He is a native **Greek** speaker and he is fluent in **English, French and Italian**.

1.15 MEMBER OF CHAMBERS - ASSOCIATIONS

1. Member of the **Technical Chamber of Greece**
2. Member of the **American Society for Photogrammetry and Remote Sensing**
3. Member of the **Greek Society for Photogrammetry and Remote Sensing**
4. Member of the **Hellenic Society for the Promotion of Space Science Research and Support**

1.16 OTHER PERSONAL INFORMATION

Nationality: Greek

Date & Place of Birth: 09/11/1960, Athens, Greece

Marital Status: Married, with one children

Military Obligations: Completed. Sergeant - Military Corps of Transport (1992-1993)

Work Address: National Observatory of Athens, Ioannou Metaxa & Vas. Pavlou, 15236 Penteli

PO BOX 20048, tel: 0030-2103490088 (86), fax: 0030-2106138343

Home address: Katsimpiri 41, GR 155 61, Cholargos, Athens, Greece, tel: 0030-2106543276, mob: 0030 6932208817

2. SCIENTIFIC, RESEARCH, EDUCATIONAL, DEVELOPMENT PROJECTS



2.1 COORDINATION OF RESEARCH PROJECTS



2.1.1 PROJECTS WITH IMPACT ON EMBLEMATIC EUROPEAN ACTIONS (GEO&COPERNICUS)



BEYOND-Building a Center of Excellence for EO based Monitoring of Natural Disasters

FP7- REGPOT-2012-2013-1 Coordination and Support Actions
2013-2016, GA 316210
2.305.000 EUR
www.beyond-eocenter.eu

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
<input checked="" type="checkbox"/>	DISASTERS <input checked="" type="checkbox"/> ENERGY <input checked="" type="checkbox"/> FOOD SECURITY <input checked="" type="checkbox"/> PUBLIC HEALTH <input checked="" type="checkbox"/> WATER MANAGEMENT <input checked="" type="checkbox"/>	ATMOSPHERE <input checked="" type="checkbox"/> MARINE <input checked="" type="checkbox"/> LAND <input checked="" type="checkbox"/> CLIMATE <input checked="" type="checkbox"/> EMERGENCY <input checked="" type="checkbox"/> SECURITY <input checked="" type="checkbox"/>	ZERO HUNGER <input checked="" type="checkbox"/> AFFORDABLE ENERGY <input checked="" type="checkbox"/> CLIMATE CHANGE <input checked="" type="checkbox"/> LIFE ON LAND <input checked="" type="checkbox"/> SUSTAINABLE CITIES <input checked="" type="checkbox"/>	COORDINATION ACTION <input checked="" type="checkbox"/> RESEARCH & INNOVATION <input type="checkbox"/> INNOVATION ACTION <input type="checkbox"/>
<input checked="" type="checkbox"/>				

The BEYOND Center of Excellence <http://www.beyond-eocenter.eu/> develops research and provides disaster management services addressing priorities and needs in South Eastern Europe, Mediterranean, N. Africa, Middle East and the Balkans. The Center's creation supported by the competitive framework of EU FP7-REGPOT-2012-2013-1 and costed 2,3 MEuros. It generated unique excellence and EO research infrastructure for the region. It maintains a fully operational and self-sustained activity, through competitive funding from Space research and operational projects supported by EU, ESA and International Funding Organisations (FP7, H2020, ESA EOEP, WB, EIB, etc.). The operational activity of the BEYOND Center serves the Civil Protection and Decision Making Process for disaster management, and the stakeholders acting in Institutional Disaster Management Authorities at International level. The Center in its activity has been validated, and is performing in compliance to European Copernicus and ESA standards (set by the SAFER project - see description below) in the provision of disaster management services. The Center's activity focuses on [Emergency Response](#) (during crisis) and [Emergency Support](#) (preparedness and recovery) (according to the [Copernicus EMS standards](#)), the protection of Sea and Atmospheric environment, as well as advanced topics relating to Agriculture and Food Security, improved Access to Renewable Energy Resources, and Climate Resilience and Adaptation to Climate Change. Many Institutional Authorities and International Organisations have profited from the services offered by the BEYOND Center such as [The European Forest Fires Information System/EFFIS](#), the [The Global Fire Monitoring Center-GFMC](#), the [European program for disasters Copernicus EMS](#), a large number of Civil Protection Authorities in countries over EU, Africa, Latin America, and Asia, as well as a number of Fire Brigade authorities, Forestry Departments, Directorates for the Protection of Forests and Natural Ecosystems, Environmental Agencies and Ministerial Bodies, Rehabilitation Services, etc. Indicatively and only in the period of 2016-2018, the BEYOND Center has been activated more than 20 times by the Copernicus EMS for the purposes of civil protection authorities worldwide, in order to address multi-hazard management

needs, in cases of devastating earthquakes, volcanic eruptions, landslides, soil and coastal erosion, wildfires, floods, toxic gas emissions, duststorms, industrial accidents.

The activity of the Center is supported by a multidisciplinary team of experts comprising of more than 35 scientists (17 at M.Sc and 7 Ph.D. level).

The BEYOND Center has been funded from competitive programs (EU, ESA, National Programs), as well as from International Funding Organisations amounting 1.2-1.5 million Euros per year. At the same time, it supports with its infrastructure and research, the activity of other researchers in the country, providing an additional equal inflow of research funds at IAASARS/NOA.

The operation of the BEYOND Center contributes to the production of innovative research. It has supported the production of scientific publications in peer reviewed journals and articles in international conferences with several citation references. More specifically, this activity has already produced a number of 48 scientific publications in journals and international conference proceedings.

The 1st prize as the Best Challenge Service among over 70 competitive proposals, brought international recognition (Copernicus Masters 2014 - [Best Service Challenge Award](#)), for the [FireHub](#) services. Dr Haris Kontoes is the owner of the patent no. 20150100061 issued by the Industrial Property Organization to protect the copyright of the [FireHub](#) service and Mr. Themistocles Herekakis, the co-developer of the [FireHub](#) information system, is the co-owner.

The BEYOND Center's research projects and disaster management services have been recognized by the United Nations Organization, assigning to the Center the role of the UN-SPIDER Regional Support Office, in the area of the Southeast Europe, Middle East, and the Balkans. The aim is to assist the transfer of know-how, capacity building and training of the competent authorities, as well as the provision of natural disaster management services.

The BEYOND Center has installed and operates large scale infrastructures for the systematic reception, management and redistribution of real-time Earth Observation data acquired by satellites and in-situ monitoring networks. The coverage and usage of the monitoring infrastructure is international. It covers observational needs of a wide research community and decision makers across the Southeast Europe, North Africa, Middle East and the Balkans. It includes:

1. **The Hellenic Mirror Site** (<https://sentinels.space.noa.gr/>) providing near real-time satellite data to the international research community and the private sector, from the Sentinels (S-1, S-2, S-3, S-5P) (Copernicus missions). The infrastructure is empowered by GRNET SA, the Greek partner of the GEANT network.
2. **The IntHub, DIASHub, and CollHub (International, DIAS, and Collaborative Data Hubs) Hubs, operated by the BEYOND Center for the purposes of ESA.** They manage real-time distribution to more than 15Tbytes of Sentinels data a day to the Worldwide Space Agencies (NASA, NOAA, USGS, GA), DIAS platforms, and National Collaborative Data Hubs (Mirror Sites). The infrastructure is empowered by GRNET SA, the Greek partner of the GEANT network.

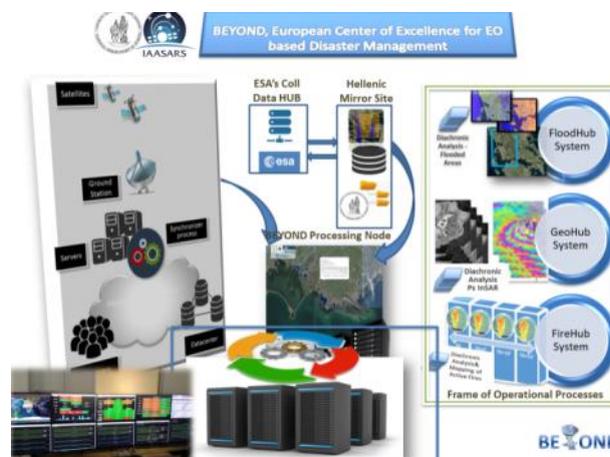
3. **Satellite acquisition antenna (DVB-2) and archiving facility** for the real time reception of data from EUMETSAT missions (MSG1, MSG2, MSG3).



4. **An X-/L-band acquisition antenna for real-time satellite data reception from missions EOS (AQUA, TERRA)/NASA, SUOMI-NPP/NASA, NOAA/AVHRR, METOP, FY, and corresponding archiving facility.** The range of reception is the whole of **Southeast Europe, North Africa, Middle East and the Balkans.**



5. Advanced **PollyXT atmospheric lidar ground system**, and a mobile unit **lidar system EMORAL**.
6. A High Performing Processing Unit consisting of **severs with high computing power**, and a **300TBytes archive**. The unit is devoted for satellite data processing, and services provision by operating the processing chains namely **FireHub, FloodHub, GeoHub of the BEYOND Center**



7. **Unmanned aerial platforms (UAVs, Drones)**, long-distance fixed-wing SendeFly e-Bee and ATLAS eight copter for lifting multiple load carriers (~5kgr).



ECOSYSTEM OF BEYOND SERVICES (see also Annex)

1. **Monitoring of wildfires** in real time – The [FireHub](#) System
2. **Monitoring of flood events** – The **FloodHub** System
3. Monitoring and assessment of **geo-hazards** – The [GeoHub](#) System
4. Response to **Copernicus EMS Activations**: Assessment studies and mapping of **hazards, exposure, vulnerability, risk, and damages**, as well as **integrated evacuation and mitigation plans**
5. Integration of **Crowd services** in disaster management - [DisasterHub](#)
6. **UAV/Drone based Damage mapping** after a catastrophic event
7. **Atmospheric disturbances and air pollution** events
8. **Monitoring of Agricultural Practices and Food Security** at various partial scales and resolutions
9. **Nowcasting and forecasting of Solar Energy**– The [SENSE](#) System
10. Assessment and projection of **Essential Climate Variables** – The [DEAR-Clima](#) System
11. Monitoring of [Dust Episodes](#) and [Dust Storm](#) forecasting

INDICATIVE EXAMPLES OF BEYOND ACTIVATIONS IN THE FRAMEWORK OF THE COPERNICUS EMERGENCY MANAGEMENT SERVICE

The BEYOND Center has been activated in the following worldwide disaster risk and recovery cases (<http://beyond-eocenter.eu/index.php/ems>):

Activation code and web link	Activation scope	Country / Territory
EMSN018	Multiple natural hazard risk assessment - Planning and Recovery	Azores islands, Portugal
EMSN020	Multiple natural hazard risk assessment - Planning and Recovery	Madeira and Porto Santo islands, Portugal
EMSN021	Earthquake risk assessment - Planning and Recovery	Austria
EMSN022	Post-disaster analysis, damage assessment, recovery and rehabilitation planning and monitoring, flood risk assessment, disaster preparedness and response mechanisms	Bulgaria
EMSN025	Forest fire damage assessment - Planning and Recovery	Greece
EMSN026	Post-disaster assessment of toxic cloud dispersion after an industrial accident	Catalonia, Spain
EMSN030	Ground deformation mapping and monitoring by satellite	Ukraine

	based multi-temporal DInSAR technique	
EMSN031	Forest fire damage assessment and landslide risk	Madeira island, Portugal
EMSN037	Multiple natural hazards risk assessment for UNESCO	Arica-Chile, Tacna-Peru, Maputo-Mozambique
EMSN041	Forest fire risks assessment	Croatia
EMSN046	Detailed flood delineation	Hildesheim, Germany
EMSN047	Volcanic risk	Democratic Republic of the Congo
EMSN048	Flood assessment risk	Sardinia, Italy

Furthermore, the BEYOND Center has been activated after the fatal flood in western Attica, Greece, on 15 November 2017, following a heavy rainfall, mainly affecting the areas of Mandra and Nea Peramos (24 casualties, and a lot of infrastructure and assets destroyed completely or partially). It produced flood delineation and proposed mitigation measures (<http://beyond-eocenter.eu/index.php/floods/mandra2017>). For more information about BEYOND project, see ANNEX II.



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 H2020-SC5-2015, GA : No 690133
 2016-2019
 2.910.800 EUR
<http://geocradle.eu/en/>

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
 <input checked="" type="checkbox"/>	 DISASTERS  ENERGY  FOOD SECURITY  PUBLIC HEALTH  WATER MANAGEMENT	 ATMOSPHERE  MARINE  LAND  CLIMATE  EMERGENCY  SECURITY	 ZERO HUNGER  AFFORDABLE ENERGY  CLIMATE CHANGE  LIFE ON LAND  SUSTAINABLE CITIES	COORDINATION ACTION <input checked="" type="checkbox"/> RESEARCH & INNOVATION <input type="checkbox"/> INNOVATION ACTION <input type="checkbox"/>

GEO-CADLE is a Coordination and Support Action established for providing support to the Intergovernmental Organization [GEO \(Group on Earth Observations\)](#) and the Program for Global Monitoring for the Environment and Security [Copernicus](#). GEO-CRADLE is also a synergetic action that establishes a network of stakeholders across the entire value added chain in Earth Observation (research, service providers, data providers, decision makers) and builds on platforms for the integration and dissemination of EO data and know-how across the regions of **North Africa, Middle East, and the Balkans (NAMEBA - also called as RoI - Region of Interest)**. For the time being GEO-CRADLE coordinates Earth Observation activities in 21 countries over NAMEBA. It supports practices of research organizations, public authorities, and private sector entities for accessing to and exploiting the satellite data of Copernicus and Copernicus contributing missions, as well as accessing to open and high quality in-situ platforms, data portals and arithmetic modelling capacities linking with the more advanced European research and industry facilities. The program establishes links with International Organizations and International Funding Mechanisms and creates roadmaps for actions towards using the Earth Observation technology and data in support to the four thematic priority areas of the project that are Adaptation to Climate Change, Improved Food Security and Water Extreme Management, Exploitation of Renewable Energy Resources, and Access to Raw Material in the regions of RoI. GEO-CRADLE as such has been upgraded first as GEO Community Activity and then as [GEO Initiative](#), and so far, its outcomes have been used as fundamental components in the definition and development of following European Union flagship initiatives and big projects in the domain such as [EuroGEOSS](#) and [NextGEOSS](#).

In the course of its lifetime the project has succeeded to:

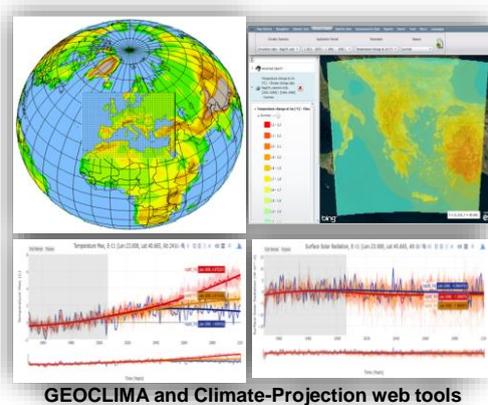
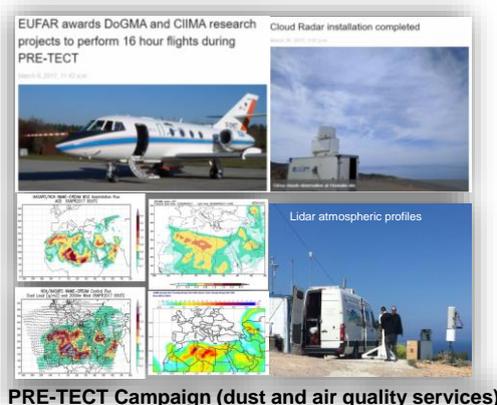
- **Promote the uptake of EO services and data in response to regional needs.**
- **Support the effective integration of existing Earth Observation Capacities in the RoI.**
- **Facilitate the networking and engagement of the EO stakeholders in the RoI.**
- **Build trust and capacity among the actors, and enhance their participation in and contribution to the implementation of GEOSS and Copernicus in the RoI.**
- **Propose a roadmap (<http://geocradle.eu/en/regional-capacities/roadmap/>) for the implementation of GEO, GEOSS and Copernicus in the RoI.**

The results of the project so far can be summarized as follows:

- 1. Extensive mapping and assessment for the first time over the entire ROI of the EO capacities and state-of-the-art.** Documentation of the identified capacities in a well-structured and easily searchable data base (<http://geocradle.eu/en/tools/networking-platform/>). Specific focus has been placed on capturing the current state-of-play with regards to monitoring infrastructure (84 usable in-situ networks and 25 space data acquisition facilities), skills, national policies, involvement in international projects, etc. This has allowed to construct an up-to-date picture of the current capacities and identify potential gaps against user needs.
- 2. A detailed collection of needs from more than 80 end users** over the NAMEBA has been completed with the aim to steer the integration of existing EO capacities towards addressing those needs. This was done systematically through dedicated interviews and exchanges in numerous outreach activities and organization of tens of regional meetings and workshops. As outcome of this process a **regional action plan was produced** in which about 40 priority proposals were initially included, and from **which after consolidation a number of 8 common regional actions in relation to service delivery and capacity building challenges were promoted.**
- 3. Engagement and creation for the first time in the ROI a network of EO stakeholders** (scientists, service/data providers, end-users, governmental organizations, and decision makers), which facilitates the exchange of know-how and partnering between the regional actors and the EU EO interlocutors. The project operates a networking platform (<http://geocradle.eu/en/tools/networking-platform/>), **in which 262 profiles of EO actors active in the ROI are included, allowing for interested parties to seek potential partners for cooperation on EO activities. GEO has expressed strong interest in using the networking platform for publishing profiles of stakeholders engaged in the AfriGEOSS initiative as well.**
- 4. Design and launch of the Regional Data Hub (RDH)** (<http://datahub.geocradle.eu/>), a prototype and innovative infrastructure which exploits the advanced IT tools of GCI DAB APIs and DKAN, allowing the ease and effective access to the GCI platform and any other regional portal and dataset. It fosters the open and free data exchange and expands the visibility of the GCI and other existing portals in the ROI among the EOI actors. According to GEO, the RDH represents an example of a data hub which needs to be replicated from functional and technological point of view in other relevant EU GEO related projects. **Today RDH facilitates free access to millions of geospatial data sets over the three regions.**
- 5. Conduct dedicated liaison activities** for establishing relationships with high-level stakeholders including inter alia GEO (Secretariat, GEO-GLAM, GMES and Africa, AfriAlliance, ConnectinGEO, AfriGEOSS, etc.), Copernicus (DG GROW), DG RTD and ESA. This has yielded substantial momentum for the project, exemplified through the invited participation of project representatives in important fora (e.g. GEO Plenary, EU EO companies' workshop, etc.). Through **targeted communication activities, and numerous events organized or attended**, the project has contributed significantly to the build-up of strong momentum around its activities, reached out a large number of actors, and has disseminated the goals of GEO and Copernicus in the ROI.
- 6. "Export" Copernicus:** Through a series of activities GEO-CRADLE has raised awareness on Copernicus in the ROI, and among EU service providers. In addition, the Copernicus Core products are integrated in the pilot activities described hereinafter. Awareness-raising activities have been undertaken with the dissemination of EC Copernicus materials.
- 7. Launch 4 activities** after followed a rigorous gap analysis and **identification of regional priorities as described previously.** Thus, the selected activities will pave the way for the development of sustainable EO services in the region in the 4 thematic priorities of the projects, making use of infrastructure integration and collaboration between partners.

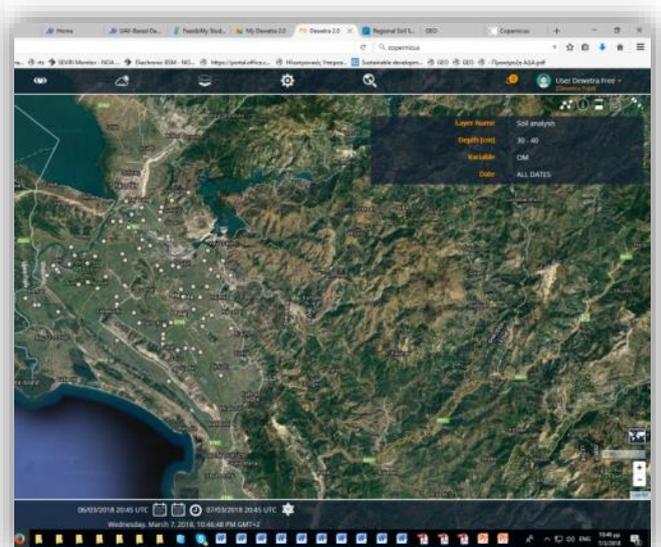
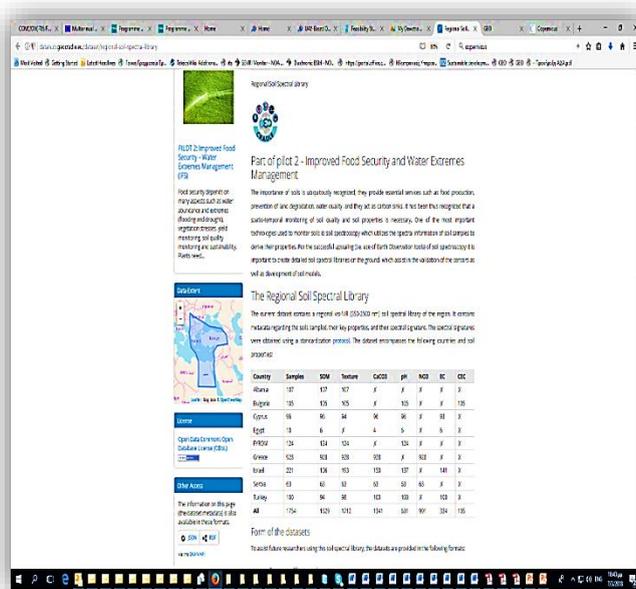


8. **Scientific footprint of the project:** The pilot studies have resulted in various innovative research and innovation results and tools **as well as a number of 7 scientific publications** have been already created and published in 5 journals and relevant scientific conferences.
9. The pilot-feasibility studies of the project have returned **significant socio-economic benefits** to the involved countries and societies over the RoI as:
 - a. **Adaptation to Climate Change (ACC) pilot:** The identification of user needs in the RoI is specifically addressed for 4 sub-regions: 1. FYROM and Albania, 2. Serbia, Romania, Bulgaria, 3. Greece, Cyprus and Turkey and 4. Morocco, Tunisia, Egypt, Israel. Climate change related needs were identified for these regions. These needs have been further classified into the following thematic areas: air quality, meteorology and natural risks, namely: 1. desert dust services, 2. regional climate change services, 3. air quality services, all aiming to pave the ground for the holistic monitoring and forecasting of region-specific atmospheric components, ECVs and hazards, in line with the standards and vision of GEOSS and Copernicus. Specific cases of End Users currently showing strong interest on the promoted services have been aviation authorities, and environmental and civil protection institutions and agencies in the RoI. The services are provided for free to any user through dedicated web services of GEI-CRADLE portal: <http://datahub.geocradle.eu/dataset/dear-clima>, <http://datahub.geocradle.eu/dataset/acc-dust>.

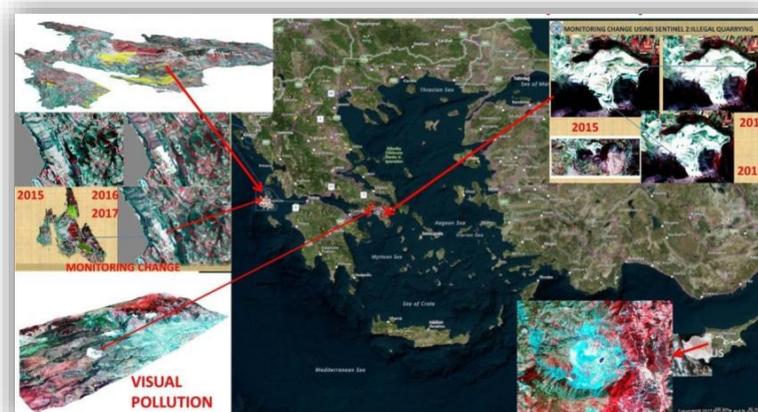


ACC dust and air quality activities in PRE-TECT campaign (left) and ACC Climate Projection portal (right).

- b. **Improved Food Security – Water Extremes Management (IFS-WEM) pilot:** 1) Transfer of know-how between the involved partners (from EO advanced to less advanced countries) on the application of soil spectroscopy in the RoI. Collection of soil samples and building a standardized Soil Spectral Library (SSL) in the RoI to be served as input to machine learning algorithms which create models correlating the spectra with the soil properties to be applied to Sentinel-2 satellite data to create soil thematic maps. SSL has been completed in Greece, Cyprus and Israel, it is ongoing in Turkey and Serbia, and currently pending in Albania and Bulgaria. 2) Development of an adapted and enhanced version of the WebGIS platform myDEWETRA to assist in improving the accessibility and comparability of flood and drought risk information and data at regional and national level in the RoI, taking as input data of the RoI as well as the soil maps derived from state-of-the-art techniques using Sentinel-2 satellite data in conjunction with the soil spectral data. The services developed are freely available through web service facility: <http://geocradle.eu/en/regional-capacities/feasibility-studies/> (GEO-CRADLE portal).

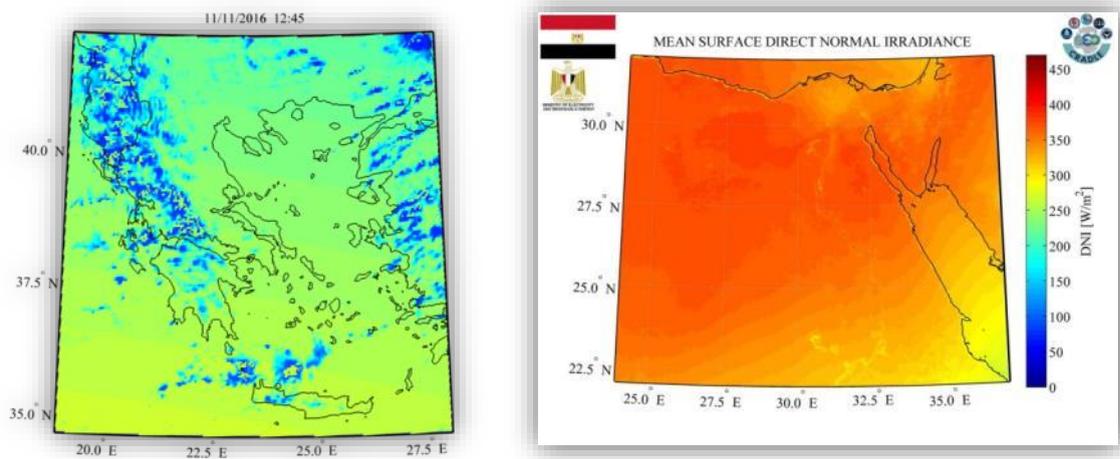


- c. **Access to Raw Materials (ARM):** Launch of two types of pilot projects: monitoring of illegal quarrying and improved monitoring in abandoned mines. Elaboration of EO methodologies relying on the use of Sentinel (Copernicus) satellite data, for better management of the mining and post-mining areas and the reduction of their impact on the surrounding areas, with a universal character, applicable for other RoI as well. Intense effort to find a third pilot project, preferably in North Africa or Middle East. The services are freely delivered through a web service application available in the GEO-CRADLE portal: <http://geocradle.eu/en/regional-capacities/feasibility-studies/>.



Change monitoring in mining areas/Monitoring of illegal quarrying activities in Greece using EO data.

- d. **Renewable Energy Resources (SENSE):** The SENSE pilot builds upon the regional energy needs, and takes advantage of the current satellite data availability, efficient envision of new but crucial model inputs and state-of-the-art real time solar energy calculating system capabilities for generating reliable, high resolution solar Atlases and broader climatology studies for the Region of Interest, while it engraves strategy methods of how to integrate such a solar energy nowcasting system into a wider GEOSS driven system in the international scale with multifarious collaborations and carefully selected end-users. SENSE succeeded in stimulating the interest of relevant energy stakeholders and decision makers like Ministries of Electricity and Renewable Energies (Egypt), Electric Power Transmission Operators (Greece) and Solar Energy investors from the private sector (Attica Group). The services are freely delivered through web service applications available in the GEO-CRADLE portal and Regional Data Hub (<http://datahub.geocradle.eu/dataset/solar-atlas>).



Nowcasting product of Global Horizontal Irradiance for Greece (left) and June average solar map of direct Normal irradiance for Egypt (right)



**FRAMEWORK SERVICE CONTRACT FOR COPERNICUS EMERGENCY
MANAGEMENT SERVICE RISK AND RECOVERY MAPPING-**
Program Call for tender JRC/IPR/2014/G.2/0012/OC
2015-2018
1.000.000 EUR
<http://emergency.copernicus.eu/>

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
<input checked="" type="checkbox"/>	DISASTERS <input checked="" type="checkbox"/> ENERGY FOOD SECURITY PUBLIC HEALTH WATER MANAGEMENT	ATMOSPHERE MARINE LAND CLIMATE EMERGENCY <input checked="" type="checkbox"/> SECURITY <input checked="" type="checkbox"/>	ZERO HUNGER AFFORDABLE ENERGY CLIMATE CHANGE LIFE ON LAND <input checked="" type="checkbox"/> SUSTAINABLE CITIES <input checked="" type="checkbox"/>	COORDINATION ACTION <input type="checkbox"/> RESEARCH & INNOVATION <input type="checkbox"/> INNOVATION ACTION <input checked="" type="checkbox"/>

Work that uses the infrastructure and the BEYOND Center of Excellence

Copernicus EMS - Mapping provides all actors involved in the management of natural disasters, man-made emergency situations and humanitarian crises, with timely and accurate geospatial information derived from satellite remote sensing and completed by available in situ or open data sources. The information generated by the service can be used as supplied (e.g. as digital or printed map outputs). It may be further combined with other data sources (e.g. as digital feature sets in a geographic information system). In both cases it may support geospatial analysis and decision makers’ processes of emergency managers. Copernicus EMS - Mapping is provided during all phases of the emergency management cycle, in two temporal modes, and free of charge for the users. It can be activated only by authorized users.

The infrastructure and excellence developed in the BEYOND Center of Excellence are actively involved in the provision of Risk & Recovery Mapping which consists of the on-demand provision of geospatial information in support of Emergency Management activities related to Emergency Support. This applies in particular to activities dealing with **prevention, preparedness, disaster risk reduction and recovery phases**. There are three broad [product categories](#): Reference Maps, Pre-disaster Situation Maps and Post-disaster Situation Maps. The research developed in BEYOND, **exploits satellite data and ingests fusions of geo-partial information and data in rush mode**, when, where needed, **for enhanced risk modelling and improved assessment** of the expected disaster impacts.

The list of methodologies developed, adapted, validated, and used in BEYOND to address risk and recovery needs of the civil protection authorities worldwide are listed below (in more details in ANNEX III):

- Seismic Methodologies: Seismic Hazard, Seismic Vulnerability, Seismic Vulnerability of Pipelines, Seismic Risk.
- Lava Flow Methodologies: Lava Flow Hazard, Lava Flow Vulnerability, Lava Flow Risk.
- Forest Fires Methodologies: Fire Damage Delineation & Burn Severity Grading, Damage/Biomass Loss Statistics, Forest Fire Hazard, Population & Assets Vulnerability to Forest Fires, Forest Fire Risk – Population, Assets and Transportation Network at risk.
- Industrial Accidents Methodologies: Industrial Accidents Hazard, Industrial Accidents Exposure, Industrial Accidents Risk.

- Tsunami Methodologies: Tsunami Hazard Assessment, Assets Vulnerability to Tsunami, Storm Surge Hazard Risk.
- Soil Erosion Methodology: Soil Erosion Hazard.
- Coastal Erosion Methodology: Coastal Erosion Vulnerability.
- Ground Deformation Methodology: Ground Deformation Dynamics.
- Landslides Methodology: Landslide Hazard, Landslide Vulnerability, Landslide Risk.
- Subsidence and Landslide Methodology: Subsidence and Landslide Risk.
- Floods Methodology: Flood Delineation at peak conditions, Flood Depth at peak conditions, Flood Damage Assessment, Flood Hazard, Flood Vulnerability, Flood Risk, Flash Flood Hazard triggered by earthquakes, Flash Flood Risk triggered by earthquakes.
- Disruption of Transportation Networks Methodology: Vulnerability of Disruption of Transportation Networks.

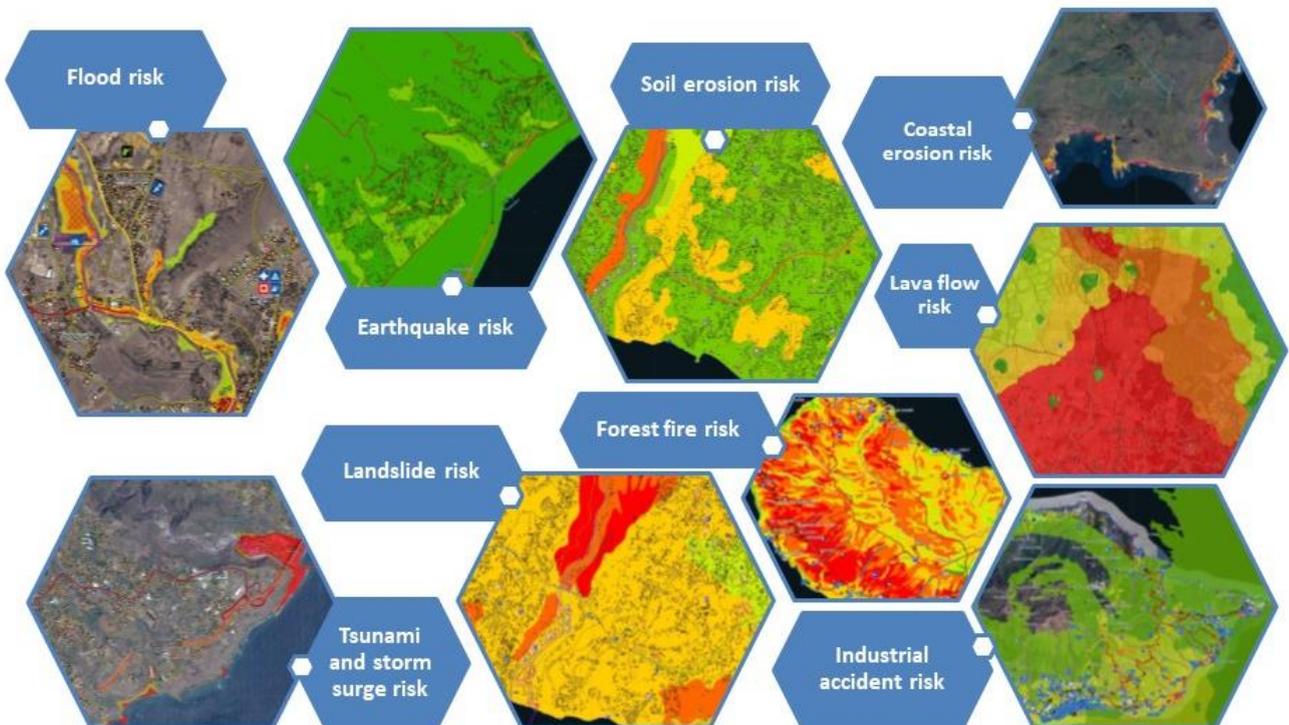
Up to now the BEYOND Center has been activated in the framework of the **COPERNICUS EMERGENCY MANAGEMENT SERVICE** in the following worldwide disaster risk and recovery cases (<http://beyond-eocenter.eu/index.php/ems>):

Activation code and web link	Activation scope	Country / Territory
EMSN018	Multiple natural hazard risk assessment - Planning and Recovery	Azores islands, Portugal
EMSN020	Multiple natural hazard risk assessment - Planning and Recovery	Madeira and Porto Santo islands, Portugal
EMSN021	Earthquake risk assessment - Planning and Recovery	Austria
EMSN022	Post-disaster analysis, damage assessment, recovery and rehabilitation planning and monitoring, flood risk assessment, disaster preparedness and response mechanisms	Bulgaria
EMSN025	Forest fire damage assessment - Planning and Recovery	Greece
EMSN026	Post-disaster assessment of toxic cloud dispersion after an industrial accident	Catalonia, Spain
EMSN030	Ground deformation mapping and monitoring by satellite based multi-temporal DInSAR technique	Ukraine
EMSN031	Forest fire damage assessment and landslide risk	Madeira island, Portugal
EMSN037	Multiple natural hazards risk assessment for UNESCO	Arica-Chile, Tacna-Peru, Maputo-Mozambique
EMSN041	Forest fire risks assessment	Croatia
EMSN046	Detailed flood delineation	Hildesheim, Germany
EMSN047	Volcanic risk	Democratic Republic of the Congo
EMSN048	Flood assessment risk	Sardinia, Italy

COPERNICUS EMERGENCY MANAGEMENT SERVICE

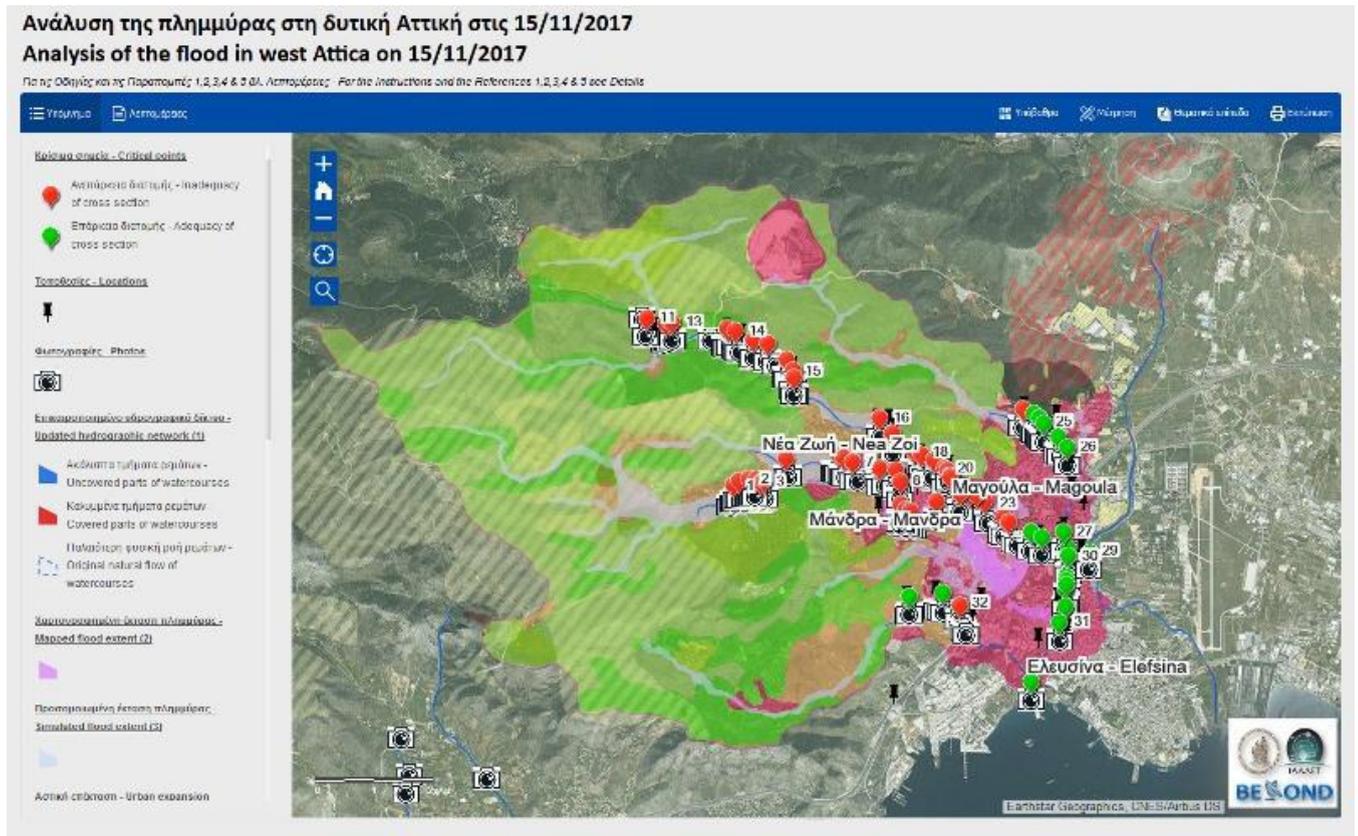


COPERNICUS EMERGENCY MANAGEMENT SERVICE



Furthermore, the BEYOND Center has been activated after the fatal flood in western Attica, Greece, on 15

November 2017, following a heavy rainfall, mainly affecting the areas of Mandra and Nea Peramos (24 casualties, and a lot of infrastructure and assets destroyed completely or partially). It produced flood delineation and proposed mitigation measures (<http://beyond-eocenter.eu/index.php/floods/mandra2017>).





FRAMEWORK SERVICE CONTRACT FOR COPERNICUS EMERGENCY MANAGEMENT SERVICE RISK AND RECOVERY MAPPING- The European Forest Fire Information System (EFFIS) Program Call for tender JRC/IPR/2014/G.2/0012/OC 2018-2021, GA : No 259811 696.000 EUR <http://emergency.copernicus.eu/>

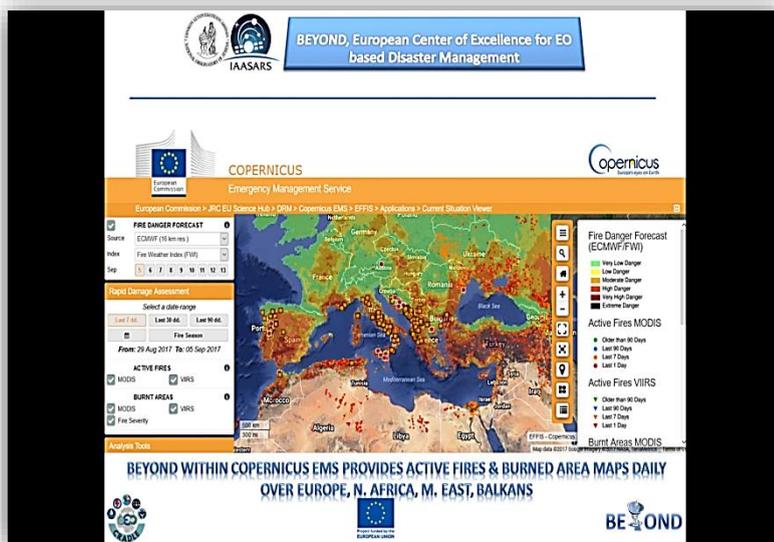
IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
<input checked="" type="checkbox"/>	DISASTERS ✓ ENERGY FOOD SECURITY PUBLIC HEALTH ✓ WATER MANAGEMENT	ATMOSPHERE MARINE LAND CLIMATE EMERGENCY ✓ SECURITY ✓	ZERO HUNGER AFFORDABLE ENERGY CLIMATE CHANGE LIFE ON LAND ✓ SUSTAINABLE CITIES ✓	COORDINATION ACTION <input type="checkbox"/> RESEARCH & INNOVATION <input type="checkbox"/> INNOVATION ACTION <input checked="" type="checkbox"/>

A project that exploits the infrastructure and research of the BEYOND Center of Excellence.

The European Forest Fire Information System (EFFIS) supports the services in charge of the protection of forests against fires in the EU countries and provides the European Commission services and the European Parliament with updated and reliable information on wild land fires in Europe. A number of specific applications are available through EFFIS. EFFIS is one of the components of the [Emergency Management Services](#) in the EU Copernicus program. EFFIS also supports the global level into a [Global Wildfire Information System \(GWIS\)](#). The project engages BEYOND Center of Excellence in this context, for **providing the EFFIS system with timely, reliable and accurate satellite based fire data over Europe, Middle East and North Africa** concerning: **Active Fires** (hot spots) and **Burned areas** (fire perimeter) in real time as soon as a satellite image from the multitude of sensors accessed by the BEYOND Center acquisition antennas and data hubs

becomes available (e.g. EOS Aqua/Terra, NPP, FY, Sentinel-2, Sentinel-3). Advanced research has been conducted in BEYOND for adaptation and validation of the FIREHUB/BEYOND system to meet the operational characteristics and accuracy standards of the required service.

The algorithm used for automated Burnt Scar extraction, applicable for both middle (e.g. VIIRS, MODIS, FengYun-3, Sentinel-3) and high resolution satellite systems (e.g. Sentinel-2) is based on an implementation of the Liu et al, 2014 publication "Study of Burn



Scar Extraction Automatically Based on Level Set Method using Remote Sensing Data". Further modifications and optimizations were applied in order to produce more accurate results and minimize omission and commission error rates, as well as to adapt the proposed algorithm to the heterogeneous satellite systems

and their specific data analysis requirements.

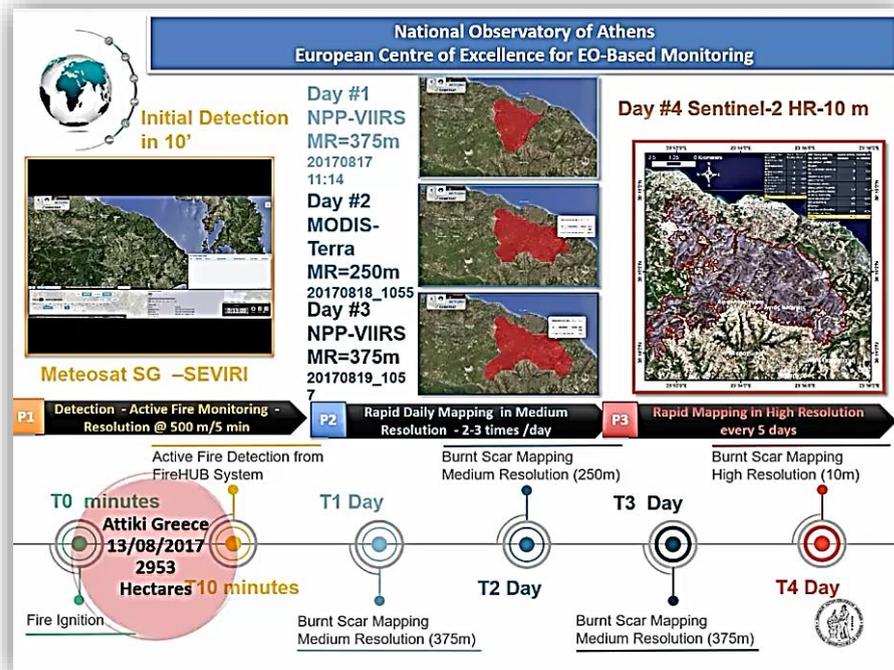
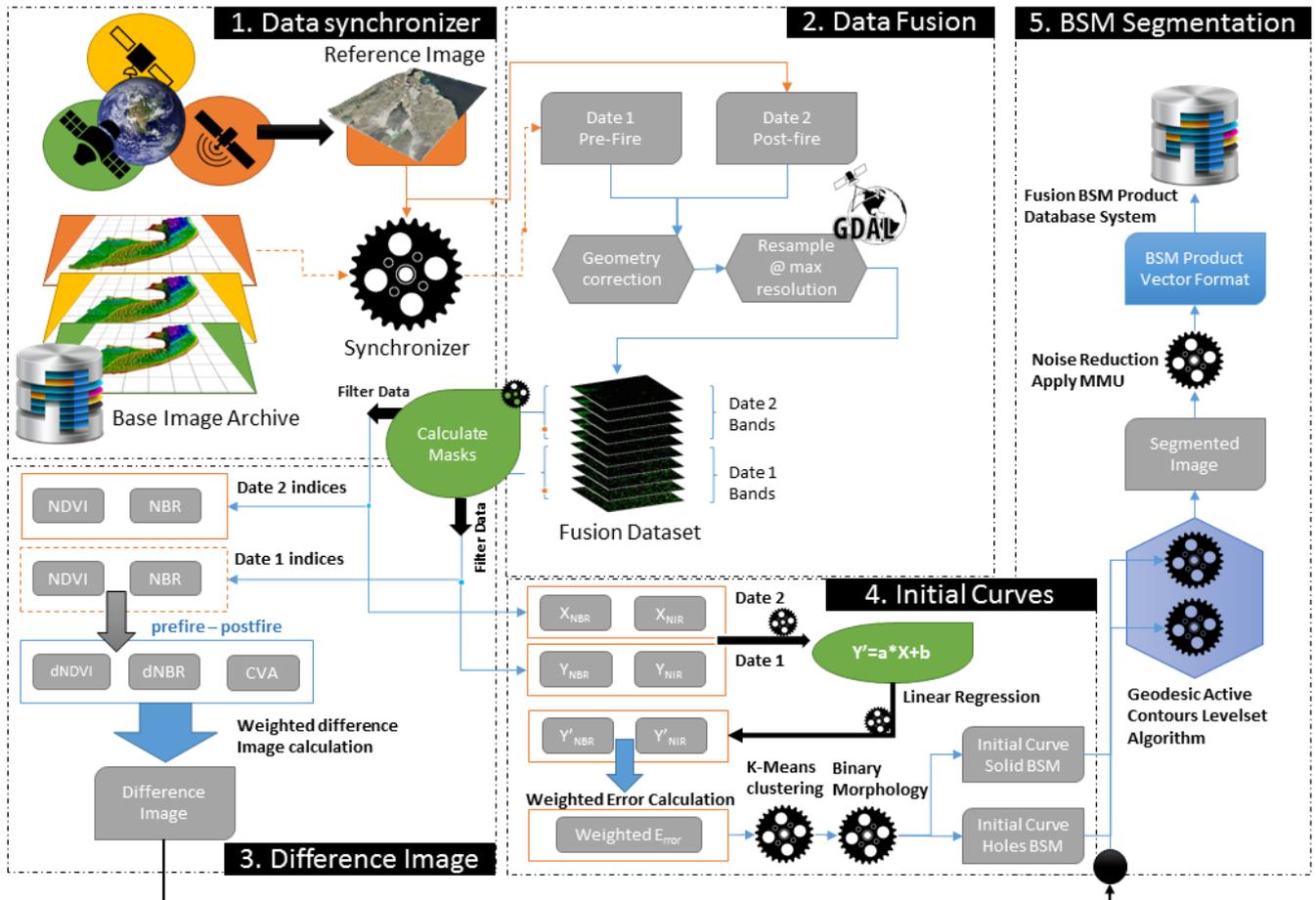
The main advantages of the algorithm are the following:

- Enhanced histogram matching between master and reference spectral bands by applying cascaded local standardization techniques which furthermore amplify local minima/maxima that in turn distinguish burnt scar areas thus resulting to significantly improved classification of burned/non burned areas.
- Integration of diverse index capacities to better characterize the different levels of burn severity and to further extract the burnt scar product.
- Utilization of Level Set Methods (LSM) for the classification of burnt and non-burnt areas, as one of the most state-of-the-art segmentation approaches. Level set methods are implicit, parameter free, provide a direct way to estimate the geometric properties of the evolving structure, can change the topology and are intrinsic. These methods are ideal for Burnt Scar Mapping (BSM) extraction as they are spatially-aware and converge automatically, they are designed for problems which have topological changes, curvature dependence, singularities formation and issues which appear in interface propagation techniques (*Bhaidasna and Mehta, 2013*). Among many techniques developed to derive burnscar information from remote sensing data, such as fixed thresholding or post-classification techniques using the OSTU algorithm, Fuzzy C-Mean (FCM) algorithm etc., the implemented approach can extract the outline curve of fire burn scar more effectively and exactly. The method has higher extraction accuracy and less algorithm complexity than that of the conventional methods. Compared to fixed threshold approaches, where the algorithm discriminates burn scar from neighbouring objects with empirically derived fixed sets of thresholds, this method clearly prevails because it “chooses” the appropriate local thresholds, as mentioned earlier. A fast and robust implementation of the Geodesic Active Contour Level set Method (*Leventon et al, 2000*) is utilized while *Liu* suggests the use of *Chan and Vese* levelset segmentation algorithm (*Chan and Vese, 2001*). The evaluation of the Geodesic Active Contour Level set Method gave better results than the proposed by *Liu* method.
- The core algorithm is highly adaptable to available optical sensors for burnt scar product extraction, provided that those sensors at least provide visible red, near-infrared and short-wave-infrared bands.

References

1. Bhaidasna Z., Mehta S. (2013) A review on level set method for image segmentation. *Int. J. Comput Appl* 63(11):20–22.
2. Chan T, Vese L (2001) Active contours without edges. *Image Processing, IEEE Transactions on* 10: 266–277.
3. Leventon, M.E., Grimson, W.E.L., and Faugeras, O. (2000) Statistical shape influence in geodesic active contours. In *Proc. Conf. Computer Vis. and Pattern Recog.*, Hilton Head Island, SC, vol. 1, pp. 316–323. June 13–15.
4. Liu Y, Dai Q, Liu J, Liu S, Yang J (2014) Study of Burn Scar Extraction Automatically Based on Level Set Method using Remote Sensing Data. *PLoS ONE* 9(2): e87480. doi:10.1371/journal.pone.0087480

Algorithmic Procedure Diagram



SENTINELS GREEK HUB

SENTINELS ROLLING ARCHIVE PRODUCTS USER ACCESS, OPERATIONS, MAINTENANCE AND EVOLUTIONS
 ESA-EOPG- CSCOP-CR- 0006
 2017-2020
 650.000 EUR
<https://inthub.copernicus.eu/>

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
 <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> DISASTERS <input checked="" type="checkbox"/> ENERGY <input checked="" type="checkbox"/> FOOD SECURITY <input checked="" type="checkbox"/> PUBLIC HEALTH <input checked="" type="checkbox"/> WATER MANAGEMENT	<input checked="" type="checkbox"/> ATMOSPHERE <input checked="" type="checkbox"/> MARINE <input checked="" type="checkbox"/> LAND <input checked="" type="checkbox"/> CLIMATE <input checked="" type="checkbox"/> EMERGENCY <input checked="" type="checkbox"/> SECURITY	<input checked="" type="checkbox"/> ZERO HUNGER <input checked="" type="checkbox"/> AFFORDABLE ENERGY <input checked="" type="checkbox"/> CLIMATE CHANGE <input checked="" type="checkbox"/> LIFE ON LAND <input checked="" type="checkbox"/> SUSTAINABLE CITIES	COORDINATION ACTION <input type="checkbox"/> RESEARCH & INNOVATION <input type="checkbox"/> INNOVATION ACTION <input checked="" type="checkbox"/>

The project relies on the infrastructure and research developed in BEYOND Center of Excellence



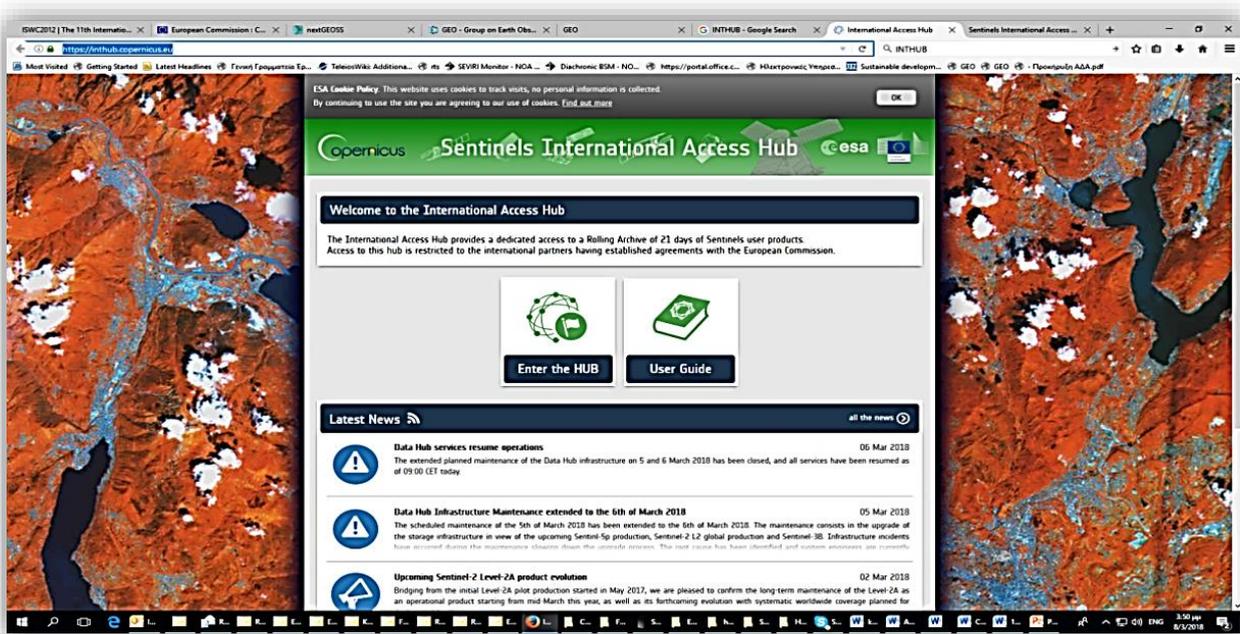
The BEYOND Center is operating for the needs of the European Space Agency (ESA), in collaboration with the Greek Research & Technology Network (GRNET) (the HPC provider), the nodes **Copernicus International Data Hub**, **Collaborative Data Hub**, and **DIAS Data Hub**. The **International Access Hub** provides a dedicated access to a Rolling Archive of Sentinels satellite products. Access to



this hub is provided through <https://inthub2.copernicus.eu> and it is restricted to the international partners as **NASA**, **USGS**, **GA**, **NOA** having established agreements with the European Commission. On the other hand the **Collaborative Data Hub**, and the **DIAS Data Hub** are dedicated to deliver data in near real time to the European citizens, national

initiatives and projects, and the DIAS platforms, the latter established to support the research and the uptake the EO market and services in Europe and worldwide. Since the start of the Data Hub operations, that is

October 2017, more than 1 PByte of Sentinel data and 1.000.000 of products have been downloaded by the users over the world using the **Greek International Hub Node**.





2.2 EUROPE'S STRATEGIC PRIORITY PROJECTS IN THE EARTH OBSERVATION SECTOR



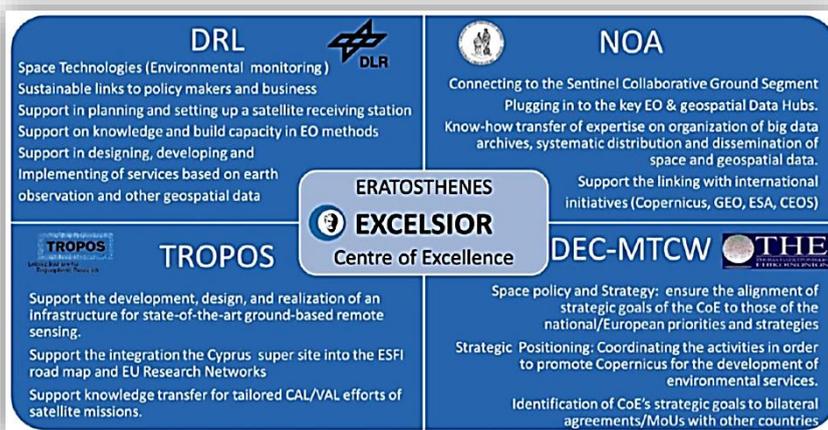
EXCELSIOR
H2020-WIDESPREAD-04-2017-TeamingPhase1
2017-2018, GA : No 763643
Stage 1:80.000 EUR (NOA's 1st year funding)/(400.000 Euros overall funding)
Stage2: 30.000.000 EUR (total after acceptance of stage 1)
<http://www.excelnior2020.eu/>

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
<input checked="" type="checkbox"/>	DISASTERS <input checked="" type="checkbox"/> ENERGY <input checked="" type="checkbox"/> FOOD SECURITY <input checked="" type="checkbox"/> PUBLIC HEALTH <input checked="" type="checkbox"/> WATER MANAGEMENT <input checked="" type="checkbox"/>	ATMOSPHERE <input checked="" type="checkbox"/> MARINE <input checked="" type="checkbox"/> LAND <input checked="" type="checkbox"/> CLIMATE <input checked="" type="checkbox"/> EMERGENCY <input checked="" type="checkbox"/> SECURITY <input checked="" type="checkbox"/>	ZERO HUNGER <input checked="" type="checkbox"/> AFFORDABLE ENERGY <input checked="" type="checkbox"/> CLIMATE CHANGE <input checked="" type="checkbox"/> LIFE ON LAND <input checked="" type="checkbox"/> SUSTAINABLE CITIES <input checked="" type="checkbox"/>	COORDINATION ACTION <input checked="" type="checkbox"/> RESEARCH & INNOVATION <input type="checkbox"/> INNOVATION ACTION <input type="checkbox"/>
<input checked="" type="checkbox"/>				

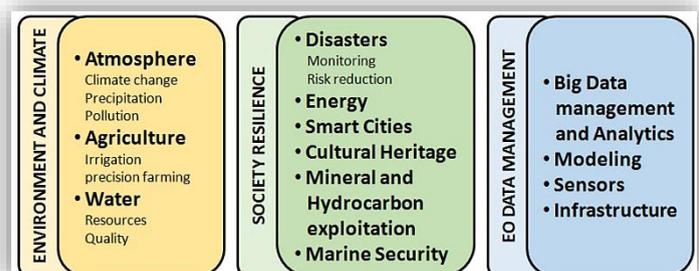
The project relies on the infrastructure and research developed in BEYOND Center of Excellence.

The EXCELSIOR Horizon 2020 Teaming project envisions the creation of an Earth Observation Centre at the Cyprus University of Technology (CUT), an inspiring environment for conducting basic and applied research and innovation through the integrated use of cutting-edge remote sensing and space-based techniques for monitoring physical and built environment in the eastern Mediterranean region. Five partners have united to create the Centre of Excellence, with the common vision to become a world-class innovation, research and

education Centre, actively contributing to the European Research Area. More specifically, the EXCELSIOR project is a team effort between the CUT, the German Aerospace Centre (DLR), the BEYOND Center of the National Observatory of Athens (NOA), the German Leibniz Institute for Tropospheric Research (TROPOS) and the Cyprus Department of



Electronic Communications of the Ministry of Transports, Communications, and Works (MTCW). The Center of Excellence will benefit through the knowledge transfer from the DLR, NOA and TROPOS, in Earth observation science and technology for the monitoring the physical and built environment. The project will engineer the design of the Center of



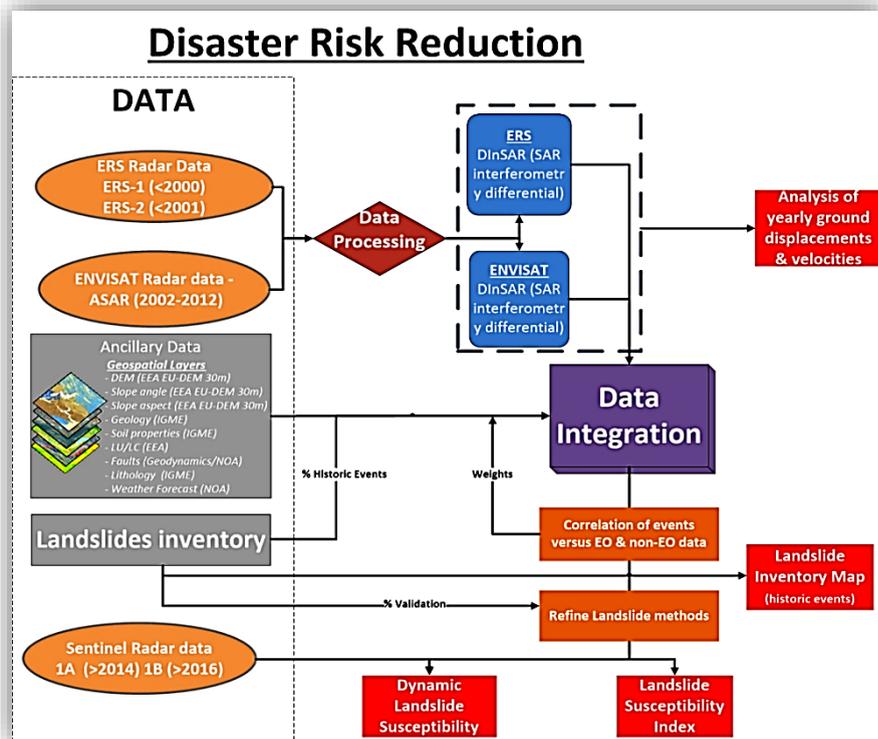
Excellence and provide the roadmap and also the business plan for the development of the relevant research and the implementation of innovative services addressing the priorities of Cyprus and also the neighboring regions in sectors as **Agriculture& Food Security, Disasters Resilience, Adaptation to Climate Change, Minerals & Hydrocarbon Exploitation, Energy & Renewable Resources, Marine Security, ICT (Big Data Analytics)**. The development of large EO infrastructure is also foreseen encompassing satellite acquisition stations, sensor technology, in-situ monitoring networks. By the end of stage 1 (September 2018), the consortium will submit the business plan for the following ten years of Center's lifetime. If stage 2 is accepted, the beneficiaries will be funded 50% by the H2020 project, and 50% by the state of Cyprus and up to the total amount of 30MEuros for the development and the operation of the Center of Excellence.

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
 <input type="checkbox"/>	 DISASTERS ✓  ENERGY ✓  FOOD SECURITY ✓  PUBLIC HEALTH ✓  WATER MANAGEMENT ✓	 ATMOSPHERE ✓  MARINE ✓  LAND ✓  CLIMATE ✓  EMERGENCY ✓  SECURITY ✓	 ZERO HUNGER ✓  AFFORDABLE ENERGY ✓  CLIMATE CHANGE ✓  LIFE ON LAND ✓  SUSTAINABLE CITIES ✓	COORDINATION ACTION <input type="checkbox"/> RESEARCH & INNOVATION <input checked="" type="checkbox"/> INNOVATION ACTION <input type="checkbox"/>
 <input checked="" type="checkbox"/>				

Project relying on the infrastructure and research developed in the BEYOND Center of Excellence and the GEO-CRADLE Coordination and Support Action.

The project **NextGEOSS** (Global Earth Observation System of Systems) develops the **next generation of the GEOSS Earth Observation (EO) initiative**, enabling **global access to EO data**, prototype and higher TRL innovative services using a single platform. The project extends the EU heritage in **research and commercial use of earth observation (EO) data**, encourages and stimulates the **data exploitation by businesses**, engages stakeholders and end-users (through the [GEO-CRADLE Portal](#)), delivers **technological developments** and promotes **the use of GEOSS** to support the creation and use of EO activities in research and commercial sectors.

NextGEOSS identifies training needs and encourages the wider user-engagement with EO data and its commercial potential. In the framework of NextGEOSS the role of NOA is critical. It strengthens the access to Earth Observation at regional level so that it becomes easier to harvest, consolidate and exploit those data at global level using the NOA facilities for data acquisition, and the operation of the various satellite data hubs, namely



the Hellenic Mirror Site. Supports overcoming the fragmentation of the European landscape of existing public and private Earth Observation data infrastructures and maximize their combined exploitation by building upon the concepts of the [GEO-CRADLE Regional Data Hub](#) and [GEOSS Common Infrastructure](#) (GCI) platform. The BEYOND/NOA research team is also developing a **prototype Multihazard Enhanced Risk Assessment Platform** based on the statistical analysis of long time series of data accessible through the NextGEOSS Data Hub. The emphasis is on the development of **state-of-the-art models** that meet advanced requirements of users in accessing to high accuracy data and information products to deal with **geohazards such as landslides** resulted from heavy rains, and earthquake events. The workflow is demonstrated on models developed in the context of the **Copernicus Emergency Management Service (EMS)** and the BEYOND Center of Excellence, and use as input information the ground deformation velocities derived from the interferometric processing of multi-temporal Synthetic Aperture Radar (SAR) data (ERS, ENVISAT, Sentinel-1), landslides events repositories and inventory databases provided by our partner IGME (Institute of Geology & Mineral Exploration), and other non EO data such as DEM, Slope, Aspect, Geology, Soil, Lithology, LU/LC, Faults, precipitation, Soil Moisture, Seismicity, Drainage density. The outcomes of this research study provides: **Analysis of yearly ground displacements (velocities); Landslide Susceptibility based on historical data analysis; Updated Landslide Inventory Maps** based on the systematic processing of SAR imagery (e.g. Sentinel-1, or other older and freely available HR SAR data).



DRR: Disaster Risk Reduction Using Innovative Data Exploitation Methods and Space Assets
ESA AO/1-8130/14/F/MOS, ESA EXPRESS PROCUREMENT (EXPRO+) / OPEN-COMPETITIVE
2015-2018, CCN: No 201521496
72.900 EUR (NOA Budget)/300.000 EUR (Overall Budget)

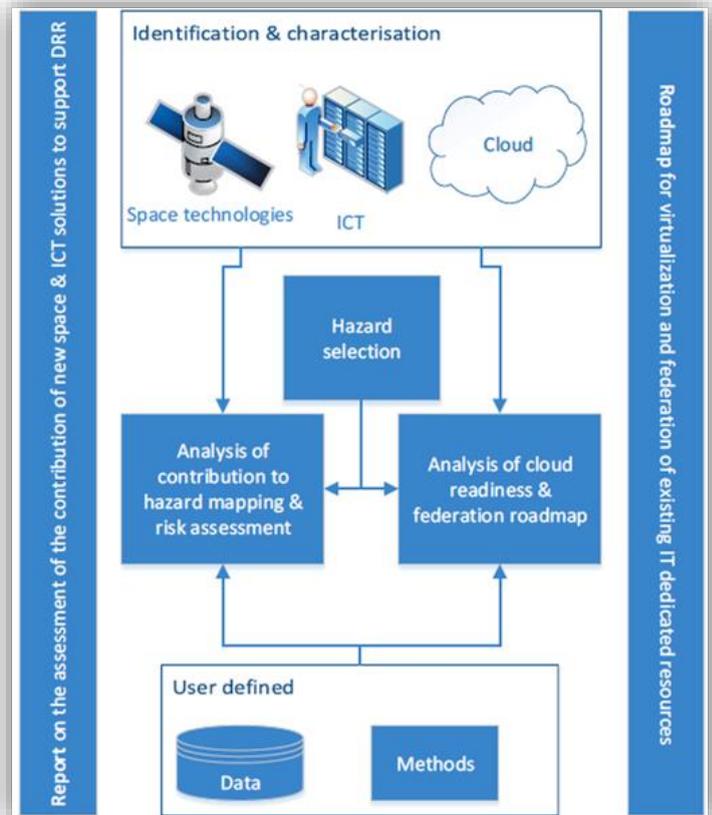
IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
<input checked="" type="checkbox"/>	DISASTERS <input checked="" type="checkbox"/> ENERGY FOOD SECURITY PUBLIC HEALTH WATER MANAGEMENT	ATMOSPHERE MARINE LAND CLIMATE EMERGENCY <input checked="" type="checkbox"/> SECURITY	ZERO HUNGER AFFORDABLE ENERGY CLIMATE CHANGE LIFE ON LAND SUSTAINABLE CITIES <input checked="" type="checkbox"/>	COORDINATION ACTION <input type="checkbox"/>
<input checked="" type="checkbox"/>				RESEARCH & INNOVATION <input checked="" type="checkbox"/>
				INNOVATION ACTION <input type="checkbox"/>

The project exploited the infrastructure and research developed in the [BEYOND Center of Excellence \(pillar GeoHub\)](#) and the network of stakeholders maintained by the [GEO-CRADLE](#) coordination and support action.

The project addressed scientific objectives as:

1. Provide evidence based indications on how **current space assets and EO data exploitation platforms** offer optimum contribution to user organizations involved in **Disaster Risk Management (DRM)** and **Disaster Risk Reduction (DRR)**.
2. Assess the needed **developments in terms of space assets** which are required to further progress into the successful exploitation of EO based products in **DRM/DRR domains**.

The research team of BEYOND/NOA contributed in the **support of User Consultation** meetings, **Definition of User Needs** and priorities in relation to DRR, the analysis of contribution of **new satellite assets and ICT technologies in DRR**, the **development of SW tools** to facilitate the interferometric processing of satellite SAR data on cloud (the [TEP geo-hazard platform](#)), and showcased how the processing developments on cloud could effectively exploit satellite data in conjunction with navigation/positioning data (GPS/GLONASS) for **assessing the volcanic/seismic activity** over extended territorial sites.





EO FOR SUSTAINABLE DEVELOPMENT IN THE CLIMATE RESILIENCE DOMAIN

ESA Call for Tender Reference AO/1-9019/17/I-NB

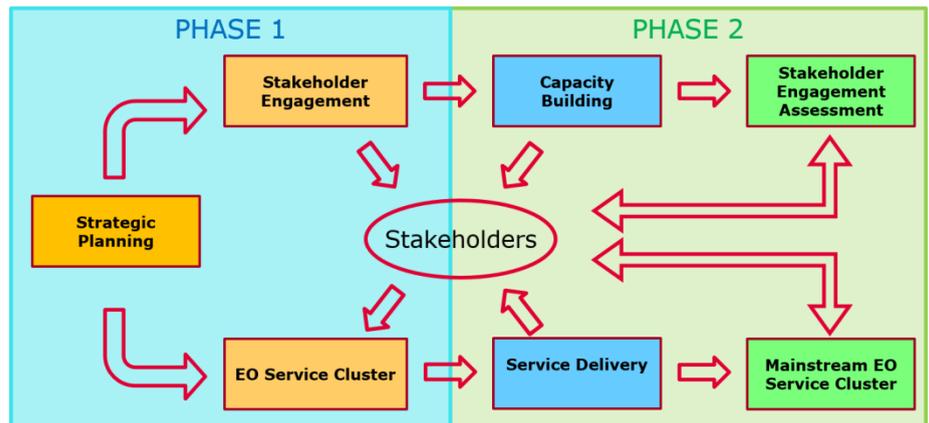
2018-2021, CCN: Contract Under Negotiation

240.000 EUR (NOA Budget)/1.900.000 EUR (Overall Budget)

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
<input checked="" type="checkbox"/>	DISASTERS <input checked="" type="checkbox"/> ENERGY FOOD SECURITY <input checked="" type="checkbox"/> PUBLIC HEALTH <input checked="" type="checkbox"/> WATER MANAGEMENT <input checked="" type="checkbox"/>	ATMOSPHERE <input checked="" type="checkbox"/> MARINE LAND CLIMATE <input checked="" type="checkbox"/> EMERGENCY <input checked="" type="checkbox"/> SECURITY	ZERO HUNGER AFFORDABLE ENERGY CLIMATE CHANGE <input checked="" type="checkbox"/> LIFE ON LAND <input checked="" type="checkbox"/> SUSTAINABLE CITIES <input checked="" type="checkbox"/>	COORDINATION ACTION <input checked="" type="checkbox"/> RESEARCH & INNOVATION <input checked="" type="checkbox"/> INNOVATION ACTION <input type="checkbox"/>

The project exploits the infrastructure and research developed in the [BEYOND Center of Excellence](#) (pillar [AirHub](#)), the capacity building methodology and the network of stakeholders maintained by the [GEO-CRADLE](#) coordination and support action.

The Project has international, national and local stakeholders and users as a central focal point. It addresses needs and receives stakeholder feedback



It sets a **clear cyclic feedback interaction** with stakeholders in order to delineate a **sounding and efficient engagement and control stakeholder plan** so that the maximum benefits can be trespassed to all the actors (EO data and service providers, local community, government agencies, national and regional institutions). The project has defined **main working lines** as: **1. EO based climate service delivery**, which will run demo trials, assess their usefulness and determine the level of stakeholder satisfaction; **2. Evaluate the most efficient way to assure a sustainable, long-term and independent exploitation** of the developed EO based climate services by local and regional users. **3. Capacity building and awareness monitoring**, though establishing a capacity building plan with the proper materials, and monitor, and also **assess the evolution of stakeholder engagement along project lifetime**, and **trigger alarms** when interest drops down and/or the project is not fulfilling their expectations. **The research team of BEYOND/NOA has undertaken the full responsibility to run the capacity building actions in the framework of the project.**

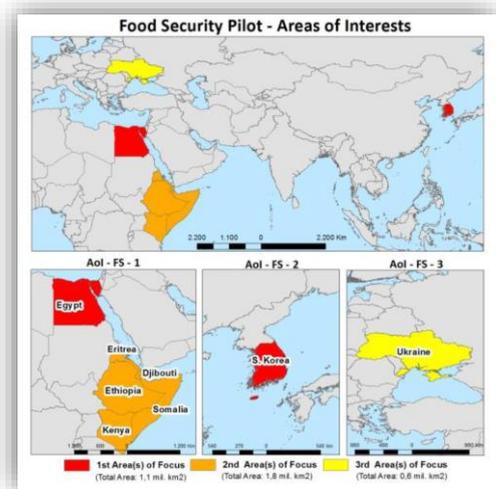
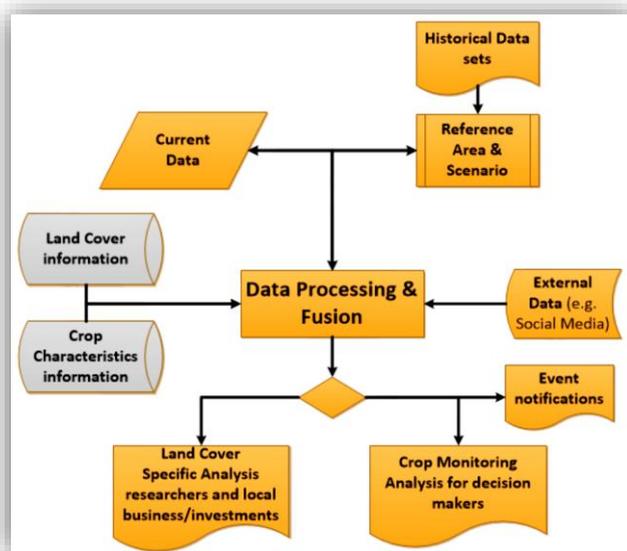


EOPEN: OPEN INTEROPERABLE PLATFORM FOR UNIFIED ACCESS AND ANALYSIS OF EARTH OBSERVATION DATA PROGRAM
H2020 EO-2-2017
2017-2020, GA: No 776019
218.125 EUR (NOA Budget)/1.999.500 EUR (Overall Budget)
<http://eopen-project.eu/>

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
<input checked="" type="checkbox"/>	DISASTERS <input checked="" type="checkbox"/> ENERGY <input checked="" type="checkbox"/> FOOD SECURITY <input checked="" type="checkbox"/> PUBLIC HEALTH <input checked="" type="checkbox"/> WATER MANAGEMENT <input checked="" type="checkbox"/>	ATMOSPHERE <input checked="" type="checkbox"/> MARINE <input checked="" type="checkbox"/> LAND <input checked="" type="checkbox"/> CLIMATE <input checked="" type="checkbox"/> EMERGENCY <input checked="" type="checkbox"/> SECURITY <input checked="" type="checkbox"/>	ZERO HUNGER <input checked="" type="checkbox"/> AFFORDABLE ENERGY <input checked="" type="checkbox"/> CLIMATE CHANGE <input checked="" type="checkbox"/> LIFE ON LAND <input checked="" type="checkbox"/> SUSTAINABLE CITIES <input checked="" type="checkbox"/>	COORDINATION ACTION <input type="checkbox"/> RESEARCH & INNOVATION <input checked="" type="checkbox"/> INNOVATION ACTION <input type="checkbox"/>
<input type="checkbox"/>				

The project relies on (α) the infrastructures and research developed in BEYOND Center of Excellence, (β) the roadmap resulted from GEO-CRADLE in regards to the priorities concerning the gathering and channeling of information over extended geographic areas in the agriculture sector, and (c) the Copernicus DataHubs operated by the BEYOND Center of Excellence (e.g. Hellenic Mirror Site, DIASHub).

The EOPEN project study the needs of users wanting to use or include EO data in their big data analysis problems. The EOPEN concept is directed towards making EO data easy to use by the involved stakeholders. To achieve this, the EOPEN develops an exploitation platform that supports Big Data analysis by offering: 1. A library of commonly needed EO data processing capabilities and modules for data preparation; 2. Services and the capabilities to make optimal use of existing EO data sources and processing capabilities; 3. A



framework supporting the Big Data Use Case lifecycle; 4. An infrastructure to perform Big

Data processing and analytics. The contribution of the NOA is to engage the stakeholder community, and provide unhindered access to the Copernicus big satellite data so as to meet requirements concerning agricultural sector and food security over vast geographic areas. NOA leverages on high resolution of Sentinel

1-2 data together with crowd data and crowdsourcing techniques. The process demonstrates **innovative EO information products easily used on a world basis in EU and non-EU countries (South Korea & China)** for ensuring food insecurity. The innovation here generates reliable, accurate, timely and sustained crop monitoring and yield forecasts, supporting to the local/regional agriculture. This has a direct impact on food policies and security; reducing food poverty; boosting local business and investment opportunities. A web-application is built on a user centric approach transforming needs and requirements.



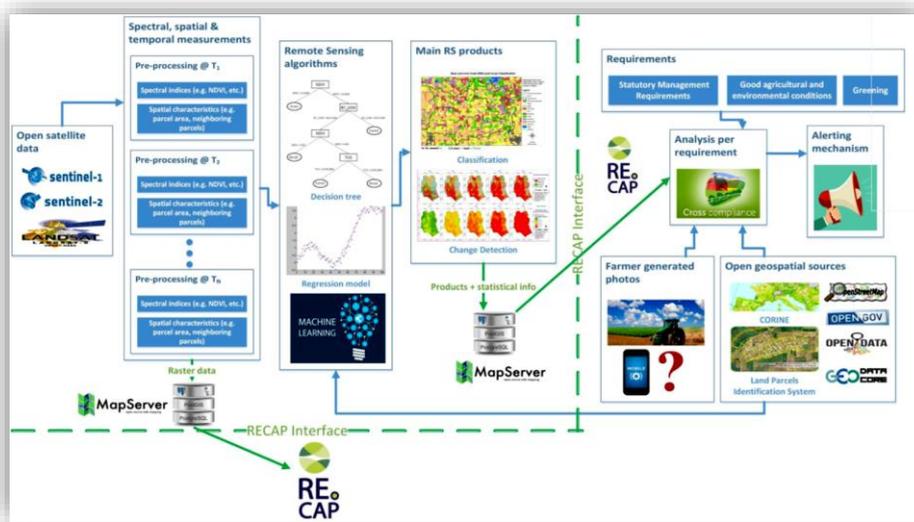
RECAP: PERSONALISED PUBLIC SERVICES IN SUPPORT OF THE IMPLEMENTATION OF THE CAP H2020 INSO-2014-2015/CNECT 2016-2018, GA: No 693171 291.375 EUR (NOA Budget)/2.142.382 EUR (Overall Budget) <https://www.recap-h2020.eu/>

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
<input checked="" type="checkbox"/>	DISASTERS ENERGY FOOD SECURITY PUBLIC HEALTH WATER MANAGEMENT	ATMOSPHERE MARINE LAND CLIMATE EMERGENCY SECURITY	ZERO HUNGER AFFORDABLE ENERGY CLIMATE CHANGE LIFE ON LAND SUSTAINABLE CITIES	COORDINATION ACTION <input type="checkbox"/> RESEARCH & INNOVATION <input type="checkbox"/> INNOVATION ACTION <input checked="" type="checkbox"/>

The projects relies on (α) the roadmap resulted from the GEO-CRADLE project with respect to the research priorities concerning the gathering and channeling of information in support to the Common Agriculture Policy, and (b) the Copernicus DataHubs operated by the BEYOND Center of Excellence (e.g. Hellenic Mirror Site, DIASHub).

RECAP develops an operational platform for public services for the improved implementation of the Common Agricultural Policy (CAP). It integrates open satellite data (Sentinel data from the Hellenic Mirror Site & Copernicus SciHub and DIASHub) and crowd-data, and transforms them into co-designed, and co-created services to meet information needs of public authorities, farmers, and agricultural consultants. The project:

1. increases efficiency and transparency of public authorities for the implementation of the CAP;
2. allows improved remote monitoring of farmers' obligations by using open geo-spatial data;
3. offers personalized services to farmers for better compliance with the environmental standards imposed by the CAP;
4. stimulates the development of state-of-the-art and the delivery of innovative added value services for the benefit of the stakeholders in Earth Observation and Agriculture sectors.



maps in three different levels of crop nomenclature. For the classification of the big feature spaces created from using multi-temporal Sentinel-2 and -1 data, the research team used state-of-the-art non-parametric

Support Vector Machines (SVM) and ensemble Bagged Trees (BT) classifiers, accordingly adapted to provide both enhanced accuracy and execution time. The feature space is designed to be rich, comprising of multispectral imagery and vegetation index time-series.

Several experiments resulted in determining the suited number and nature of useful variables in all levels of nomenclature. **The study essentially describes a completely transferable and scalable set of methods.** The crop identification has designed so as to be geographically independent and scalable from a small region to national or even continental scales. Input data are deliberately kept least and freely available in order to achieve maximum transferability and ease of data retrieval.



Marine-EO

MARINE-EO: BRIDGING INNOVATIVE DOWNSTREAM EARTH OBSERVATION AND COPERNICUS ENABLED SERVICES FOR INTEGRATED MARITIME ENVIRONMENT, SURVEILLANCE AND SECURITY

H2020 EO-2-2016- PRE-COMMERCIAL PROCUREMENT (PCP) 2017-2020, GA: No 730098

111.037 EUR (NOA Budget)/4.378.584 EUR (Overall Budget)

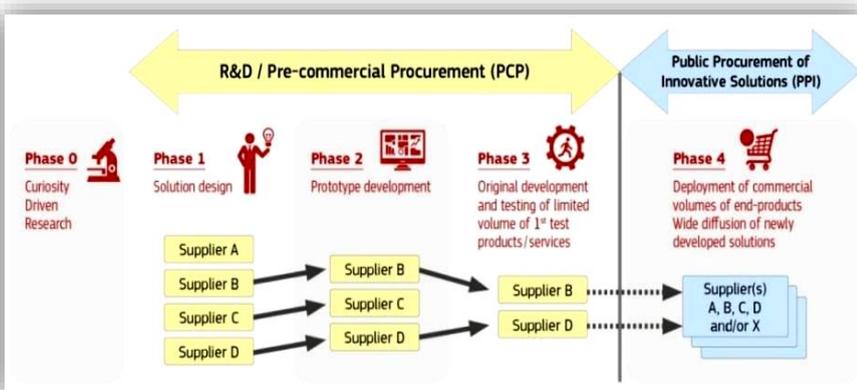
<https://marine-eo.eu/>

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
<input checked="" type="checkbox"/>	DISASTERS ENERGY FOOD SECURITY PUBLIC HEALTH WATER MANAGEMENT <input checked="" type="checkbox"/>	ATMOSPHERE MARINE <input checked="" type="checkbox"/> LAND CLIMATE EMERGENCY SECURITY <input checked="" type="checkbox"/>	ZERO HUNGER AFFORDABLE ENERGY CLIMATE CHANGE LIFE ON LAND SUSTAINABLE CITIES	COORDINATION ACTION <input type="checkbox"/>
<input type="checkbox"/>				RESEARCH & INNOVATION <input type="checkbox"/>
				INNOVATION ACTION <input checked="" type="checkbox"/>

The project relies on research outcomes and services developed by the BEYOND research team in past EU and ESA Copernicus projects related to marine environment, such as LIMES, MARISS, MARCOAST (their description is given in the following sections of this CV).

The Marine-EO project develops, tests and validates two sets of demand-driven EO-based services, adopted on open standards, bringing incremental or radical innovations in the field of maritime awareness and leveraging on the existing Copernicus Services and other products from the Copernicus portfolio. It encompasses two Thematic Areas.

The Thematic Area 1 addresses priorities of the Marine Environment Monitoring and Climate Change. The



so-called SATOCEAN set of services provides information about ocean parameters variability in time and space, best probable fishing areas, fish farm locations, and water quality. It also incorporates sea ice extent for safe navigation and maritime operations in the Arctic.

Thematic Area 2 addresses priorities of the Marine Security: The so-called

SATSURVEILLANCE service contributes to the development of **EUROSUR regulation** by providing services in response to Europe’s security challenges in the domains of Border Security.

The project proposes a set of “support” / “envelop” services which integrate EO and Copernicus-enabled services to the operational logic and code of conduct. The services bring “closer” the demand side (Public Authorities) with the EO data providers (Copernicus & Copernicus contributing missions), and EO data experts and analysts (Service providers/ industry and SMEs), creating a dynamic environment for a single digital market to grow. Moreover, Marine-EO strengthens transnational collaboration in maritime awareness sector by facilitating knowledge transfer and optimization of resources for the public authorities, the latter participating in the buyers group. This brings together the supply and demand side in order to foster

the development of innovative solutions in response to the increasing demand for strengthening **Earth Observation and Copernicus capabilities**. This PCP is also enabling the public procurers to compare alternative potential solution approaches and filter out the best possible solutions the market can deliver in order to address the public need. To this end NOA contributes with its Copernicus DataHubs and EO research expertise in an experienced group of partners towards observing the problem from different perspectives, including an operational and a technical view, while working together for the development, integration and validation of **innovative solutions in the field of Earth Observation**, the harmonization of tools and methods for the EU wide testing and validation of systems, and the **facilitation of public-private cooperation for the sake of market visibility**. In addition the NOA's research team and its partners undertake the full coordination of this Pre-Commercial Procurement (PCP) action, which **challenges the industry from the demand side** to develop **innovative solutions for public sector** needs and provides a first **customer reference which enables companies to create competitive advantage in the market**.



RISK-EOS: PROMOTION OF THE GSE RISK-EOS FIRE SERVICES PORTFOLIO IN GREECE -PRODUCTION AND DELIVERY OF SEASONAL BURN SCARS MAPPING (BSM) PRODUCTS (PHASE 2 & 3)

ESA - SERVICE CONSOLIDATION ACTIONS OF EARTHWATCH GMES SERVICES ELEMENTS, ESA/GSE PROGRAM, Contract No: ITF-AJ-0053-07

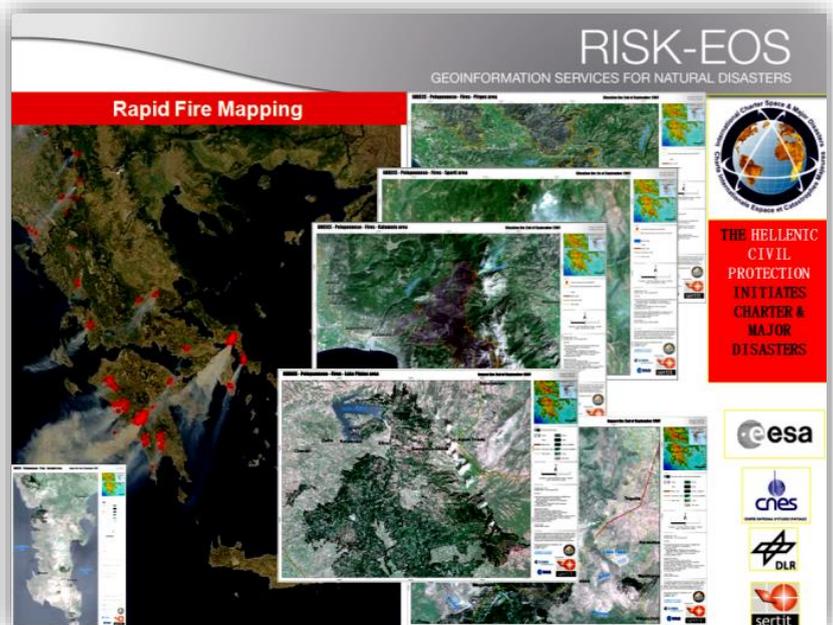
2007-2008

310.000 EUR (NOA Budget)

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
 <input checked="" type="checkbox"/>	 DISASTERS <input checked="" type="checkbox"/>  ENERGY  FOOD SECURITY  PUBLIC HEALTH  WATER MANAGEMENT	 ATMOSPHERE  MARINE  LAND  CLIMATE  EMERGENCY <input checked="" type="checkbox"/>  SECURITY <input checked="" type="checkbox"/>	 ZERO HUNGER  AFFORDABLE ENERGY  CLIMATE CHANGE  LIFE ON LAND <input checked="" type="checkbox"/>  SUSTAINABLE CITIES <input checked="" type="checkbox"/>	COORDINATION ACTION <input type="checkbox"/> RESEARCH & INNOVATION <input type="checkbox"/> INNOVATION ACTION <input checked="" type="checkbox"/>

The project was supported financially by the European Space Agency (ESA). It consists a precursor action for specifying the methodology and validating the services which are available today through the operational pillar of Copernicus EMS, with the engagement of the [Center of Excellence BEYOND](#).

The project constitutes the extension in Greece of the operational program, which relied on the satellite detection for the routine monitoring, mapping, and assessment of natural disasters over Europe in (a) real time, and (b) seasonal basis. The research team of NOA developed a methodology for rapid mapping of burned areas and the assessment of damages in the affected zones. It exploited multi-spectral satellite data of high and very high spatial resolution e.g. Landsat TM, SPOT XS, as well as FORMOSAT-2, και IKONOS. The project gave for the first time a standardized and operational mapping of the burned areas over the entire country. Only in the year of 2007, during the very devastating summer fires, a detailed mapping of burned areas was conducted for a total of 193.656 ha

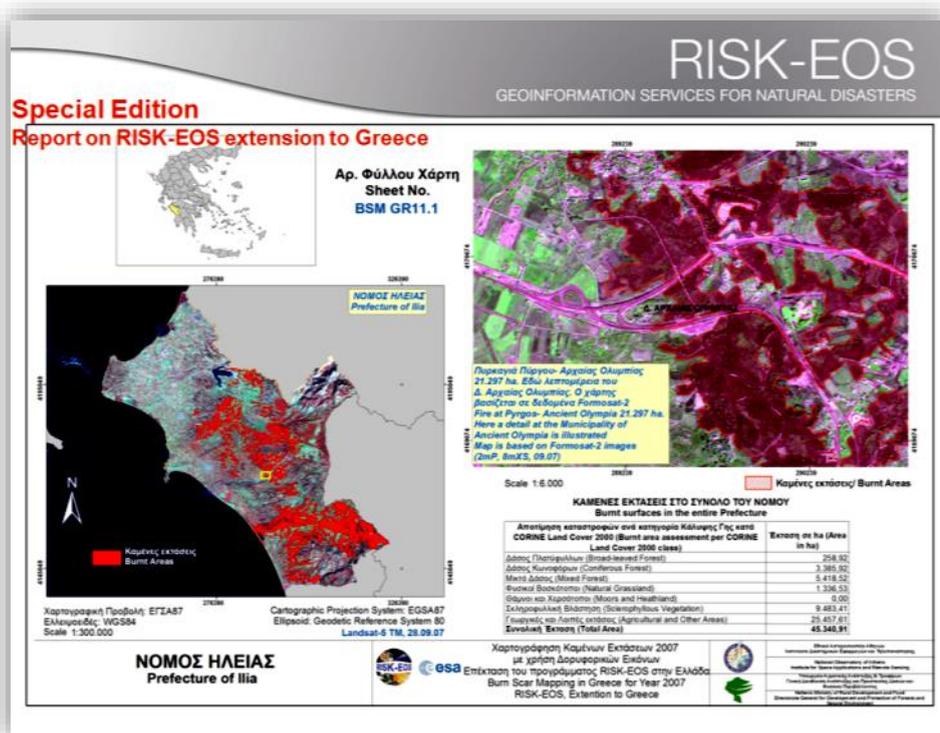


at a spatial resolution of 2 to 30 meters on the ground. The project served a big number of institutional stakeholders in Greek such as Civil Protection and Forestry Services across Greece, the Directorate for the

Protection of Forests and Natural Ecosystems of the Ministry of Agriculture, etc. It has been delivered a rich portfolio of services and mapping products of high precision and accuracy. Moreover, during the devastating fire season of 2007, the project **activated the rapid mapping service** over the region of Peloponnese and **mapped in rush mode** every fire event in various spatial resolutions.

In the framework of the project an **advanced and prototype research** was conducted by the NOA research team towards the automatic mapping of burn scars on multi-temporal sets of satellite data from any available satellite system. Dedicated **models and classification algorithms were developed** adapted to Greek landscape and natural ecosystems using any type of satellite data. The developed methodology **was tested and validated in the context of operational applications and** returned results of high accuracy. **A number of**

scientific publications were derived based on the developed research and methodological tools. Moreover, a **bilingual special issue** was created in collaboration with the **Ministry of Agriculture**, which was devoted to the devastating fires of 2007, entitled **“Assessment of 2007 burnt areas in Greece using satellite data - Reference year: 2007, Satellite data: Landsat 5 TM, SPOT XS, FORMOSAT 2 (P+XS)”**.





SAFER: SERVICES AND APPLICATIONS FOR EMERGENCY SUPPORT

COMMISSION OF THE EUROPEAN COMMUNITIES, DG ENTERPRISE, FP7-2007-SPACE-1/ GMES COLLABORATIVE PROJECT, Contract No: ITF-AJ-0053-07

2009-2011

128.000 EUR (NOA Budget)

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
<input checked="" type="checkbox"/>	DISASTERS ✓ ENERGY FOOD SECURITY PUBLIC HEALTH WATER MANAGEMENT	ATMOSPHERE MARINE LAND CLIMATE EMERGENCY ✓ SECURITY ✓	ZERO HUNGER AFFORDABLE ENERGY CLIMATE CHANGE LIFE ON LAND ✓ SUSTAINABLE CITIES ✓	COORDINATION ACTION <input type="checkbox"/>
<input type="checkbox"/>				RESEARCH & INNOVATION <input checked="" type="checkbox"/>

The project was supported financially by the European Commission. It consists a precursor action for specifying the methodology and validating the services which are available today through the operational pillar of [Copernicus EMS](#), with the engagement of the [Center of Excellence BEYOND](#).

The project has been conducted in the framework of the flagship **Global Monitoring for Environment and Security (GMES)** currently known as **Copernicus program**. It consisted the **biggest synergetic operational action that run at European level**, engaging more than 50 partners such as Space Agencies, Research and Private Sector entities acting in the Emergency Response sector all over Europe. It **generated the roadmap for the development** of the operational [Emergency Management Services \(EMS\)](#) pillar for Emergency



Support and Emergency Response. The SAFER project delivered services **in real time (rush mode)** during the

crisis, as well as **off-line detailed assessments of the damages** in the affected by the disasters areas. The research team of NOA delivered Emergency Services that supported the decision making processes in a number of institutional authorities of Greece including the: **a) the General Directorate for the Protection of Forests and Natural Ecosystems - Hellenic Ministry of Agriculture, b) the General Secretariat of Civil Protection, c) Forestry services over Greece, d) the National Agriculture Research Foundation, etc.** The services included: **1. early warning** in cases of fire events and **routine monitoring of the fires' propagation** every 5 minutes over Greece. **2. Rapid mapping (rush mode) at high and very high spatial resolution. 3. Seasonal detailed mapping of the damages** in the affected areas at the end of the fire season for entire Greece.

The project relied on the research outcomes of RISK-EOS (see description above) and developed new research and methodologies for exploiting new generations of satellite systems and enhancing innovative data modelling techniques for deriving accurate assessments of disasters. The results of the project have been published in peer reviewed publications in journals and scientific conferences.



LinkER: GMES EMERGENCY – SUPPORTING THE IMPLEMENTATION OF AN OPERATIONAL GLOBAL MONITORING FOR ENVIRONMENT AND SECURITY SERVICE IN THE FIELD OF EMERGENCY MANAGEMENT

COMMISSION OF THE EUROPEAN COMMUNITIES, DG ENTERPRISE, INVITATION TO TENDER NO: ENTR/08/028

2009-2011

126.000 EUR (NOA Budget)

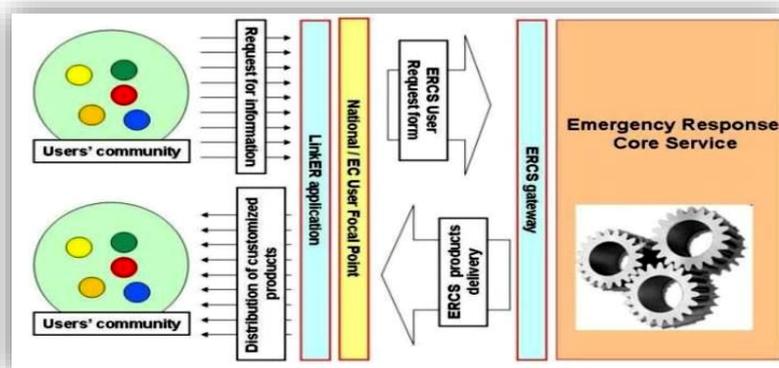
IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
<input checked="" type="checkbox"/>	DISASTERS <input checked="" type="checkbox"/> ENERGY FOOD SECURITY PUBLIC HEALTH WATER MANAGEMENT	ATMOSPHERE MARINE LAND CLIMATE EMERGENCY <input checked="" type="checkbox"/> SECURITY <input checked="" type="checkbox"/>	ZERO HUNGER AFFORDABLE ENERGY CLIMATE CHANGE LIFE ON LAND <input checked="" type="checkbox"/> SUSTAINABLE CITIES <input checked="" type="checkbox"/>	COORDINATION ACTION <input checked="" type="checkbox"/>
<input type="checkbox"/>				RESEARCH & INNOVATION <input type="checkbox"/>
				INNOVATION ACTION <input type="checkbox"/>

The project was supported financially by the European Commission. It consists a precursor action for specifying the methodology and validating the services which are available today through the operational pillar of [Copernicus EMS](#), with the engagement of the [Center of Excellence BEYOND](#).

The project generated the roadmap and established protocols towards activating the two pillars of Copernicus for [Emergency Management Services \(EMS\)](#), namely (a) **Emergency Response (Rapid Mapping)**, (b) **Emergency Support (Risk Assessment and Recovery)**. The project LinkER achieved three goals:

1. Identified and nominated in each country an organization (that is the Central Civil Protection Authority) acting as a focal point authorized to activate Copernicus EMS. The role of the focal point is also to receive the (SAFER standardized)

Emergency Response and Emergency Support services/products, and deliver them at national level to the authorized users and decision makers to support disaster management operations. **2. Installed and put in full operation at the premises of the focal points** the proper computer and networking infrastructures to facilitate the activation process and ensure timely reception of the delivered Emergency services.



3. Conducted capacity building for training the focal points on how to use the established procedures and installed technical infrastructure. The research team of NOA undertook the implementation of the above actions in three EU countries which were **Greece, Cyprus, and Bulgaria**. It offered **consultation and support to the involved civil protection authorities** so as to ensure the **timely activation, and unhindered reception of the services for Emergency Response and Emergency Support**. In addition, through the LinkER project, the research team of NOA offered Emergency services to the institutional authorities of Greece such as **the General Directorate for the Protection of Forests and Natural Ecosystems - Hellenic Ministry of Agriculture, the General Secretariat of Civil Protection, the Forestry services over Greece, the National Agriculture Research Foundation, etc.**



TELEIOS—VIRTUAL OBSERVATORY INFRASTRUCTURE FOR EARTH OBSERVATION DATA

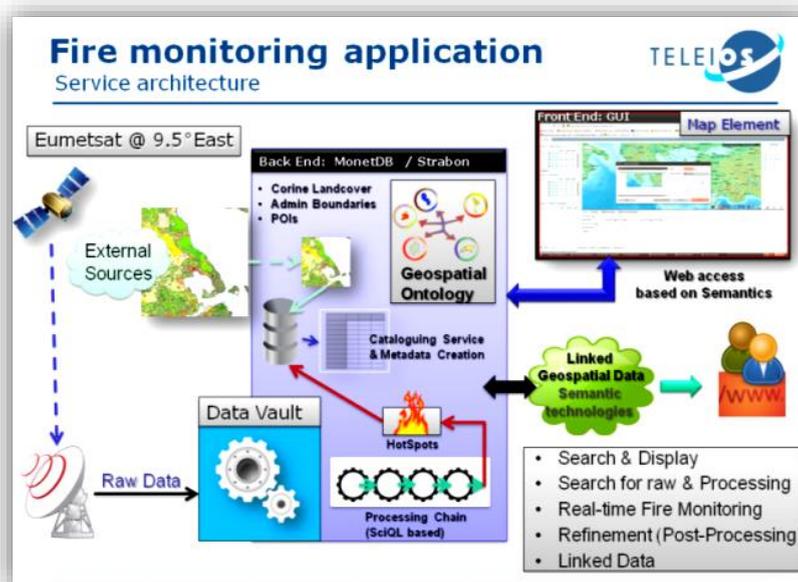
COMMISSION OF THE EUROPEAN COMMUNITIES, INFORMATION SOCIETY AND MEDIA DIRECTORATE-GENERAL, FP7-ICT-2009-5 COLLABORATIVE PROJECT, GA : No 257662 TELEIOS

2010-2013

303.000 EUR (NOA Budget)

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
<input checked="" type="checkbox"/>	DISASTERS <input checked="" type="checkbox"/> ENERGY FOOD SECURITY PUBLIC HEALTH WATER MANAGEMENT	ATMOSPHERE MARINE LAND CLIMATE EMERGENCY <input checked="" type="checkbox"/> SECURITY <input checked="" type="checkbox"/>	ZERO HUNGER AFFORDABLE ENERGY CLIMATE CHANGE LIFE ON LAND <input checked="" type="checkbox"/> SUSTAINABLE CITIES <input checked="" type="checkbox"/>	COORDINATION ACTION <input type="checkbox"/>
<input type="checkbox"/>				RESEARCH & INNOVATION <input checked="" type="checkbox"/>
				INNOVATION ACTION <input type="checkbox"/>

The project TELEIOS consisted a fundamental action that supported the definition, and the development of the basic processes of the innovative [FIREHUB system of services](#) of the [BEYOND Center of Excellence](#) , which offers real-time fire monitoring and burnt scar mapping applications; the FIREHUB system has awarded the [Best Challenge Service award in the Copernicus Master's competition of 2014](#). The project integrated high level IT science in image Data Base and data modelling techniques, in order to achieve rapid access and improved processing in real time of big volumes of satellite data (Tbytes of MSG SEVIRI images are processed during the fire season / Gbytes of images on a daily basis) which are collected at the acquisition stations operated by the [BEYOND Center of Excellence](#). The project gave conceptual and algorithmic solutions wrt to the operational detection and real time monitoring of fires on a 5 minutes basis. It delivered a methodology to cope with uncertainty



issues concerning the classification of active fires and also resolving time/spatial related inconsistencies in fire detection. To this end the research integrated time series analysis of fire detections and also combined the returned detections with underlying knowledge and geo-spatial information from the affected ecosystems. It delivered a fully automatic processing chain, the TELEIOS system, that incorporates data processing and uncertainty modelling tools for the delivery of fire detection and fire monitoring products in rush mode avoiding completely the human intervention in the data classification and product delivery processes. For this, appropriate ontologies using RDF/SPARQL, as well as image DataBase technologies such as MonetDB were integrated in the TELEIOS system architecture.

SWeFS: ΠΛΕΓΜΑ ΑΙΣΘΗΤΗΡΩΝ ΓΙΑ ΤΗ ΘΩΡΑΚΙΣΗ ΑΠΟ ΠΕΡΙΒΑΛΛΟΝΤΙΚΟΥΣ ΚΙΝΔΥΝΟΥΣ/SENSOR WEB FIRE SHIELD



ΓΕΝΙΚΗ ΓΡΑΜΜΑΤΕΙΑ ΕΡΕΥΝΑΣ ΚΑΙ ΤΕΧΝΟΛΟΓΙΑΣ (ΓΓΕΤ), ΠΡΟΓΡΑΜΜΑ ΓΙΑ ΤΗΝ ΕΝΙΣΧΥΣΗ ΤΗΣ ΔΙΕΠΙΣΤΗΜΟΝΙΚΗΣ ΕΡΕΥΝΑΣ ΚΑΙ ΚΑΙΝΟΤΟΜΙΑΣ, ΓΑ : 01/164/6

2012-2015

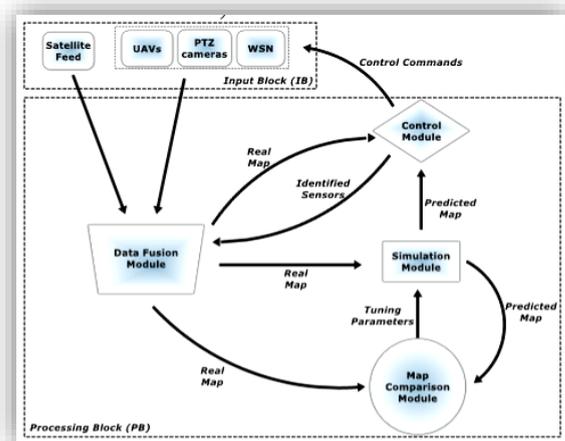
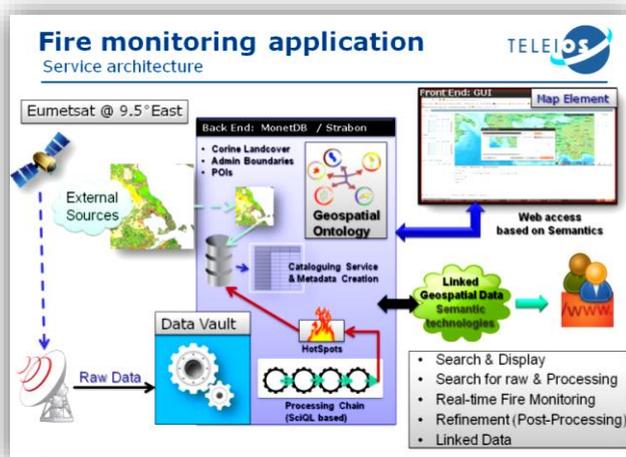
77.000 (NOA Budget)/519.798 EUR (Overall Budget)

<http://excellence.minedu.gov.gr/thales/en/thalesprojects/375785>

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
<input checked="" type="checkbox"/>	DISASTERS ✓ ENERGY FOOD SECURITY PUBLIC HEALTH ✓ WATER MANAGEMENT	ATMOSPHERE MARINE LAND ✓ CLIMATE EMERGENCY ✓ SECURITY	ZERO HUNGER AFFORDABLE ENERGY CLIMATE CHANGE LIFE ON LAND ✓ SUSTAINABLE CITIES ✓	COORDINATION ACTION <input type="checkbox"/> RESEARCH & INNOVATION <input checked="" type="checkbox"/> INNOVATION ACTION <input type="checkbox"/>
<input checked="" type="checkbox"/>				

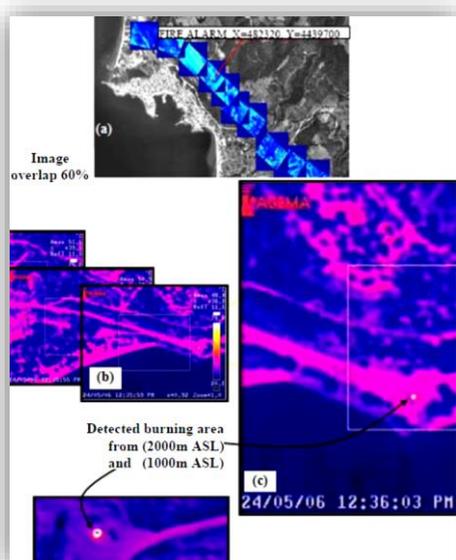
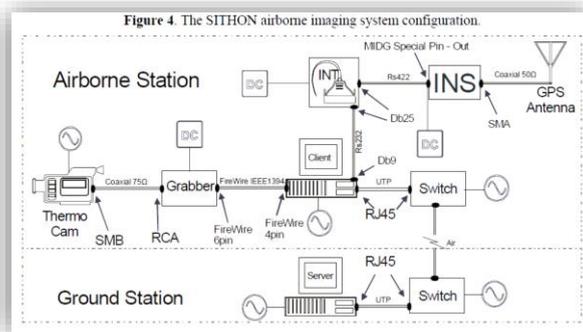
The project SWeFS consisted a complementary action that supported the further development of the innovative [FIREHUB system of services](#) of the [BEYOND Center of Excellence](#) , which offers real-time fire monitoring and burnt scar mapping applications; the FIREHUB system has awarded the [Best Challenge Service award in the Copernicus Master's competition of 2014](#).

The SWeFS research project delivered a novel **Sensor Web platform for dynamic data-driven assimilation (DDDAS)** for securing the Wildland-Urban Interface (WUI) zones against environmental risks, and serious threat of forest fires in Greece. SWeFS called for multidisciplinary research in the areas of **sensor networks, distributed vision systems, remote sensing, geographical information systems (GIS), data stream fusion, space-time predictive modeling and control systems**. The research team of BEYOND Center of Excellence undertook the integration of satellite data in a multi-sensor system approach feeding the final decision with a multitude of evidences from sensor networks. The developed fusion architecture **adopts a two-level fusion scheme**, thus improving the reliability of the system w.r.t. fire detection. In the first level of fusion (data fusion), a statistical analysis was adopted for fusing data taken from **in-field sensors** and assigning a probability of fire occurrence to each of them. In the second level of fusion (information fusion), **probability values about fire events from the first level were combined through approximate reasoning scheme like evidential theory (Dempster – Shafer) (doctoral thesis of Dr C. Kontoes)**.



IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
<input checked="" type="checkbox"/>	DISASTERS <input checked="" type="checkbox"/> ENERGY FOOD SECURITY PUBLIC HEALTH WATER MANAGEMENT	ATMOSPHERE <input checked="" type="checkbox"/> MARINE LAND CLIMATE EMERGENCY <input checked="" type="checkbox"/> SECURITY <input checked="" type="checkbox"/>	ZERO HUNGER AFFORDABLE ENERGY CLIMATE CHANGE LIFE ON LAND <input checked="" type="checkbox"/> SUSTAINABLE CITIES <input checked="" type="checkbox"/>	COORDINATION ACTION <input type="checkbox"/> RESEARCH & INNOVATION <input checked="" type="checkbox"/> INNOVATION ACTION <input type="checkbox"/>
<input checked="" type="checkbox"/>				

The project SITHON (ΣΙΘΩΝ) is a precursor action specifying fundamental components of the integrated FIREHUB system of the BEYOND Center of Excellence. The project was funded by the Greek General Secretariat of Research and Technology - Ministry of Development. It explored the integration and assessment (in terms of accuracy and effectiveness) of modern airborne and in-situ thermal sensing techniques for delivering an early detection and warning system for fires occurrence and propagation. It developed an integrated geo-information



system equipped with telematic techniques for receiving dynamic data (generated from the in-situ and airborne thermal sensors), so as to update in real time the decision makers on the status of the disaster. The developed system was allowing the precise location of fire events, and the automatic (real time) delivery of information concerning the fuel types, and the roads for accessing the affected areas, the locations of water reservoirs, the threatened locations of critical infrastructures that need special attention, and several other parameters useful in decision making for firefighting. The research team of NOA designed and developed the airborne thermal sensing system SITHON for the detection and monitoring of active fires. It has been developed a prototype industrial system which has been successfully tested and validated in several occasions of fire events. The system allows the on-the-fly control of the thermal camera (aperture) in a fully automatic mode, the onboard processing of the thermal imagery, and the dynamic sending of fire locations to the control center on the ground. The airborne

thermal system SITHON has been presented in publications in peer reviewed articles and scientific conferences.



FIREMENTOR: ΕΠΙΧΕΙΡΗΣΙΑΚΟ ΣΥΣΤΗΜΑ ΣΧΕΔΙΑΣΜΟΥ ΚΑΙ ΛΗΨΗΣ ΑΠΟΦΑΣΕΩΝ ΓΙΑ ΔΙΑΧΕΙΡΙΣΗ ΔΑΣΙΚΩΝ ΠΥΡΚΑΪΩΝ

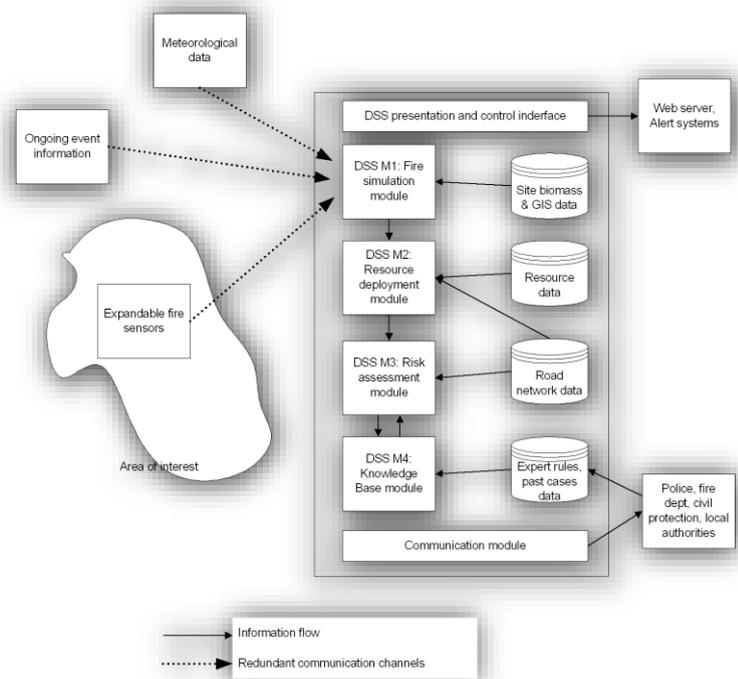
ΓΕΝΙΚΗ ΓΡΑΜΜΑΤΕΙΑ ΕΡΕΥΝΑΣ ΚΑΙ ΤΕΧΝΟΛΟΓΙΑΣ, ΕΠΑΝ, ΜΕΤΡΟ 4.5 - ΔΡΑΣΗ 4.5.1 - ΦΥΣΙΚΟ ΠΕΡΙΒΑΛΛΟΝ ΚΑΙ ΒΙΩΣΙΜΗ ΑΝΑΠΤΥΞΗ

2003-2007

110.000 EUR (NOA Budget)

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
 <input checked="" type="checkbox"/>	 DISASTERS ✓  ENERGY  FOOD SECURITY  PUBLIC HEALTH  WATER MANAGEMENT	 ATMOSPHERE ✓  MARINE  LAND  CLIMATE  EMERGENCY ✓  SECURITY ✓	 ZERO HUNGER  AFFORDABLE ENERGY  CLIMATE CHANGE  LIFE ON LAND ✓  SUSTAINABLE CITIES ✓	COORDINATION ACTION <input type="checkbox"/>
 <input checked="" type="checkbox"/>				RESEARCH & INNOVATION <input checked="" type="checkbox"/>
				INNOVATION ACTION <input type="checkbox"/>

The project FIREMENTOR is a precursor action specifying fundamental components of the integrated [FIREHUB system](#) of the [BEYOND Centre of Excellence](#). The project developed a fire fighting training system assisting the fire fighters to effectively and timely react in cases of wildfires, in support to the optimization of firefighting operations on the site, and the evacuation of cities in cases of peri-urban fires. The research team of NOA contributed in the integration of satellite Earth Observation techniques for enhancing the system's knowledge, and the creation of proper information layers. It developed image processing techniques which effectively combined very high resolution data from airborne cameras and sensors with satellite data, for the vertical assessment of forest biomass parameters. It also delivered an innovative methodology for the update and accurate assessment of forest biomass parameters at regional and national level. To be noted that the accurate knowledge of forest biomass is a unique input for assessing the fires' behavior over Greece's forest ecosystems. The research outcomes have been presented in several publications.





MASSIVE: MAPPING SEISMIC VULNERABILITY AND RISK OF CITIES

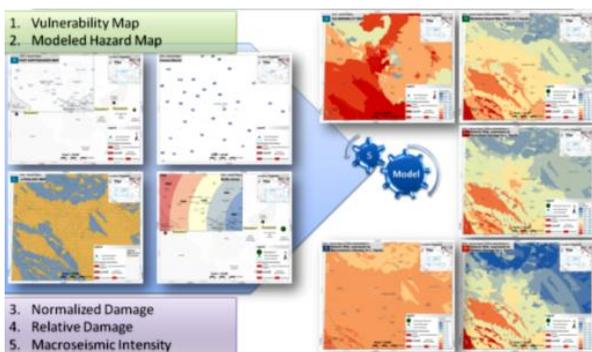
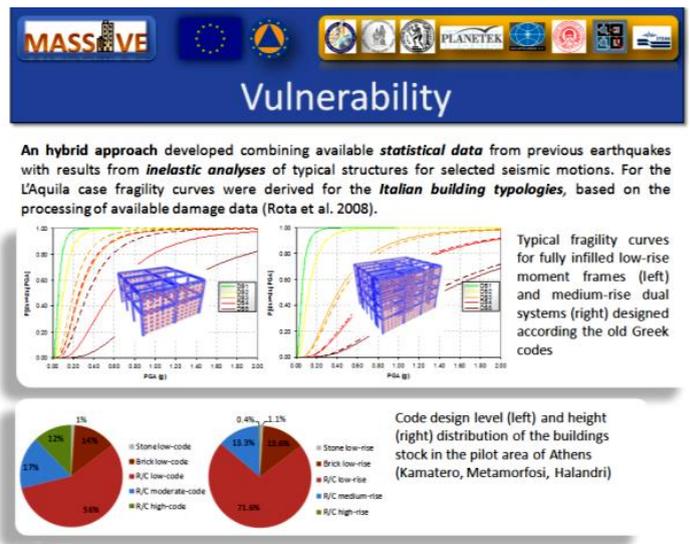
COMMISSION OF THE EUROPEAN COMMUNITIES, ENV A.3 – CIVIL PROTECTION UNIT, CIVIL PROTECTION FINANCIAL INSTRUMENT, GA: No 070401 2009-2011

180.000 EUR (NOA Budget)/474.348 EUR (Overall Budget)

http://ec.europa.eu/echo/files/civil_protection/civil/prote/pdfdocs/massive_final_technical_report_en.pdf

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
<input checked="" type="checkbox"/>	DISASTERS <input checked="" type="checkbox"/> ENERGY FOOD SECURITY PUBLIC HEALTH WATER MANAGEMENT	ATMOSPHERE MARINE LAND CLIMATE EMERGENCY <input checked="" type="checkbox"/> SECURITY	ZERO HUNGER AFFORDABLE ENERGY CLIMATE CHANGE LIFE ON LAND SUSTAINABLE CITIES <input checked="" type="checkbox"/>	COORDINATION ACTION <input type="checkbox"/>
<input checked="" type="checkbox"/>				RESEARCH & INNOVATION <input checked="" type="checkbox"/>
				INNOVATION ACTION <input type="checkbox"/>

The project **MASSIVE** is precursor action specifying fundamental components of the integrated **GeoHub system** of the **BEYOND Centre of Excellence**. The project was funded by the **EU Civil Protection and Humanitarian Aid Operations Unit**. It integrated skills from the **Earth Observation and Earthquake (EQ)** sectors. The project conducted research and developed an information/training system in support to actions for effective preparedness and EQ damage assessment in urban zones. Two Central Civil Protection Authorities of Greece and Italy, have benefited from the outcomes of the research study. The **MASSIVE information/training system** was developed using know how and validation data from the two major catastrophic EQ events, that occurred in (a) Athens (Greece) 1999, and (b) L' Aquila (Italy) 2009. In the framework of MASSIVE, advanced image processing techniques and algorithms have been developed, exploiting diachronic acquisitions of very high resolution satellite data for assessing socio-economic and built environment parameters. Moreover, the project advanced research topics and developed a methodology to update the existing knowledge on seismic hazard, vulnerability, risk and damage assessment in the regions of Greater Athens (Greece), and Abruzzo (Italy). The methodology relied on the use of historic data and knowhow from the two region, in regards to geology and earthquake characteristics, and invoked modeling solutions for a variety of earthquake scenarios so as to derive reliable assessments with expected damages and mitigation measures. The project delivered an integrated information and user training system, the so-called MASSIVE system, to the Civil Protection Authorities of Greece and Italy.





3HAZ-CORINTH: EARTHQUAKES, TSUNAMIS AND LANDSLIDES IN THE CORINTH RIFT, GREECE. A MULTIDISCIPLINARY APPROACH FOR MEASURING, MODELLING AND PREDICTING THEIR TRIGGERING MODES AND THEIR EFFECTS

COMMISSION OF THE EUROPEAN COMMUNITIES, FP6, PRIORITY 1.1.6.3, GLOBAL CHANGE AND ECOSYSTEM, GA : 004043

2005-2007

34.000 EUR (NOA Budget)/1.499.990 EUR (Overall Budget)

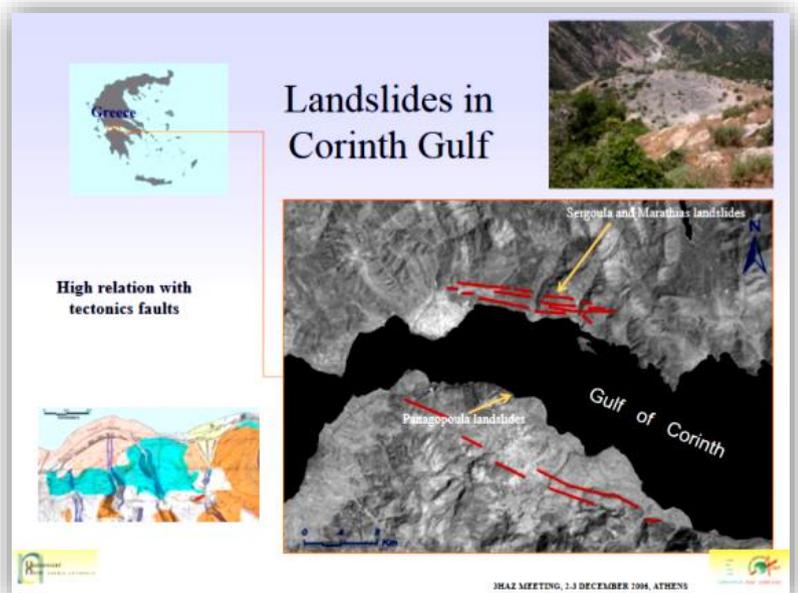
https://cordis.europa.eu/project/rcn/75177_en.html

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
 <input checked="" type="checkbox"/>	 DISASTERS ✓  ENERGY  FOOD SECURITY  PUBLIC HEALTH  WATER MANAGEMENT	 ATMOSPHERE  MARINE  LAND  CLIMATE  EMERGENCY ✓  SECURITY	 ZERO HUNGER  AFFORDABLE ENERGY  CLIMATE CHANGE  LIFE ON LAND  SUSTAINABLE CITIES ✓	COORDINATION ACTION <input type="checkbox"/>
 <input checked="" type="checkbox"/>				RESEARCH & INNOVATION <input checked="" type="checkbox"/>
				INNOVATION ACTION <input type="checkbox"/>

The project 3HAZ-CORINTH allowed the **diachronic large scale assessment of tectonic movements in the Gulf of Corinth**, through the synergetic use of different **monitoring networks deployed on the ground, on the sea, and from space**. A detailed mapping of the **tectonic faults on the ground and under the sea** was conducted.

The derived maps were correlated with seismic data, systematically recorder by the deployed networks. The research team of NOA conducted a **diachronic analysis of SAR imagery**, using **Permanent Scattered Interferometric Processing Technique**, to estimate the **small scale velocities of surface movement**, induced by the active tectonic behavior of the region. The study processed tenths of SAR images from sensors as **ERS1&2 και ENVISAT** extending over a period of 15 years. It was also developed a prototype software for the diachronic analysis of the PS modelled surface velocities, the so-called **PERSHEPHONE SW**. The results of the study were presented in **publications in journals and scientific conferences**. To be

noted that the PS based velocity assessments in the Gulf of Corinth area, were not available before running the 3HAZ-CORINTH project, due to the lack of appropriate technology, SAR processing skills, and systematic DGPS measurements over the years.



SARPerS

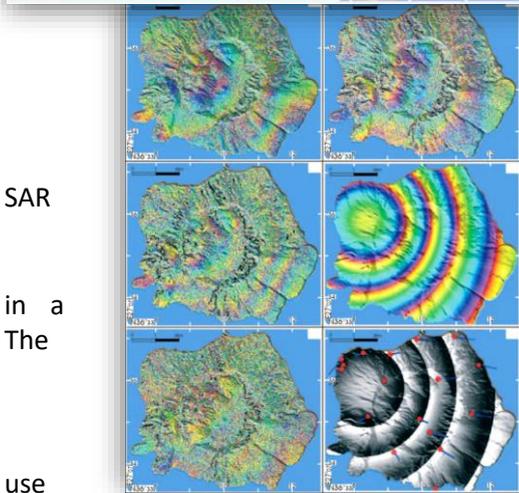
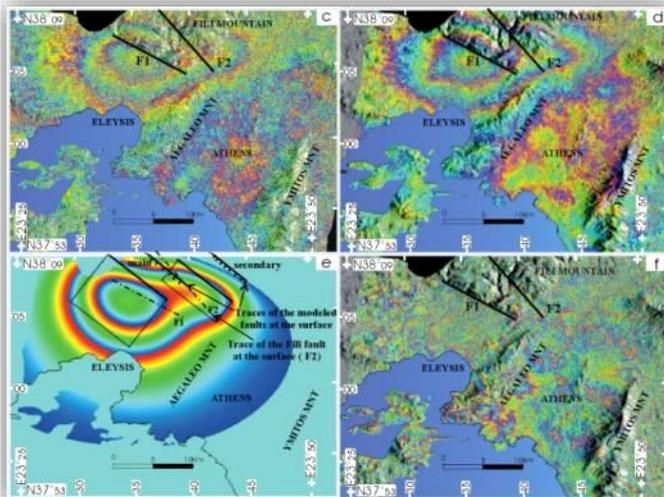
1. SARPerS: DETECTION OF ACTIVE SMALL-SCALE DEFORMATION IN GREECE USING MULTITEMPORAL INSAR AND PERMANENT SCATTERERS TECHNIQUES.

2. STUDY OF THE VOLCANIC ACTIVITY IN NISYROS ISLAND (AEGEAN SEA) BASED ON RADAR INTERFEROMETRY

EUROPEAN SPACE AGENCY-ESRIN, OPPORTUNITY ANNOUNCEMENT FOR ERS 1/2 AND/OR ENVISAT , CONTRACT NUMBER: AO 1489

2000-2010

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
 <input checked="" type="checkbox"/>	 DISASTERS <input checked="" type="checkbox"/>  ENERGY  FOOD SECURITY  PUBLIC HEALTH  WATER MANAGEMENT	 ATMOSPHERE  MARINE  LAND  CLIMATE  EMERGENCY <input checked="" type="checkbox"/>  SECURITY	 ZERO HUNGER  AFFORDABLE ENERGY  CLIMATE CHANGE  LIFE ON LAND  SUSTAINABLE CITIES <input checked="" type="checkbox"/>	COORDINATION ACTION <input type="checkbox"/>
 <input checked="" type="checkbox"/>				RESEARCH & INNOVATION <input checked="" type="checkbox"/>
				INNOVATION ACTION <input type="checkbox"/>



SAR
in a
The
use
and

Precursor activity that paved the development of research and core services included in [GeoHub](#) system of the [BEYOND Center of Excellence](#).

The SARPerS project was supported by the European Space Agency (ESA). It ensured the uninterrupted provision of satellite data ERS1 & 2 and ENVISAT, as well as the advancement of research in SAR data differential interferometric processing. The main objective was the calculation of permanent scatterers in the wider areas of the Gulf of Corinth and Athens.

The estimation of precursor seismic phenomena, the monitoring of tectonic movements nearby fault zones, and the assessment of surface deformation fields especially due to the intense construction activity in the greater area of Athens, were the main results of the research. The unhindered access to the satellite data supported a series of studies carried out in the framework of M.Sc/Ph.D. theses in collaboration with the Higher Geodesy Laboratory of the NTUA. The project resulted number of scientific papers and publications in conferences. project "Study of the Volcanic Activity in NISYROS Island (Aegean Sea)" was supported by the European Space Agency (ESA), allowing uninterrupted and unrestricted access to RADAR SAR data from ERS1/2 satellite missions, as well as the of differential interferometric methods for the monitoring mapping of tectonic micro-movements (class > 2.5 cm) in

Greece, due to **volcanic and seismic** activity. The project allowed the **calculation of the fault parameters of the catastrophic earthquake in Athens** (September 1999), as well as the **characteristics of volcanic activity in Nisyros**. It also reinforced and supplemented the relevant state-of-the-art research existing at the time, in relation to these two geodynamic phenomena. The results of the research on the 1999 Athens earthquake, and the study on the unrest of the Nisyros volcano (unrest period 1995-1997), were presented in several **conferences and scientific journals**. The studies have been cited to a large number of third party publications. The study concerning the Athens earthquake concluded that the seismic event was due to an unknown until the moment fault segment which was located in the mountain of Fylis in Parnitha. Research through **inversion modeling techniques** gave the characteristics of the earthquake parameters that triggered the catastrophic event.



1. MODELLING AND CORRECTION OF ATMOSPHERIC AND ORBITAL ARTEFACTS ON InSAR DERIVED CALCULATIONS TOWARDS AN IMPROVED SEISMIC AND VOLCANIC RISK ASSESSMENT

2. A SYSTEM FOR IMPROVED MANAGEMENT OF OIL SPILL POLLUTION OF SEAS BASED ON SATELLITE TECHNOLOGY

GENERAL SECRETARIAT OF RESEARCH AND TECHNOLOGY (GSRT), BILATERAL SCIENTIFIC COLLABORATION BETWEEN GREECE-FRANCE & GREECE - ITALY

2002-2004

60.000 EUR

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
 <input type="checkbox"/> <input checked="" type="checkbox"/>	 DISASTERS  ENERGY  FOOD SECURITY  PUBLIC HEALTH  WATER MANAGEMENT	 ATMOSPHERE  MARINE  LAND  CLIMATE  EMERGENCY  SECURITY	 ZERO HUNGER  AFFORDABLE ENERGY  CLIMATE CHANGE  LIFE ON LAND  SUSTAINABLE CITIES	COORDINATION ACTION <input type="checkbox"/>
 <input type="checkbox"/>				<input checked="" type="checkbox"/>
				INNOVATION ACTION <input checked="" type="checkbox"/>

Between the first projects that laid the foundation for the development of FloodHub and [GeoHub](#) systems of the [BEYOND Center of Excellence](#).

(1) The project was implemented in collaboration with the **Institute of Geophysics of Paris** (Institut Physique du Globe de Paris/Jussieu) and the **Laboratory of Higher Geodesy of the Department of Surveying Engineering of NTUA**. Models have been developed to **correct the radar SAR ERS1 & 2 and ENVISAT** based interferometric calculations from noise due to **atmospheric disturbances** (troposphere and ionosphere) and **satellite orbit geometry uncertainties**. It also provided the basis for the advancement of relevant research in the field of **permanent scatterers** at NOA, focusing on the wider area of Athens. The project helped to gather appropriate data and exploit the InSAR technology, with a view to observe and assess very small movements of a few millimeters per year, due to the construction activity and the overexploitation of groundwater reservoirs.

(2) The 2nd project was implemented in collaboration with the **Laboratory for Meteorology and Environmental Modeling** of the Institute of BioMeteorology of the National Research Council of Italy, the **European Space Agency (ESA)**, and the **National Center for Marine Research (HCMR)**. The project **specified and developed a prototype operational application system for the detection of oil spills, monitoring and management of sewage pollution in the Mediterranean**. The design of the system was based on a detailed study of the capabilities offered by the Radar SAR, ERS1&2, RADARSAT and ENVISAT satellite systems, and suggested ways to link with more **conventional ground, offshore and airborne monitoring systems** (air, water and coastal systems). A system has been developed that **integrates orbital data** of various satellite systems as above, and allows for the estimation of satellite image availability by assessing the temporal frequency and exact time a satellite is overpassing any point in the Greek seas, and the derivation of several other useful parameters **supporting systematic actions for monitoring of the marine environment by the use of SAR sensors**. Several criteria were used for delimiting the marine areas that represent an increased risk of oil spill pollution, such as the frequency of ship passages, the type of ships and cargos, the meteorological conditions, the anthropogenic activities along the coasts, as well as the specificity of the regions in terms of ecological and socio-economic significance. **The project completed the information system of POSEIDON of the HCMR providing operational forecasting and immediate information on the current meteorological and dynamic conditions over the Greek seas** and attempting realistic estimations on the **spread of oil spill pollution using the POSEIDON dispersion models**. The project **developed a web-based GIS system**, which gives assessments on the dispersion of oil spill pollution from the first alarm and for at least 24 hours thereafter. **The results of the project were subject of a number of relevant scientific publications.**



ACRITAS: ADVANCED COORDINATION CENTER INFORMATION TECHNOLOGIES & APPLICATIONS FOR BORDER SECURITY

GENERAL SECRETARIAT OF RESEARCH AND TECHNOLOGY (GSRT), OPERATIONAL PROGRAM FOR «COMPETITIVENESS & ENTERPRENEURSHIP» «COOPERATION 2011» , GA : 11SYN-9-1207 2013-2016

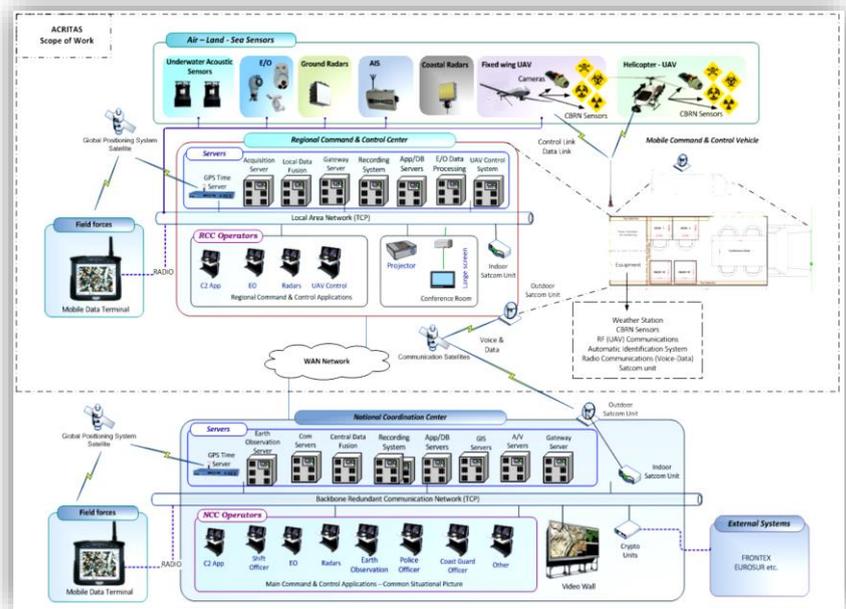
131.095 EUR (NOA Budget)/1.320.547 EUR (Overall Budget)

<http://www.kemea.gr/en/research/research-programmes/136-national-programmes>

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
<input checked="" type="checkbox"/>	DISASTERS ENERGY FOOD SECURITY PUBLIC HEALTH WATER MANAGEMENT	ATMOSPHERE MARINE <input checked="" type="checkbox"/> LAND <input checked="" type="checkbox"/> CLIMATE EMERGENCY SECURITY <input checked="" type="checkbox"/>	ZERO HUNGER AFFORDABLE ENERGY CLIMATE CHANGE LIFE ON LAND SUSTAINABLE CITIES	COORDINATION ACTION <input type="checkbox"/> RESEARCH & INNOVATION <input checked="" type="checkbox"/> INNOVATION ACTION <input type="checkbox"/>
<input type="checkbox"/>				

ACRITAS effectively responded to the development of an **integrated border control system**, applicable to **land and sea borders**. It provided rapid deployment to harsh and isolated environments providing **multifunctional surveillance capabilities, intelligent data products and innovative services** to regional and national authorities for boarder control. It developed innovative and modular environment for addressing major issues faced by the Greece’s authorities as: **illegal immigration, smuggling, trafficking and proliferation of dangerous materials (CBRN)**. **Scalability, mobility and adaptability** were considered to be the most important features of the system. ACRITAS functions as a stand-alone mobile **Regional Coordination Centre (RCC)** and/or in cooperation with the **National Coordination Centre (NCC)**.

The **BEYOND** research team coordinated the work and undertook the development of models and algorithms that allow the simultaneous exploitation of multiple surveillance sources such as **aerial platforms (UAV, Drones), ground sensors (infrared, acoustic, hydrophones) and radar sensors**. Innovative tools for border surveillance services have been developed, allowing for a



seamless and timely geographical representation of the situation (on the ground and on the surface of the sea). It is possible to **couple multiple imaging and other data** in order to identify targets and to detect sudden changes in areas of high operational value. Data flows feed an event management and complex data processing system to automatically export and send alarms. With regard to the terrestrial environment,

advanced visual vision and image processing algorithms have been developed that compare real-time historical satellite high-spatial satellite take-ups with UAV shots and make robust conclusions and identify **any significant unexpected changes occurring along land borders**. With regard to maritime borders, a signal processing methodology has been developed, and made possible to **locate seagoing waterborne motion from signals recorded by hydrophone networks**. The signal waveform analysis, the time delays in signal acquisition, the cross-correlation of signals, and their comparison with known waveforms of particular types of engines, provided the ability to identify the locations and the moving **direction of the sea vehicles**. **The results of the project were subject of relevant scientific publications.**



LIMES: LAND/SEA INTEGRATED MONITORING FOR EUROPEAN SECURITY

COMMISSION OF THE EUROPEAN COMMUNITIES, FP6 - PRIORITY 4, AERONAUTICS & SPACE / GMES SECURITY, GA : No 031046

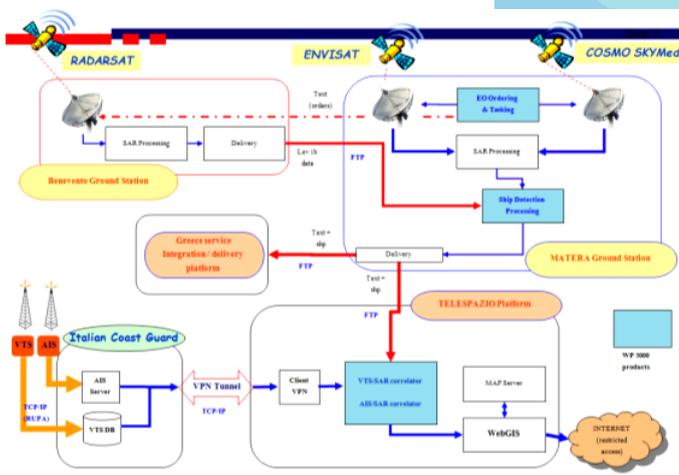
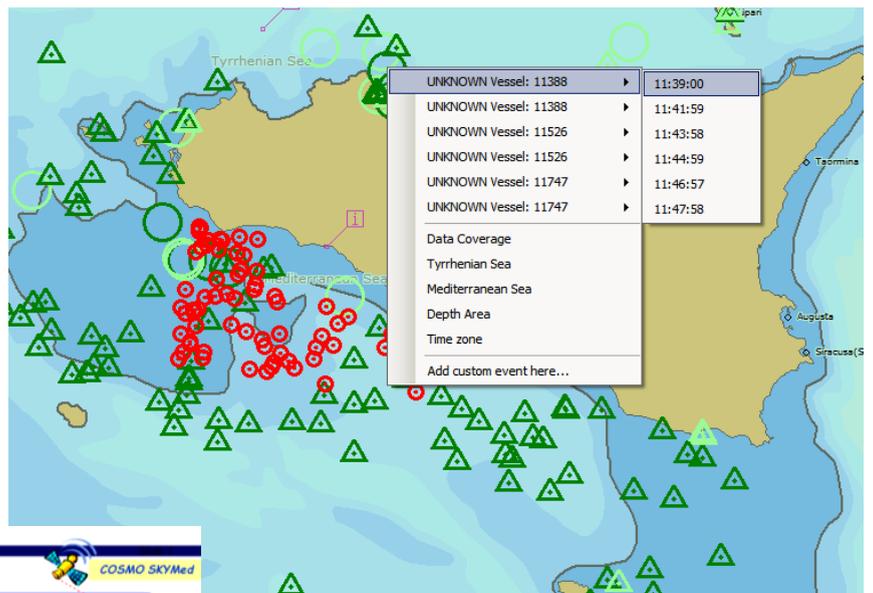
2006-2010

121.000 EUR (NOA Budget)/7.550.000 EUR (Overall Budget)

https://en.wikipedia.org/wiki/LIMES_Project

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
<input checked="" type="checkbox"/>	DISASTERS ENERGY FOOD SECURITY PUBLIC HEALTH WATER MANAGEMENT	ATMOSPHERE MARINE <input checked="" type="checkbox"/> LAND <input checked="" type="checkbox"/> CLIMATE EMERGENCY SECURITY <input checked="" type="checkbox"/>	ZERO HUNGER AFFORDABLE ENERGY CLIMATE CHANGE LIFE ON LAND SUSTAINABLE CITIES	COORDINATION ACTION <input type="checkbox"/> RESEARCH & INNOVATION <input checked="" type="checkbox"/> INNOVATION ACTION <input type="checkbox"/>
<input type="checkbox"/>				

A research project that supported the development of the operational [Copernicus Security \(MARINE SECURITY pillar\)](#). It has been the largest European Integrated Research Project funded in FP6 Framework Program of EC, in the field of maritime security. It has been a collaboration of 52 entities including universities, research centers, shipping authorities, coast guard authorities, the FRONTEX International Force, the



Eastern European Border Control Center (ESBC) and others. The project developed and exploited a real-time EO based information system for the maritime surveillance and the protection of maritime borders, coupling the satellite remote sensing with ground-based sensors for **maritime traffic monitoring** such as AIS, VTS, VTMIS. The NOA research team participated in the development of the **geo-information system**, utilizing nautical charts - ECDIS technologies. It actively participated in **reporting the user needs** (Greek Coast Guard and ESBC) in matters relating to sea surveillance, **pre-defining the system's architecture** and **developing essential parts** of the information

system, by dynamically combining **satellite imagery with terrestrial means** so as to give a clear picture of the **ship traffic across the maritime borders, near the coast, but also in the open sea**. Special research has been developed to **model the ship's movements (AIS) forward or backward** in time, and match them with the corresponding vessel targets/locations detected on satellite images, thereby **verifying the course and identity of the ships**, as well as to **provide timely alarms** in cases of suspect vessels. The NOA research team undertook also actions for **demonstrating the integrated IT system**.



1. MARISS: EUROPEAN MARITIME SECURITY SERVICES

2. MARCOAST: INTEGRATED SYSTEM FOR SUSPECT VESSELS EMERGENCY TRACKING OIL SPILLS

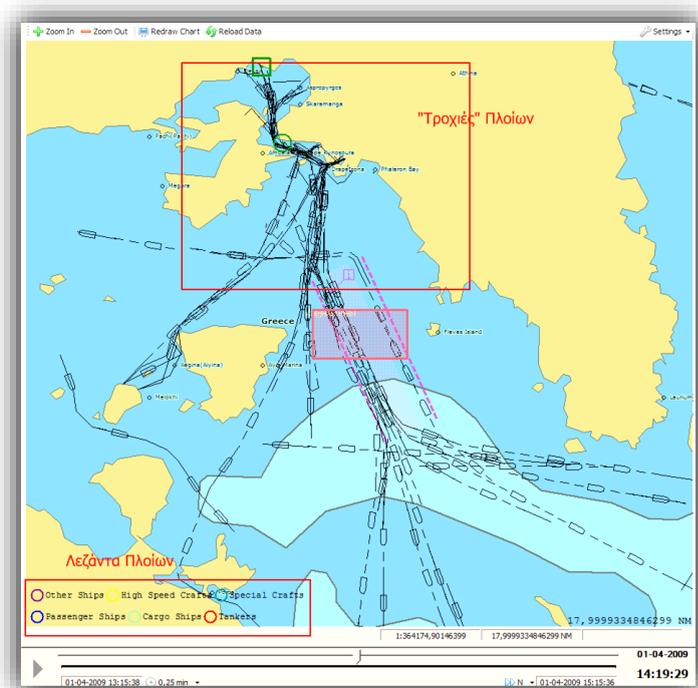
SERVICE CONSOLIDATION ACTIONS OF EARTHWATCH GMES SERVICES ELEMENTS, CONTRACTS:19191/05/I-LG & 08-10029-A-C

2005-2010, 100.000 EUR (NOA Budget)

http://www.esa.int/Our_Activities/Observing_the_Earth/Copernicus/Maritime_Security

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
<input checked="" type="checkbox"/>	DISASTERS ENERGY FOOD SECURITY PUBLIC HEALTH WATER MANAGEMENT	ATMOSPHERE MARINE <input checked="" type="checkbox"/> LAND CLIMATE EMERGENCY SECURITY <input checked="" type="checkbox"/>	ZERO HUNGER AFFORDABLE ENERGY CLIMATE CHANGE LIFE ON LAND SUSTAINABLE CITIES	COORDINATION ACTION <input type="checkbox"/>
<input type="checkbox"/>				RESEARCH & INNOVATION <input type="checkbox"/>
				INNOVATION ACTION <input checked="" type="checkbox"/>

Both projects advanced the research which was developed in the framework of LIMES (see above) and established the operational actions of the Copernicus programme on border control and security (BOARDER MONITORING), and the fight against oil spill marine pollution (MARITIME SAFETY). The projects were funded by the European Space Agency (ESA) and have been the operational implementation of the results of the LIMES project (precursor EC project). The projects have integrated skills from numerous EU organisations, including research institutes (IAASARS/NOA, DLR) and business users. NOA’s research team developed integrated information systems using satellite imagery and in-situ (AIS) data and provided technical support to Greek users, the Center for Surveillance of the Eastern Seas Borders (ESBC) and the Greek Coast Guard, so that the proposed satellite based information systems covers the operational requirements of both sea borders control (MARISS) and oil spill pollution in the sea (MAROCOAST). The information systems ensured timely information for (a) detecting marine pollution from passing ships using ERS1 / 2 & ENVISAT SAR radar imagery, and (b) the combined use of AIS (maritime traffic control) data to identify the most likely suspect that may have caused the pollution event. Between the research activities have been the integration of knowledge combining ship information (e.g. ship type, cargo type, flag, register, expert, transit time for detected pollution, sending or not AIS1 & 5 signals based on the processed satellite image), in order to give a quantitative expression of the likelihood that the passing ship would be responsible for the pollution.



ISLA

ISLA: LAND AND WATER MANAGEMENT IN MEDITERRANEAN ISLANDS USING EARTH OBSERVATION DATA

COMMISSION OF THE EUROPEAN COMMUNITIES, FP4 - ENVIRONMENT & CLIMATE, CEO - APPLICATION SUPPORT, GA : ENV4-CT98-0759

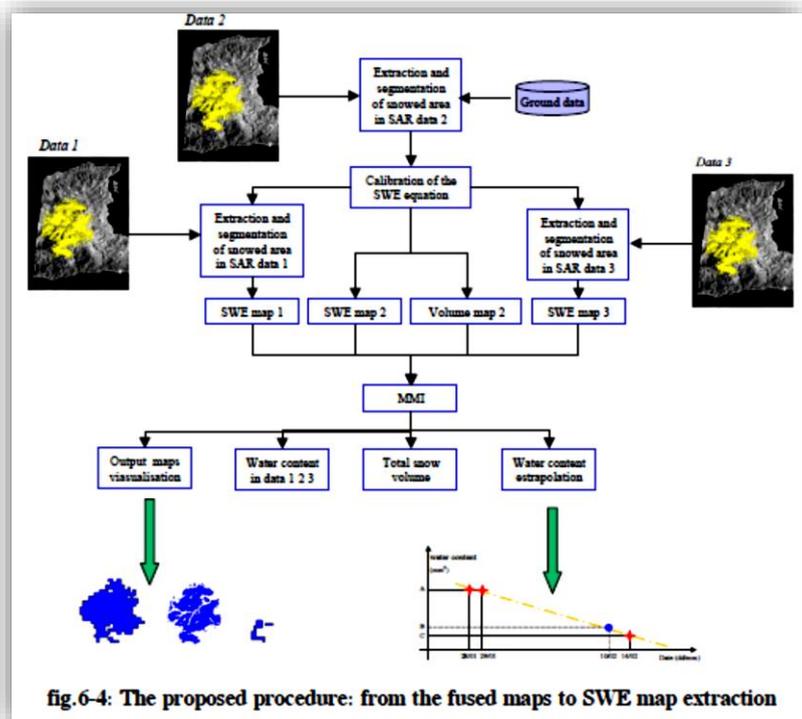
1998-2000,

80.000 EUR (NOA Budget) /910.000 EUR (Overall Budget)

<http://www.fwr.org/fp4.pdf>

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
 <input checked="" type="checkbox"/>	 DISASTERS  ENERGY  FOOD SECURITY  PUBLIC HEALTH  WATER MANAGEMENT <input checked="" type="checkbox"/>	 ATMOSPHERE  MARINE <input checked="" type="checkbox"/>  LAND <input checked="" type="checkbox"/>  CLIMATE  EMERGENCY  SECURITY	 ZERO HUNGER  AFFORDABLE ENERGY  CLIMATE CHANGE  LIFE ON LAND <input checked="" type="checkbox"/>  SUSTAINABLE CITIES	COORDINATION ACTION <input type="checkbox"/>
 <input checked="" type="checkbox"/>				RESEARCH & INNOVATION <input checked="" type="checkbox"/>
				INNOVATION ACTION <input type="checkbox"/>

One of the first research projects that attempted to develop EO service capabilities in the field of water management in the Mediterranean islands **using satellite technology (optical and SAR sensors)** combined with sophisticated **airborne thermal sensors**. The research goal of NOAA's team was to **exploit NOAA/AVHRR optical satellite and ERS SAR data**, and develop the proper **methodology and tools** for assessing **the water balance** in study areas over the Mediterranean islands, and also assessing **snow cover** in the mountainous areas, and the extent it affects water balance. The data were organized in a Geographical Information System environment, which was developed specifically for the purposes of the project, so that they became available to the competent bodies (water management organizations, prefectures, local government, etc.) to support the actions for water resources management especially in the areas with strong water scarcity during the summer period.





2.4 BUILDING EARTH OBSERVATION INFRASTRUCTURE FACILITIES AT NOA



1. CREATION OF A NATIONAL INSTALLATION FOR THE ARCHIVING, CLASSIFICATION AND PROCESSING OF SATELLITE OBSERVATIONS

2. CREATING INFRASTRUCTURE FOR COLLECTION AND USE OF THE ERS SATELLITE

3. INFRASTRUCTURE DEVELOPMENT OF ANTENNA RECEPTION FOR METEOSAT, SEAWIFS SATELLITES

GENERAL SECRETARIAT FOR RESEARCH AND TECHNOLOGY, SUBSTITUTE RESEARCH WEBSITE

1996-1999

630.000 EUR (NOA Budget)

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
 <input checked="" type="checkbox"/>	 DISASTERS <input checked="" type="checkbox"/>  ENERGY <input checked="" type="checkbox"/>  FOOD SECURITY <input checked="" type="checkbox"/>  PUBLIC HEALTH <input checked="" type="checkbox"/>  WATER MANAGEMENT <input checked="" type="checkbox"/>	 ATMOSPHERE <input checked="" type="checkbox"/>  MARINE <input checked="" type="checkbox"/>  LAND <input checked="" type="checkbox"/>  CLIMATE <input checked="" type="checkbox"/>  EMERGENCY <input checked="" type="checkbox"/>  SECURITY <input checked="" type="checkbox"/>	 ZERO HUNGER <input checked="" type="checkbox"/>  AFFORDABLE ENERGY <input checked="" type="checkbox"/>  CLIMATE CHANGE <input checked="" type="checkbox"/>  LIFE ON LAND <input checked="" type="checkbox"/>  SUSTAINABLE CITIES <input checked="" type="checkbox"/>	COORDINATION ACTION <input type="checkbox"/> RESEARCH & INNOVATION <input type="checkbox"/> INNOVATION ACTION <input type="checkbox"/>
 <input checked="" type="checkbox"/>	(Linked to Geo Societal Benefit Areas from the row above)	(Linked to Copernicus Thematic Areas from the row above)	(Linked to UN Sustainable Development Goals from the row above)	(Linked to Project Types from the row above)

The research infrastructure was developed under the responsibility of the **Hellenic Space Research and Technology Committee** at the premises of NOA. At the time it was developed, Dr Kontoes was holding the position of junior **researcher at IAASARS/NOA**, as well as the position of the **Secretary of the Hellenic Space Research and Technology Committee**. The project included: 1. **Installation of hardware and software equipment** (HW and SW) to support satellite data collection and data processing stations; 2. **Installation of NOAA/AVHRR and METEOSAT satellite antenna solutions**; 3. **Installation of network and internet downloading infrastructure**, to ensure real-time access, processing and distribution of EO data and products to end users; 4. **Creating data and metadata bases** of satellite images and products; 5. In cooperation with ESA, **conducting capacity building and seminars for installing and using processing tools**, to foster the development of SAR applications using ERS satellites 5. In consultation with NASA, **installing SEADAS hardware and software to download and process SEAWIFS images**, as well as produce primary productivity products in open seas.

3. CONDUCTING STUDIES FOR PROJECTS AS RURAL AND SURVEYING ENGINEER OF NTUA

In his **capacity as consultant engineer**, he participated in the realization of important **design projects** being **responsible for the coordination, quality control, and guidance** of the design team of the projects.

Consultant Engineer Degree: During the period of his **capacity as consultant engineer (Technical Chamber of Greece registration number: 44270)** he held: **Consultant Engineer Degree of Category C on Topographic Studies and of Category B on Urban Planning Studies.**

Some of the most important projects - studies that he carried out are listed below:



3.1 STUDIES FOR SATELLITE REMOTE SENSING APPLICATIONS

- [1] December 1991 - May 1992: **Agricultural Statistics Program Using Remote Sensing for the year 1991**, Contracting authority: Ministry of Agriculture / Commission of the European Communities, DG VI, Contract number: 4469-91-09 ED ISP GR.
- [2] March 1993 - June 1993: **Agricultural Statistics Program Using Remote Sensing for the year 1992**, Contracting authority: CESD Communautaire (European Commission - EUROSTAT). Contract number: 3353/DJB/NS.
- [3] December 1993 - May 1994: **Agricultural Statistics Program Using Remote Sensing for the year 1993**, Contracting authority: European Union (Joint Research Center Ispra-site). Contract number: 5483/93/09 ISP GR.
- [4] January 1995- March 1995: **Agricultural Statistics Program Using Remote Sensing for the year 1994**, Contracting authority: CESD Communautaire (European Commission-EUROSTAT). Contract number: 1534/EHL/SW.
- [5] June 1994 - December 1994: **Arable Crops Monitoring Program Using Remote Sensing for the year 1993**, Contracting authority: Ministry of Agriculture / Commission of the European Communities, DG VI.
- [6] May 1996 - October 1996: **Arable Crops Monitoring Program Using Remote Sensing for the year 1995**, Contracting authority: Ministry of Agriculture / Commission of the European Communities, DG VI.



3.2 STUDIES FOR DIGITAL PHOTOGRAMMETRY & GIS APPLICATIONS

- [7] December 1995 - June 1996: **National Cadastre Program. Cadastral Data Registration and Organisation for the Local Government Authorities of Zografou and Kesariani of Attica Prefecture**, Contracting authority: Cadastral and Mapping Organization of Greece / Ministry of the Environment, Urban Planning and Public Works
- [8] August 1996 - October 1996: **Production of orthophotomaps scale 1:5000 for the Local Government Authorities of Megala Kalivia and Ag. Kiriaki of Trikala Prefecture** (The orthophotomaps depict the total area of the Local Government Authorities, a surface of 5000 hectares), Contracting authority: Cadastral and Mapping Organization of Greece / Ministry of the Environment, Urban Planning and Public Works
- [9] October 1996 - January 1997: **Photogrammetric rendering of charts scale 1:1000 and production of orthophotomaps scale 1:5000 for the Local Government Authorities of Filippiada, Romia and Thesprotiko of Preveza Prefecture** (photogrammetric charts 200 hectares, orthophotomaps 6500 hectares), Contracting authority: Cadastral and Mapping Organization of Greece / Ministry of the Environment, Urban Planning and Public Works
- [10] January 1997 - March 1997: **Photogrammetric rendering of charts scale 1:1000 and production of orthophotomaps scale 1:5000 for the Local Government Authorities of Rethymno and Elounta**,

- Contracting authority: Cadastral and Mapping Organization of Greece / Ministry of the Environment, Urban Planning and Public Works
- [11] September 1996 - March 1997: **Integrated System of Management and Control of Cultivations**, Contracting authority: Ministry of Agriculture – Commission of the European Communities (DG VI)
- [12] February 1995 - July 1995: **Photogrammetric Rendering and Cadastral Organisation in Road Study (Bypass Arta-Filippiada)**, Contracting authority: Ministry of the Environment, Urban Planning and Public Works / 7th ΠΥΔΕ
- [13] July 1996 - August 1996: **Watercourses Settlement Study**, Contracting authority: Municipality of Zakynthos
- [14] May 1996 – June 1997 & May 1999 – June 2000: **Aerial photography & Production of Orthophotos in the framework of the creation of the Olive and Viticultural Registry, 1996 & 1999**, Contracting authority: Ministry of Agriculture, Rural Development and Food
- [15] November 1998 – June 1999: **Creation of urban atlas of the wider area of Athens**, Contracting authority: Joint Research Center, European Commission
- [16] October 1999 – February 2000: **Integration of ATLAS Databases**, Contracting authority: Joint Research Center, European Commission
- [17] May 2001 – August 2001: **Photointerpretation of LANDSAT TM Satellite Images for the definition of Land Cover Uses for the needs of the Hellenic Statistical Authority, 2001**, Contracting authority: Cadastral and Mapping Organization of Greece / Ministry of the Environment, Urban Planning and Public Works
- [18] December 2001 – December 2002: **Methodological analysis of the results of the "LUCAS 2001" survey, 2002**, Contracting authority: EUROPEAN COMMISSION / EUROSTAT / Unit F2: Agricultural products and fisheries
- [19] January 2004 – May 2004, **Digitization of the declared parcels, Integrated Subsidy Management System (LPIS)**, Contracting authority: Ministry of Agriculture, Rural Development and Food
- [20] January 2004 – September 2004: **Update of the database CORINE LAND COVER GREECE for the years 2000, 2004**, Contracting authority: Cadastral and Mapping Organization of Greece / Ministry of the Environment, Urban Planning and Public Works
- [21] May 2008 – August 2009, **Production of Historical Digital Orthophotomaps**, Contracting authority: Cadastral and Mapping Organization of Greece / Ministry of the Environment, Urban Planning and Public Works
- [22] August 2009 – October 2011, **Development of Geographic Information System & Development of National Road Registry Applications - Technical Support, 2009**, Contracting authority: Ministry of the Environment, Urban Planning and Public Works / ΔΜΕΟ

4. EDUCATIONAL WORK – THESES / Ph.D. SUPERVISING - OUTREACH



4.1 TEACHING - EDUCATIONAL FUNCTION

- [23] **Professor, member of the Special Inter-Institutional Educational Committee of the postgraduate program "SPACE SCIENCE TECHNOLOGIES AND APPLICATIONS"** co-organized by the IAASARS/NOA and the Department of Informatics and Telecommunications of the University of Peloponnesus. Teaching supervisor of the course "**Fundamentals of remote sensing**", and co-teaching of two other semester classes "**Space Applications**" and "**Advanced Space Applications**" (2016-2018).
- [24] Supervisor of **7 postgraduate diploma theses** of the postgraduate program "**SPACE SCIENCE TECHNOLOGIES AND APPLICATIONS**" (2016-2018).
- [25] **Series of lectures at the Summer School of IAASARS/EAA on the subject of implementation of Remote Sensing in the Management of Natural Disasters and Monitoring of the Environment (2016-2017).**
- [26] After a decision of the BoD of the Institut Physique du Globe de Paris, he acted as **member of the core supervising committee of the Ph.D. Thesis of Mr. Antonio Avallone (2003).**
- [27] After a decision of the Surveying Engineering Department of the National Technical University of Athens (NTUA), he acted as **member of the core supervising committee of the Ph.D. Thesis of Ms. A. Pothos (2017).**
- [28] After a decision of the Surveying Engineering Department of the National Technical University of Athens (NTUA), he acted as **member of the core supervising committee of the Ph.D. Thesis of Ms. A. Sakellaris (2017).**
- [29] After a decision of the Surveying Engineering Department of the National Technical University of Athens (NTUA), he acted as **member of the core supervising committee of the Ph.D. Thesis of Ms. M. Vakalopoulou (2017).**
- [30] After a decision of the Surveying Engineering Department of the National Technical University of Athens (NTUA), he acted as **member of the core supervising committee of the Ph.D. Thesis Mr. I. Papoutsis (2014).**
- [31] After a decision of the **Geology and Geophysics Department of the Aristotle University of Thessaloniki, he acts as member of the core supervising committee of the Ph.D. Thesis of N. Svingas.**
- [32] After a decision of the Surveying Engineering Department of the NTUA, he acts as **member of the core supervising committee of the Ph.D. Thesis of Mr. I. Kotsis.**
- [33] After a decision of the Surveying Engineering Department of the NTUA, he acts as **member of the core supervising committee of the Ph.D. Thesis of Mr. V. Massina.**
- [34] After a decision of the Department of Naval Architecture and Marine Engineering of the National Technical University of Athens (NTUA), he participated in the supervision **of the M.Sc diploma thesis of the postgraduate student Mr. G. Vavasis** in the framework of the Interdepartmental Postgraduate Program of Studies "Naval and Marine Technology and Science" (2000).
- [35] After a decision of the Department of Civil Engineering of the National Technical University of Athens (NTUA), he participated in the supervision **of the diploma thesis of postgraduate student A. Tsouni** in the framework of the Interdepartmental Postgraduate Program of Studies "Water Science and Technology" (2008).
- [36] After a decision of the Surveying Engineering Department of the National Technical University of Athens (NTUA), he acted as **member of the core supervising committee of the M.Sc diploma Thesis of student M. Kaskara (2016).**
- [37] After a decision of the Department of Electronics of the Technological Educational Institute of Piraeus, he acted as **member of the core supervising committee of the undergraduate diploma Thesis of student P. Ilias (1999).**
- [38] After a decision of the Department of Animal Production of the Agricultural University, he acted as **member of the core supervising committee of the M.Sc diploma Thesis of student B. Giannaki (2006).**



4.2 OTHER LECTURES - POPULARIZATION OF SCIENCE - SEMINARS

- [39] **Series of lectures on Remote Sensing at (a) Fire Brigade Academy and (b) Technological Institute of Athens (University of Western Attica) (2017-2018).**
- [40] **Series of popular seminars and lectures on:**
- 1. Remote Sensing for the management of natural disasters, at the French Institute as part of the Festival Geo-Meetings (Athens 2014), Water, Air, Earth, Fire: Observing the planet,**
 - 2. "How Space Observation and Monitoring of Earth brings reversal in detecting and combating forest fires" during "ASTRO" observation evenings organized by the "Hellenic Kosmos" foundation in collaboration with the National Observatory of Athens, as part of "The Conquest of Space by the American Museum of Natural History of New York (Athens 2015),**
 - 3. "Fighting natural disasters from space" in the formal presentation of the Greek Mirror Site (Sentinels DataHub) during the traveling exhibition of the European Union on Space "Space Expo (Athens 2015).**
- [41] **Series of Remote Sensing lectures** in the framework of the educational programme "**WORLD: Contribution of Space Technology to Earth, Atmosphere and Space Science**", organized by the National Observatory of Athens and funded by the Operational Program for Education and Initial Professional Training - **Mobility Programme 1996-1999 (May 1997).**
- [42] **Series of lectures on Remote sensing** in the framework of the "**ASTRO: Contemporary Achievements in Astrophysics and Earth Sciences, Atmosphere and Space**" programme, organized by the National Observatory of Athens and funded by the Operational Program for Education and Initial Professional Training - **Mobility Programme 1996-1999 (October 1998).**
- [43] **Seminars on Digital Photogrammetry and Organization of Geographical and Land Information Systems** using ARC/INFO and MGE-SX tools, in the framework of the continuing training program of Engineers entitled "**Organization of Land Information**". These lectures were organized by **Technical Chamber of Central Greece (1996).**
- [44] **Lectures on Geographical Information Systems** in the framework of the Lyceum graduate training programme. These lectures were organized by **ELKEPA (1995).**
- [45] **Lectures on Digital Photogrammetry and Organization of Geographical and Land Information Systems** in the Environment of the Geographic Information System ARC/INFO and MGE-SX, in the framework of the continuing training program of Engineers entitled "Organization of Land Information". These lectures were organized by **Technical Chamber of West Crete (1995).**
- [46] **Seminars - lectures on Remote Sensing** in the framework of continuing education seminars of the NTUA, organized by the Remote Sensing Laboratory of **NTUA (Academic year 1993-1994).**
- [47] **Seminars - lectures on Remote Sensing** in the seminar "Programme for the Development of Remote Sensing Consultants on Energy and Environmental Applications" by **ELKEPA (Academic year 1993).**
- [48] **Supervising the students' projects** conducted in the class of **geodetic exercises**, Department of Rural and Surveying Mechanics NTUA, **(June 1984).**

5. ORGANISATION OF SCIENTIFIC CONFERENCES AND WORKSHOPS

- [1] **MEMBER OF THE ORGANISING COMMITTEE** of the 44TH COSPAR SCIENTIFIC ASSEMBLY 2022, proposed to take place in Athens, Greece, July 2022.



5.1 FULLY RESPONSIBLE - COORDINATION OF ORGANISING CONFERENCES

- [2] [3rd South-Eastern Europe GEO Workshop](#) organized by GEO-CRADLE on 4-5/06/2018 in Thessaloniki, Greece.
- [3] SPECIAL SESSION in the [GEO European Projects Workshop 2018 / EuroGEOSS Workshop 2018](#) on 12-14/09/2018 in Geneva, Switzerland.
- [4] SPECIAL SESSION in the [GEO Week 2018](#) on 29/10-02/11 in Kyoto, Japan.
- [5] SPECIAL SESSION in the [INSPIRE Conference 2018](#) on 18-21/09/2018 in Antwerp, Belgium.
- [6] **Co-convenor of session AS5.1: Earth surveillance and space-based monitoring of the environment: Integrated approaches**, [European Geosciences Union General Assembly 2018](#), Vienna, Austria, 8–13 April 2018.
- [7] The GEO-CRADLE network, GEOSS, and Copernicus in context of regional needs, [GEO-CRADLE Regional Workshop](#) in Istanbul, Turkey, 15-16 March 2018.
- [8] [GEO-CRADLE Regional Workshop](#) in Tunis, Tunisia, December 7th 2017.
- [9] [GEO-CRADLE Regional Workshop](#), Tel Aviv, Israel, 14-09-2017, The Porter School of Environmental Studies, Tel-Aviv University.
- [10] GEO capacity development, contribution to SDGs and realization of regional impacts derived from GEO European Projects, GEO-CRADLE Organisation at [11th GEO European Projects Workshop](#), 21 June 2017, Helsinki, Finland.
- [11] Assessing Regional Needs in the Middle East by enhancing Earth Observation uptake and relevant business performances, [GEO-CRADLE Regional Workshop](#), Cairo, Egypt, 25 May 2017
- [12] Assessing EO capacities in Balkans for Climate Change, [GEO-CRADLE Regional Workshop](#), Bucharest, Romania, 9 May 2017
- [13] Improving EO services industry involvement in EU space programmes and initiatives, [GEO-CRADLE Industry Information Workshop](#), Brussels, 26 April 2017
- [14] Addressing Regional Needs in Balkans by enhancing Earth Observation uptake and relevant business performances, [GEO-CRADLE Regional Workshop](#), Sofia, Bulgaria, 24/03/2017
- [15] [GEO-CRADLE Regional Workshop](#), 02/02/2017, Abu Dhabi, United Arab Emirates
- [16] [GEO-CRADLE networking event](#), Chişinău, Moldova, 03 January 2017
- [17] Workshop on soil spectral data & water extremes management, access to solar energy and adaptation to climate change, a roadmap for GEO and Copernicus, [GEO-CRADLE Regional Workshop](#), Limassol, Cyprus, 16-17 November 2016
- [18] GEO-CRADLE & the 2nd EuroGeoSurveys Networking Meeting, [GEO-CRADLE Regional Workshop](#), Morocco and Algeria, 17-23 October 2016
- [19] [Copernicus Information and Training Session](#), Athens, Greece, 7/10/2016
- [20] [GEO-CRADLE stakeholders' workshop meeting](#), 26/09/2016, Tirana, Albania
- [21] Accelerating EO-powered businesses and market take-up, [GEO-CRADLE Regional Workshop](#), Novi Sad, Serbia, 14-15 July 2016
- [22] Regional dimension for GEO and capacity building priorities, [GEO-CRADLE Session at the 10th GEO European Projects Workshop](#), Berlin, Germany, 31 May-2 June 2016
- [23] BEYOND Center Of Excellence: An overview for stakeholders, [BEYOND Final Workshop](#), Athens, Greece, 17 May 2016
- [24] [ONE step... BEYOND Workshop](#), organised at ESA-ESRIN, Frascati, Italy, 15 October 2015
- [25] [European Space Expo in Athens: Discover what Space brings to your life](#), co-organised by the European Commission& National Observatory of Athens, Athens, Greece, 28 March - 5 April, 2015

- [26] The European Center of Excellence BEYOND for EO based monitoring of Natural Disasters, [EGU 2015 Dedicated Splinter Session of BEYOND](#), Vienna, Austria, 12-17 April 2015
- [27] [8th GEO European Project Workshop](#), Athens, Greece, 12&13 June 2014
- [28] [2nd South-Eastern Europe GEO Workshop](#) on Integrating Earth Observation Data and Services for monitoring the Environment, protecting the citizens and stimulating the regional economic growth, Athens, Greece, 20-21 October 2014
- [29] Space Techniques for Environmental Management in the Mediterranean, EURISY Colloquium, Athens, Greece, 1998.



5.2 MEMBER OF ORGANISING/SCIENTIFIC COMMITTEES OF CONFERENCES

- [30] [2nd International Conference on Citizen Observatories for natural hazards and Water Management COWM 2018](#), November 27-30, 2018, in Venice, Italy.
- [31] [Conference](#) on Sentinels Serving Society and the Environment, EVGENIDIS Foundation, Athens, Greece, 12-13 May 2014
- [32] [Workshop](#) Global Urban Observation and Monitoring from Space, Athens, Greece, March 31- April 1, 2014.
- [33] [1st GEO South–Eastern Europe and Eastern Mediterranean Symposium](#) on Earth Observation Services for Monitoring the Environment and Protecting the General Public, Athens, Greece, 8-10 June 2009
- [34] [Forum on Global Monitoring for Environment and Security](#), Lille- France, 16-17 September, 2008
- [35] [Workshop on Burn Scar Mapping](#), Lisbon, Portugal, 10-11 February 2008
- [36] Hellenic conference on RS: State-of-the-art and applications, Athens, Greece, 22-23 February 2007
- [37] Greece joining the DRAGON Programme, ESA organisation, Athens, Greece, 2004
- [38] [Forum on Global Monitoring for Environment and Security](#), Athens, Greece, 5-6 June 2003
- [39] [Conference on Program Messinia](#), European Collaboration Program, EUR 13700 EN/1991, Athens, Greece, 1991

6. PARTICIPATION IN INTERNATIONAL & NATIONAL SCIENTIFIC CONFERENCES

Scientific results of the research studies conducted by Dr. C. Kontoes have been presented in a large number of international and national conferences and workshops. Hereinafter are indicatively referenced a number of 132 cases of conferences. More than one presentations have taken place in several of them. The proper references and links to the presented articles and power point presentations are also indicatively provided.



6.1 INTERNATIONAL SCIENTIFIC CONFERENCES

- [1] **International Conference on Advances in Remote Sensing, Thessaloniki, 1988.** Αναφορά σε εργασία [IntJ-2.1].
- [2] **First European Conference on Geographical Information Systems EGIS' 90, Amsterdam (NL).** Αναφορά σε εργασία [IntCon-2.1].
- [3] **International Geoscience And Remote Sensing Symposium (IGARSS) '91, IEEE Session WP-13, Helsinki, 1991.** Αναφορά σε εργασία [IntCon-2.2].
- [4] **International Geoscience And Remote Sensing Symposium (IGARSS) '92, IEEE, Huston, USA, 1992.** Αναφορά σε εργασία [IntCon-2.3].
- [5] **Symposium International de Cartographie Thematique Derivees des Images Satellitaires, Paris, France, 1991.** Αναφορά σε εργασία [IntCon-2.4].
- [6] **Int. Conference on the Application of Remote Sensing to Agricultural Statistics, Belgirate, Italy, 1991.** Αναφορά σε εργασία [IntCon-2.5].
- [7] **Int. Conference on the Application of Remote Sensing to Agriculture Statistics, Varese, Italy, 1989.** Αναφορά σε εργασία [IntCon-2.6].
- [8] **International Symposium on Dimethylsulphide Oceans Atmosphere and Climate, Organization DG XII/E CCE, Belgirate, Italy, 1992.** Αναφορά σε εργασία [IntCon-2.7].
- [9] **[INVITED PRESENTATION], Program "Messinia", European Collaboration Program, EUR 13700 EN/1991, 1991.** Αναφορά σε εργασία [IntCon-2.8].
- [10] **[INVITED PRESENTATION], International conference on "Satellite Observation for Sustainable Development in the Mediterranean Area", ESA/ESRIN, Frascati, 1996.** Αναφορά σε εργασία [IntCon-2.9].
- [11] **[INVITED PRESENTATION], International conference on "Machine Vision in Remotely Sensed Image Comprehension", London-Kingston, 1998.** Αναφορά σε εργασία [IntCon-2.10].
- [12] **[INVITED PRESENTATION], International conference on "Space Techniques for Environmental Management in the Mediterranean", EURISY Colloquium, Athens, 1998.** Αναφορά σε εργασία [IntCon-2.11].
- [13] **Space Techniques for Environmental Management in the Mediterranean, EURISY Colloquium, Athens, Greece, 1998.**
- [14] **Third EO/GEO Web/ Internet Workshop, Salzburg, Austria, 1998.** Αναφορά σε εργασία [IntCon-2.12].
- [15] **[INVITED PRESENTATION], Twenty-first Urban Data Management Symposium, UDMS' 99, Venice, p. IX4.1-4.9, 1999.** Αναφορά σε εργασία [IntCon-2.13].
- [16] **[INVITED PRESENTATION, Nato Advanced Research Seminar, "Integration of Earth Sciences Research on the 1999 Turkish and Greek Earthquakes and Needs for Future Cooperative Research", Istanbul, 2000.** Αναφορά σε εργασία [IntCon-2.14].
- [17] **ESA ERS-Envisat Symposium, Goeteborg, Sweden, 2000.** Αναφορά σε εργασία [IntCon-2.15].
- [18] **International Workshop on Geo-Spatial Knowledge Processing for Natural Resource Management, European Commission-University of Insubria, Varese, Italy, 2001.** Αναφορά σε εργασία [IntCon-2.16].
- [19] **[INVITED PRESENTATION, ESA ESRIN Symposium, Rome, Italy, 2001.** Αναφορά σε εργασία [IntCon-2.17].
- [20] **First Hellenic-Turkish Conference in Physics, Kos Island, Hellas, 2001.** Αναφορά σε εργασία [IntCon-2.18].

- [21] **International conference on “Integrated development in mountain areas: Theory and Action”, Metsovo, 2001.** Αναφορά σε εργασία [IntCon-2.19].
- [22] **Eleventh General Assembly of the WEGENER Project Conference, Athens, 2002.** Αναφορά σε εργασία [IntCon-2.20].
- [23] **SPIE Remote Sensing Conference, Crete, 2002.** Αναφορά σε εργασία [IntCon-2.21].
- [24] **EGS-AGU-EUG Joint Assembly, Nice, France, 2003.** Αναφορά σε εργασία [IntCon-2.22].
- [25] **[INVITED PRESENTATION], Workshop on GPS and SAR interferometry on volcanoes, IIV-CNR, Catania, 2002.** Αναφορά σε εργασία [IntCon-2.23].
- [26] **Tenth International Symposium of Remote Sensing, Remote Sensing for Agriculture, Ecosystems and Hydrology V, Barcelona, Spain, 2003.** Αναφορά σε εργασία [IntCon-2.24].
- [27] **Earth Observation Info-days by ESA and GSRT, Athens, Greece, 2004.** Αναφορά σε εργασία [IntCon-2.25].
- [28] **International workshop: Greece joining the DRAGON Programme, Athens, Greece, 2004.** Αναφορά σε εργασία [IntCon-2.26].
- [29] **MedWet / CODDE international Workshop: Enrichment of the MedWet Inventory Method, Thessaloniki, Greece, 2006.** Αναφορά [IntCon-2.27].
- [30] **COSPAR Scientific Assembly, Paris, France, 2004.** Αναφορά σε εργασία [IntCon-2.28].
- [31] **Twelfth International Symposium Remote Sensing, Remote Sensing for Agriculture, Ecosystems, and Hydrology VII, SPIE, Bryges, Belgium, 2005.** Αναφορά σε εργασία [IntCon-2.29].
- [32] **[INVITED PRESENTATION], International GLOBWETLAND SYMPOSIUM-Looking at wetlands from Space, ESA-ESRIN, Frascati, Italy, 2006.** Αναφορά σε εργασία [IntCon-2.30].
- [33] **XV Congress of the Federation of European Societies of Plant Biology, Lyon, France, 2006.** Αναφορά σε εργασία [IntCon-2.31].
- [34] **ESA Envisat International Symposium 2007, Montreux, Switzerland, 2007.** Αναφορά σε εργασία [IntCon-2.32].
- [35] **IEEE International Geoscience and Remote Sensing Symposium IGARSS 2007, Barcelona, 2007.** Αναφορά σε εργασία [IntCon-2.33].
- [36] **Sixth International Workshop of the EARSel Interest Group on Forest Fires, Advances in Remote Sensing and GIS Applications in Forest Fire Management, Thessaloniki, 2007.** Αναφορά σε εργασία [IntCon-2.34].
- [37] **EGU General Assembly 2008, Vienna, Austria, 2008.** Αναφορά σε εργασίες [IntCon-2.35, 2.36].
- [38] **[INVITED PRESENTATION], MedWet/CODDE Conference on Wetland Inventory and Assessment in the Mediterranean Region: Advanced Tools, Athens, Hellas, 2008.** Αναφορά σε εργασία [IntCon-2.37].
- [39] **Thirtyfirst General Assembly, Hersonissos, Crete, Greece, 2008.** Αναφορά σε εργασία [IntCon-2.38].
- [40] **[INVITED PRESENTATION], Seventh International Workshop EARSeL, Advances in RS and GIS applications in Forest Fire Management - Towards an Operational Use of RS in Forest Fire Management, Matera, Italy, 2009.** Αναφορά σε εργασία [IntCon-2.39].
- [41] **EGU General Assembly 2010.** Αναφορά σε εργασία [IntCon-2.40].
- [42] **Advances in the Science and Applications of SAR Interferometry, ESA ESRIN ERS Symposium 2009, Frascati.** Αναφορά σε εργασία [IntCon-2.41].
- [43] **GEO South–Eastern Europe and Eastern Mediterranean Symposium on Earth Observation Services for Monitoring the Environment and Protecting the General Public, 2009, Athens.** Αναφορά σε εργασία [IntCon-2.42].
- [44] **SPIE 2010 Remote Sensing Conference, 2010, Toulouse, France.** Αναφορά σε εργασία [IntCon-2.43].
- [45] **2nd International Conference on Citizen Observatories for natural hazards and Water Management COWM 2018, November 27-30, 2018, in Venice, Italy.**
- [46] **Forum on Global Monitoring for Environment and Security, Athens, Greece, 5-6 June 2003**
- [47] **Greece joining the DRAGON Programme, ESA organisation, Athens, Greece, 2004**
- [48] **Hellenic conference on RS: State-of-the-art and applications, Athens, Greece, 22-23 February 2007**
- [49] **Forum on Global Monitoring for Environment and Security, Lille- France, 16-17 September, 2008**
- [50] **Workshop on Burn Scar Mapping, Lisbon, Portugal, 10-11 February 2008**

- [51] **1st GEO South–Eastern Europe and Eastern Mediterranean Symposium on Earth Observation Services for Monitoring the Environment and Protecting the General Public, Athens, Greece, 2009**
- [52] **ESA Fringe Workshop, ERS – ENVISAT cross-interferometry in the Athens metropolitan area, Frascati, Italy, September 19–23, 2011, [[Paper](#)]**
- [53] **Collaborative Ground Segment Workshop 2012, 20 December 2012 - EUMETSAT (Darmstadt)**
- [54] **Collaborative Ground Segment Workshop 2013, 4 December 2013 - ESA HQ (Paris)**
- [55] **9th EARSeL Forest Fire Special Interest Group Workshop, National Burn Scar Mapping in Greece, University of Leicester, UK, October 15–17, 2013, [[Presentation](#)]**
- [56] **ESA Living Planet Symposium, (a) An exploration of CHRIS PROBA hyperspectral imagery for obtaining burnt area cartography from a uni-temporal perspective, & (b) The Santorini inflation episode: from start to finish, Edinburgh (Scotland), September 09–13, 2013 [[Presentation](#)] , [[Poster](#)]**
- [57] **EDBT/ICDT 2013 Joint Conference, Building Earth Observatories using Scientific Database and Semantic Web Technologies, Genoa, Italy, March 18-22, 2013**
- [58] **EGU General Assembly 2013, (a) A fully automatic processing chain to produce Burn Scar Mapping products, based on the Landsat archive & (b) The Santorini inflation episode: from start to finish, Vienna, Austria, April 07–12, 2013**
- [59] **International Conference on Atmospheric Dust, "Dust Model Validation using CALIPSO", Castellana Marina, Italy - June 1-6, 2014 , [[Presentation](#)]**
- [60] **8th GEO European Projects Workshop (GEPW-8), "The European Centre of Excellence BEYOND for Earth Observation based monitoring of Natural Disasters in South-Eastern Europe", Athens, Greece, June 12-13, 2014 , [[Presentation](#)]**
- [61] **12th International Conference on Meteorology, Climatology and Atmospheric Physics COME CAP 2014, Evaluation of FLEXPART smoke dispersion using MISR plume heights", Heraklion, Crete, 28 May – 31 May 2014 , [[Poster](#)]**
- [62] **2nd Tectonic Geodesy Workshop, Earthquake Planning and Protection Organization, BEYOND Center of Excellence for monitoring geophysical activity and geo-hazard mapping, Athens, Greece, May 14, 2014, [[Workshop Link](#)], [[Presentation](#)]**
- [63] **Conference on Sentinels Serving Society and the Environment, EVGENIDIS Foundation, Athens, Greece, 12-13 May 2014**
- [64] **Global Urban Observation and Monitoring from Space, Athens, Greece, March 31- April 1, 2014.**
- [65] **GEO X Plenary, the GEO Ministerial Summit and the parallel EC Side Events, Presentation of BEYOND Center of Excellence: concept and first outcomes, Geneva Switzerland, January 13-17, 2014, [[Presentation 1](#)]**
- [66] **Sentinel Collaborative Ground Segment Workshop 2014, 4 December 2014 - ESA ESRIN (Frascati)**
- [67] **8th GEO European Project Workshop, Athens, Greece, 12&13 June 2014**
- [68] **GEO XI Plenary Meeting, "FireHub: A Space based Fire Management Hub", Geneva, Switzerland, November 13-14, 2014, [[Presentation](#)]**
- [69] **2nd South-Eastern Europe GEO Workshop on Integrating Earth Observation Data and Services for monitoring the Environment, protecting the citizens and stimulating the regional economic growth, Athens, Greece, 20-21 October 2014**
- [70] **[INVITED PRESENTATION], 1st international geomatics applications conference (GEOMAPPLICA), "Operational fire disaster management services via Earth Observation in BEYOND", Skiathos Island, Greece, September 08-11, 2014 [[Presentation1](#)] [[Presentation2](#)] [[Presentation3](#)]**
- [71] **[INVITED PRESENTATION], SciNetNatHazPrev Workshop - Open Seminar entitled "Contribution on Preventing Natural Disasters", BEYOND Center of Excellence for EO-based monitoring of natural disasters in South-Eastern Europe, Thessaloniki, 30 October 2015, OASP-ITSAK, [[Presentation](#)], [[Open Seminar Agenda](#)]**
- [72] **[INVITED PRESENTATION], SciNetNatHazPrev Workshop - Open Seminar entitled "Contribution on Preventing Natural Disasters", BEYOND Center of Excellence for EO-based monitoring of natural disasters in South-Eastern Europe, Xanthi, 6th October 2015, Democritus University of Thrace, Greece [[Presentation](#)], [[Open Seminar Agenda](#)]**
- [73] **Sentinel Collaborative Ground Segment Technical Workshop December 2015 (GOCG), 7 December 2015 - Brussels**

- [74] **ONE step... BEYOND Workshop**, organised at ESA-ESRIN, Frascati, Italy, 15 October 2015 [[Presentation](#)]
- [75] **Sentinel collaborative GS workshop 2015**, Greece's Collaborative Ground Segment Initiatives, Matera, Italy, 28 May 2015 (hosted by ASI) [[Presentation](#)]
- [76] [INVITED PRESENTATION], **European Space Expo in Athens: Discover what Space brings to your life**, co-organised by the European Commission & National Observatory of Athens, Athens, Greece, 28 March - 5 April, 2015
- [77] **International Union of Geodesy and Geophysics General Assembly 2015**, The upgraded ENIGMA magnetometer array, Prague, Czech Republic, 22 June – 2 July, 2015
- [78] **The European Center of Excellence BEYOND for EO based monitoring of Natural Disasters**, EGU 2015 Dedicated Splinter Session of BEYOND, Vienna, Austria, 12-17 April 2015 [[Presentation1](#)] [[Presentation2](#)] [[Presentation3](#)] [[Presentation4](#)] [[Presentation5](#)]
- [79] [INVITED PRESENTATION] Conference entitled "Space 2016 - Challenges and Perspectives", The Centre of Excellence for EO-based monitoring of Natural Disasters: "BEYOND", Armed Forces Communications and Electronic Association (AFCEA), LAED, Athens, 27th January 2016 [[Space 2016 - Challenges and Perspectives Agenda](#)]
- [80] **GEO-CRADLE & the 2nd EuroGeoSurveys Networking Meeting**, GEO-CRADLE Regional Workshop, Morocco and Algeria, 17-23 October 2016
- [81] **The GEO-CRADLE regional workshop**, Tel Aviv, 14 September 2017, The Porter School of Environmental Studies, Tel-Aviv University
- [82] **GEO-CRADLE & the 2nd EuroGeoSurveys Networking Meeting**, GEO-CRADLE Regional Workshop, Morocco and Algeria, 17-23 October 2016
- [83] [INVITED PRESENTATION], **Copernicus Information and Training Session**, Athens, Greece, 7/10/2016
- [84] **Accelerating EO-powered businesses and market take-up**, GEO-CRADLE Regional Workshop, Novi Sad, Serbia, 14-15 July 2016
- [85] **10th GEO European Projects Workshop, Session: Mitigating the effects Natural Hazards and strengthening Disaster Resilience**, The European Centre of Excellence BEYOND for Earth Observation based monitoring of Natural Disasters in South-Eastern Europe, Berlin, Germany, 31 May-2 June 2016 [[Session Programme](#)]
- [86] [INVITED PRESENTATION], **13th International Conference on Meteorology, Climatology and Atmospheric Physics COMECAP 2016**, Synergistic satellite & modeling methods for the description of biomass smoke dispersion over complex terrain. The FireHub platform, 18-21 September 2016, Athens, Greece.
- [87] **13th International Conference on Meteorology, Climatology and Atmospheric Physics COMECAP 2016**, Development of a dust assimilation system for NMM-DREAM model based on MSG-SEVIRI satellite observations, 18-21 September 2016, Athens, Greece.
- [88] [INVITED PRESENTATION], **MEDCLIVAR 2016 Conference**, Learning from the past, perceiving, engaging for the future, 26-30 September 2016, Athens, Greece
- [89] **Workshop on soil spectral data & water extremes management, access to solar energy and adaptation to climate change, a roadmap for GEO and Copernicus**, GEO-CRADLE Regional Workshop, Limassol, Cyprus, 16-17 November 2016
- [90] **Sentinel Collaborative Ground Segment Technical Workshop 8 June 2016 - Frascati, Italy**
- [91] **GEO-CRADLE Organisation at the 10th GEO European Projects Workshop**, Regional dimension for GEO and capacity building priorities, Berlin, Germany, 31 May-2 June 2016
- [92] **Conference on BEYOND Center Of Excellence: An overview for stakeholders**, Athens, Greece, 17 May 2016 [[Presentation1](#)] [[Presentation2](#)] [[Presentation3](#)] [[Presentation4](#)] [[Presentation5](#)] [[Presentation6](#)] [[Presentation7](#)] [[Presentation8](#)] [[Presentation9](#)]
- [93] **ESA Living Planet Symposium 2016**, Congress Centre, Prague, Czech Republic, 9-13 May 2016, [[Presentation](#)], [[Paper](#)]
- [94] **EGM for Water-Food-Energy Resilience under SDGs and Paris Agreement in Mid-Latitude Region (Draft)**, SDGs and Paris Agreement Mainstreaming: Focusing on water, food and energy, United

- Nations Office for Sustainable Development, Incheon, Republic of Korea 28-29 November 2016, Seoul, Republic of Korea
- [95] European Geosciences Union General Assembly 2016, The upgraded ENIGMA magnetometer array Vienna, Austria, 17 – 22 April 2016
- [96] GEO Plenary XIII, 7-10 November 2016, St Petersburg, Russian Federation [[https://www.earthobservations.org/documents/geo_xiii/GEO-XIII-1.3\(Rcv2\)_Draft%20Agenda.pdf](https://www.earthobservations.org/documents/geo_xiii/GEO-XIII-1.3(Rcv2)_Draft%20Agenda.pdf)]
- [97] Middle East GEO-CRADLE Workshop & Project Meeting, 16-17 November 2016, Limassol, Cyprus
- [98] Earth observation and planetary science symposium, Global Space Congress, UAE, Abu Dhabi, 31 January -1 February 2017
- [99] EO stakeholder engagement in Balkans, GEO-CRADLE networking event, Chişinău, Moldova, 03 January 2017
- [100] Addressing Regional Needs in Balkans by enhancing Earth Observation uptake and relevant business performances, GEO-CRADLE Regional Workshop, Sofia, Bulgaria, 24/03/2017
- [101] GEO capacity development, contribution to SDGs and realization of regional impacts derived from GEO European Projects, GEO-CRADLE Organisation, 11th GEO European Projects Workshop, 21 June 2017, Helsinki
- [102] 2nd GEO Data Providers workshop, 20th-21st April 2017, Florence, Italy
- [103] Improving EO services industry involvement in EU space programmes and initiatives, GEO-CRADLE Industry Information Workshop, Brussels, 26 April 2017
- [104] Assessing Regional Needs in the Middle East by enhancing Earth Observation uptake and relevant business performances, GEO-CRADLE Regional Workshop, Cairo, Egypt, 25 May 2017
- [105] Assessing EO capacities in Balkans for Climate Change, GEO-CRADLE Regional Workshop, Bucharest, Romania, 9 May 2017
- [106] GEO WEEK 2017-Insight for a Changing World, 23-27 October 2017, Washington DC USA [[agenda](#)]
- [107] GEO-CRADLE Regional Workshop in Tunis, December 7th 2017, from 8h00 to 17h00, Tunis
- [108] [3rd South-Eastern Europe GEO Workshop](#) organized by GEO-CRADLE on 4-5/06/2018 in Thessaloniki, Greece.
- [109] SPECIAL SESSION in the **GEO European Projects Workshop 2018 / EuroGEOSS Workshop 2018** on 12-14/09/2018 in Geneva, Switzerland.
- [110] SPECIAL SESSION in the **GEO Week 2018** on 29/10-02/11 in Kyoto, Japan.
- [111] SPECIAL SESSION in the [INSPIRE Conference 2018](#) on 18-21/09/2018 in Antwerp, Belgium.
- [112] Co-convenor of session **AS5.1: Earth surveillance and space-based monitoring of the environment: Integrated approaches**, European Geosciences Union, General Assembly 2018, Vienna, Austria, 8–13 April 2018
- [113] **The GEO-CRADLE network, GEOSS, and Copernicus in context of regional needs**, GEO-CRADLE Regional Workshop, Istanbul, Turkey 15-16 March 2018.
- [114] **Sentinel Collaborative Ground Segment Technical Workshop**, 15 December 2016, Oberpfaffenhofen, Germany
- [115] **Sentinels Collaborative Ground Segment Workshop**, 7 February 2018, Brussels
- [116] [INVITED PRESENTATION], Conference in Sofia, Bulgaria, 18 - 19 April 2018
- [117] [INVITED PRESENTATION-Keynote Speech], International Conference on Soil Sciences, Remote Sensing for Sustainable Soil Management, "Soil spectral libraries in N. Africa, M. East, and Balkans in support to the Food Security Pilot of GEO-CRADLE", **ICOSS'2018, 17 - 19th March 2018, Hammamet, Tunisia**
- [118] [INVITED PRESENTATION-Keynote Speech], **2nd international geomatics applications conference (GEOMAPPLICA)**, Greek Collaborative Mirror Site: a Platform as a Service for the deployment of EO applications, Syros - Myconos Island, Greece, June 25th to 29th, 2018



6.2 NATIONAL SCIENTIFIC CONFERENCES

- [119] [INVITED PRESENTATION], Επιστημονικό Συνέδριο στην Ψηφιακή Χαρτογραφία, Φωτογραμμετρία, Τηλεπισκόπηση, και Τεχνολογίες Αιχμής, Οργάνωση ΤΕΕ, Αθήνα, 1994. Αναφορά σε εργασία [HelCon-2.1].
- [120] Πρώτη συνάντηση εργασίας "Ανάπτυξη Ελληνικής Εθνικής Στρατηγικής στα πεδία των εφαρμογών Παρατήρησης και Παρακολούθησης της Γης, ΕΔΕΤ/ΓΓΕΤ, Αθήνα, 1995. Αναφορά σε εργασίες [HelCon-2.2, 2.3].
- [121] Δεύτερη συνάντηση εργασίας "Ανάπτυξη Ελληνικής Εθνικής Στρατηγικής στα πεδία των εφαρμογών Παρατήρησης και Παρακολούθησης της Γης, ΕΔΕΤ/ΓΓΕΤ, Αθήνα, 1996. Αναφορά σε εργασία [HelCon-2.4].
- [122] [INVITED PRESENTATION] Ελληνικό συνέδριο "Από την Τοπογραφία στην Γεωπληροφορική", Αθήνα, 1997. Αναφορά σε εργασία [HelCon-2.5].
- [123] [INVITED PRESENTATION] Ελληνικό συνέδριο "Χρήση της Δορυφορικής Τηλεπισκόπησης για τις Ανάγκες του Δημόσιου Τομέα", Αθήνα, 1998. Αναφορά σε εργασία [HelCon-2.6].
- [124] Εβδομο Εθνικό Συνέδριο Χαρτογραφίας «Νησιώτικη Χαρτογραφία», Μυτιλήνη, Ελλάδα, 2002. Αναφορά σε εργασία [HelCon-2.8].
- [125] Έκτο Πανελλήνιο Συνέδριο Περιβάλλοντος-Ολοκληρωμένη Ανάπτυξη & Περιβάλλον, ΘΕΜΑΤΙΚΗ ΕΝΟΤΗΤΑ: 1γ. ΥΔΑΤΙΝΟ ΠΕΡΙΒΑΛΛΟΝ, Θεσσαλονίκη, Ελλάδα, 2004. Αναφορά σε εργασία [HelCon-2.9].
- [126] Έκτο Πανελλήνιο Συνέδριο Περιβάλλοντος της Ένωσης Ελλήνων Φυσικών-Ολοκληρωμένη Ανάπτυξη & Περιβάλλον, Θεσσαλονίκη, Ελλάδα, 2006. Αναφορά σε εργασία [HelCon-2.10].
- [127] Ενδέκατο Πανελλήνιο Συνέδριο της Ένωσης Ελλήνων Φυσικών «Οι νέοι ορίζοντες της Φυσικής στον αιώνα μας», Λάρισα, 2006. Αναφορά σε εργασία [HelCon-2.11].
- [128] [INVITED PRESENTATION], Ημερίδα του θεματικού δικτύου Geo-Impact της Επιτροπής Ερευνών του ΑΠΘ, Θεσσαλονίκη, Ελλάδα, 2006. Αναφορά σε εργασία [HelCon-2.12].
- [129] [INVITED PRESENTATION], Πανελλήνιο Συνέδριο Τηλεπισκόπηση: Εξελίξεις και Εφαρμογές, ΤΕΕ, ΓΕΩΤΕΕ, ΕΛΛ. Εταιρεία Φωτογραμμετρίας και Τηλεπισκόπησης, Αθήνα, 2007. Αναφορά σε εργασίες [HelCon-2.13, 2.14, 2.15].
- [130] [INVITED PRESENTATION], Ημερίδα για την καταστροφή στην Πάρνηθα, ΕΚΠΑ, Αθήνα, 2007. Αναφορά σε εργασία [HelCon-2.16].
- [131] Ογδοο Πανελλήνιο Γεωγραφικό συνέδριο της Ελληνικής Γεωγραφικής Εταιρείας, Τμήμα Γεωλογίας & Γεωπεριβάλλοντος, Αθήνα, 2007. Αναφορά σε εργασία [HelCon-2.17].
- [132] [INVITED PRESENTATION], Πρώτη Συνάντηση εργασίας του δικτύου ΠΡΟΤΗΠΑ "Προηγμένες Τεχνικές Τηλεπισκόπησης για τη Διαχείριση και Προστασία του Περιβάλλοντος", Ασπροπόταμος Τρικάλων, Ελλάδα, 2007. Αναφορά σε εργασία [HelCon-2.18].
- [133] Πανελλήνια ημερίδα Αντιπλημμυρικού Σχεδιασμού και Διαχείρισης Κινδύνου Πλημμυρών, Τεχνικό Επιμελητήριο Ελλάδας, Αθήνα, 2007. Αναφορά σε εργασία [HelCon-2.19].
- [134] Ημερίδα για τις Δασικές Πυρκαγιές, Πρωτοβουλία Ελλήνων Επιστημών, 2008, Αθήνα. Αναφορά σε εργασία [HelCon-2.20].
- [135] Ημερίδα για την Παρατήρηση της Γης στην Ελλάδα, Αθήνα, 2010, Εθνικό Ίδρυμα Ερευνών. Αναφορά σε εργασία [HelCon-2.21].

7. SCIENTIFIC PUBLICATIONS, TECHNICAL REPORTS, PRESS & MEDIA ARTICLES



7.3 PUBLICATIONS IN PEER REVIEWED INTERNATIONAL JOURNALS

- [1] **[IntJ-2.1] [INVITED] Kontoes C.C., Stakenborg J. (1990)**, "Availability of Cloud Free Landsat Images for Operational Projects. The Analysis of Cloud Cover Figures Over the Countries of the European Communities", *Int. Jour. Rem. Sens.*, Vol. 11, No 9, pp. 1599-1608.
- [2] **[IntJ-2.2.a] Kontoes C.C., Wilkinson G.G., Burril A., Goffredo S., Megier J. (1993)**, "Integration of GIS Data in a Knowledge-Based Image Analysis System for Rapid Estimates of Crop Acreages by Remote Sensing", *Int. Jour. G.I.S.*, Vol. 7, No 3, pp. 247-262.
- [3] **[IntJ-2.2.b] G. G. Wilkinson, C. Kontoes, C. N. Murray (1993)**: Recognition and Inventory of Oceanic Clouds from Satellite Data Using an Artificial Neural Network Technique. *Dimethylsulphide: Oceans, Atmosphere and Climate*, 01/1993: pages 393-399; , ISBN: 978-90-481-4325-2, DOI:10.1007/978-94-017-1261-3_41
- [4] **[IntJ-2.3] Kontoes C.C., Rokos D. (1996)**, "The Integration of Spatial Context Information in an Experimental Knowledge Based System and the Supervised Relaxation Algorithm. Two Successful Approaches to improving SPOT-XS classification", *Int. Jour. Rem. Sens.*, Vol. 17, No 16, pp. 3093-3106.
- [5] **[IntJ-2.4] [INVITED] Kontoes C.C., Rokos D. (1994)**, "The use of spatial post-classification methods of SPOT-XS satellite data in the process of producing reliable agricultural statistics. A necessary classification approach in application programs." Published in *TECHNICAL CHRONICS Scientific Edition of the Technical Chamber of Greece (TEE)*, Scientific Area A, Volume 14, Issue 3, pp. 307-328, July-September 1994.
- [6] **[IntJ-2.5] Kontoes C.C. (1995)**, "Agricultural Statistics and Remote Sensing: Necessities-Methodology-Typology", *TECHNICAL CHRONICS*, 2nd Extraordinary Edition 1995, ISSN 0376-2211, pp. 186-192.
- [7] **[IntJ-2.6] [INVITED] Kontoes C.C. (1998)**, "Image Analysis Techniques for Urban Land Use Classification. The Use of Kernel Based Approaches to Process Very High Resolution Satellite Imagery", *Machine Vision and Advanced Image Processing in Remote Sensing*, Springer Verlag, ISBN 3-540-65571-9, pp. 121-134.
- [8] **[IntJ-2.7] [INVITED] Kontoes C.C. (1999)**, "Mapping Athens from Space. High resolution satellite Imagery for Urban Mapping", *GIM*, No 9, Vol. 13, pp. 92-95.
- [9] **[IntJ-2.8] Sifakis N., Kontoes C.C., Elias P. (1999)**, "Toxic Cloud from Bombed Industry near Belgrad Seen by a Meteorological Satellite", *GEOEurope*, Issue 10, pp. 39-41.
- [10] **[IntJ-2.9] Kontoes C.C., Raptis V., Lautner M., Oberstadler R. (2000)**, "The potential of kernel classification techniques for land use mapping in urban areas using 5m-spatial resolution IRS-1C sensor imagery", *International Journal of Remote Sensing*, Vol. 21, No 16, pp. 3145-3151.
- [11] **[IntJ-2.10] Kontoes C.C., Elias P., Sykioti O., Briole P., Remy D., Sachpazi M., Veis G., Kotsis I., (2000)**, "Displacement field mapping and fault modeling of the September 7th, 1999 Athens earthquake based on ERS-2 satellite radar interferometry", *Geophysical Research Letters*, Vol. 27, No 24, pp. 3989-3992, DOI:10.1029/2000GL008510.

- [12] [\[IntJ-2.11\]](#) Sachpazi M., Kontoes C.C., Voulgaris N., Laigle M., Vougioukalakis G., Sikioti O., Stavrakakis G., Baskoutas J., Kalogeras J., Lepine J. Cl., (2002), "Seismological and SAR signature of unrest at Nisyros caldera, Greece", *Journal of Volcanology and Geothermal Research*, ELSEVIER, Vol. 116, pp. 19-34, DOI:10.1016/S0377-0273(01)00334-1.
- [13] [\[IntJ-2.12\]](#) Sykioti O., Kontoes C.C., Elias P., Briole P., Sachpazi M., Paradisis D., Kotsis I., (2003), "Ground deformation at Nisyros volcano (Greece) detected by ERS-2 SAR differential interferometry", *International Journal of Remote Sensing*, Vol. 23, No 1, pp. 183-188, DOI:10.1080/01431160305000.
- [14] [\[IntJ-2.13\]](#) Keramitsoglou I., Kontoes C. C., Sifakis N., Mitchley J. and Xofis P. (2005), "Kernel based re-classification of earth observation data for fine scale habitat mapping", *Journal of Nature Conservation*, Vol. 13, Issues 2-3, pp. 91-99, DOI:10.1016/j.jnc.2005.02.004.
- [15] [\[IntJ-2.14\]](#) Kontoes C.C., Sykioti O., Paronis D., and Harisi A. (2005), "Evaluating the performance of the space-borne SAR sensor systems for oil spill detection and sea monitoring over the south-eastern Mediterranean Sea", *International Journal of Remote Sensing*, Vol. 26, No. 18, 20 September 2005, 4029–4044, DOI:10.1080/01431160500104129.
- [16] [\[IntJ-2.15\]](#) Elias P., Kontoes C.C., Sykioti O., Avallone A., Van Gorp S., Briole P. and Paradisis D. (2006), "A method for minimising of low frequency and unwrapping artifacts from interferometric calculations", *International Journal of Remote Sensing* Vol. 27, No. 14, 3079–3086, DOI:10.1080/01431160600578388.
- [17] [\[IntJ-2.16\]](#) Keramitsoglou I, Sarimveis H., Kiranoudis C., Kontoes C.C., Sifakis N., Fitoka E. (2006), "The performance of pixel window algorithms in the classification of habitats using VHSR imagery", *ISPRS Journal of Photogrammetry & Remote Sensing*, 60(4), pp. 225-238, DOI:10.1016/j.isprsjprs.2006.01.002.
- [18] [\[IntJ-2.17\]](#) Kontoes C.C. (2008), "Operational Land Cover Change Detection Using Change-Vector Analysis", *International Journal of Remote Sensing*, *International Journal of Remote Sensing*, Vol. 29, No. 16, pp.4757-4779, DOI:10.1080/01431160801961367.
- [19] [\[IntJ-2.18\]](#) Keramitsoglou I., Kontoes C.C., Sykioti O., Sifakis N. and Xofis P. (2008), "Reliable, accurate and timely forest mapping for wildfire management using ASTER and Hyperion satellite imagery", *Forest Ecology and Management*, Vol. 255, Issue 10, 30 May 2008, pp. 3556–3562, doi:10.1016/j.foreco.2008.01.077.
- [20] [\[IntJ-2.19\]](#) [INVITED] Tsouni A., Kontoes C.C., Koutsoyiannis D., Elias P., Mamasias N., (2008), "Estimation of actual evapotranspiration by Remote Sensing: Application in Thessaly plain, Greece", *Sensors*, Vol. 8, Issue 6, pp. 3586-3600, DOI: 10.3390/s8063586, Special Issue: "Remote Sensing of Natural Resources and the Environment (Remote Sensing Sensors)", Editor Assefa M. Malesse.
- [21] [\[IntJ-2.20\]](#) Kotsis I., Kontoes C., Paradisis D., Karamitsos S., Elias P., Papoutsis I. (2008), A Methodology to Validate the InSAR Derived Displacement Field of the September 7th, 1999 Athens Earthquake Using Terrestrial Surveying. Improvement of the Assessed Deformation Field by Interferometric Stacking, *Sensors*, 8, 4119-4134; DOI: 10.3390/s8074119.
- [22] [\[IntJ-2.21\]](#) Elias, P.; Kontoes, C.; Papoutsis, I.; Kotsis, I.; Marinou, A.; Paradisis, D.; Sakellariou, D. (2009), Permanent Scatterer InSAR Analysis and Validation in the Gulf of Corinth. *Sensors*, 9, 46-55, doi:10.3390/s90100046.
- [23] [\[IntJ-2.22\]](#) Kontoes C.C., Poilvé H., Florsch G., Keramitsoglou I., Paralikidis S. (2009), A Comparative Analysis of a Fixed Thresholding vs. a Classification Tree Approach for Operational Burn Scar

Detection and Mapping, International Journal of Applied Earth Observation and Geoinformation, Vol. 11, Issue 5, October 2009, ISSN 0303 2434, DOI: 10.1016/j.jag.2009.04.001.

- [24] [\[IntJ-2.23\]](#) **Kontoes C.C., Keramitsoglou I., Sifakis N. and Konstantinidis P. (2009)**, SITHON: An Airborne Fire Detection System Compliant with Operational Tactical Requirements, *Sensors* 2009, 9, 1204-1220; doi:10.3390/s90201204 **(25/4/2013: TOP 20 ARTICLES PUBLISHED ON THE SAME TOPIC SINCE IT WAS PUBLISHED)**.
- [25] [\[IntJ-2.24\]](#) **[INVITED] Kontoes C.C., Sifakis N., Keramitsoglou I., (2009)**, GMES Burn Scar Mapping kicks into full gear after 2007 wildfires in Greece, *Windows on GMES, A BOSS4GMES Publication*, Issue 3, pp. 58-63, ISBN: 2030-5419 (ISSN)
- [26] [\[IntJ-2.25\]](#) **Sifakis N., Iossifidis C., Kontoes C., I. Keramitsoglou, (2009)**, Wildfire detection and tracking over Greece using MSG-SEVIRI satellite data, submitted for publication in *Sensors Journal*, *Remote Sensing* 12/2011; 3(3)., DOI:10.3390/rs3030524.
- [27] [\[IntJ-2.26\]](#) **G.A. Papadopoulos, V. Karastathis, C. Kontoes, I. Papoutsis, M. Charalampakis and A. Fokaefs, (2009)**, Crustal deformation associated with the 8 June 2008 earthquake (Mw6.4) in Greece: seismological observations, dislocation modeling and DInSAR analysis, *Tectonophysics* 492 (2010) 201–212, doi:10.1016/j.tecto.2010.06.012, pp. 201-212 Elsevier.
- [28] [\[IntJ-2.27\]](#) **George P. Petropoulos, Charalambos Kontoes, Iphigenia Keramitsoglou, (2010)**, Burnt Area Delineation from a uni-temporal perspective based on Landsat TM imagery classification using Support Vector Machines, *Int. Journal of Applied Earth Observation and Geoinformation*, doi:10.1016/j.jag.2010.06.008.
- [29] [\[IntJ-2.28\]](#) **Nicolas I. Sifakis, Christos Iossifidis, Charis Kontoes (2014)**: CHRISTINE Code for High Resolution Satellite mapping of optical Thickness and Ångstrom Exponent; Part II: First application to the urban area of Athens Athens-Greece and comparison to results from previous contrast-reduction codes. *Computers & Geosciences* 01/2014; 62:142–149., DOI:10.1016/j.cageo.2013.05.011
- [30] [\[IntJ-2.29\]](#) **Amiridis V., Zerefos C., Kazadzis S., Gerasopoulos E., Eleftheratos K., Vrekoussis M., Stohl A., Mamouri R.E., Kokkalis P., Papayannis A., Eleftheriadis K., Diapouli E., Keramitsoglou I., Kontoes C., Kotroni V., Lagouvardos K., Marinou E., Giannakaki E., Kostopoulou E., Giannakopoulos C., Richter A., and Burrows J.P., Mihalopoulos N. (2011)**, Impact of the 2009 Attica wild fires on the air quality in urban Athens, [Atmospheric Environment](#), doi:10.1016/j.atmosenv.2011.07.056.
- [31] [\[IntJ-2.30\]](#) **Hailikas G., Leventakis G., Kontoes C., Tsoukas V., Dritsas L., and Pantelous A. (2011)**, Design Issues of an Operational Fire Detection System Integrated with Observation Sensors, Book "Satellite Communications", ISBN 978-953-307-338-5, Book Editor: Masoumeh Karimi, InTech Open Access Publisher, Vienna, DOI:10.5772/19896.
- [32] [\[IntJ-2.31\]](#) **George P. Petropoulos, Charalambos Kontoes, Iphigenia Keramitsoglou, (2012)**, Land Use/Cover Mapping With Emphasis to Burnt Area Delineation Using Co-Orbital ALI and Landsat TM Imagery, *International Journal of Applied Earth Observation and Geoinformation*, 18 (2012) 344–355, Elsevier, DOI:10.1016/j.jag.2012.02.004.
- [33] [\[IntJ-2.32\]](#) **Charalampos Kontoes, Themistoklis Herekakis, Emmanouela Ieronymidi, Iphigenia Keramitsoglou, Anna Fokaefs, Gerasimos A. Papadopoulos, Sideris Paralikidis, Dorothea Aifantopoulou, Anna Maria Deflorio, Daniela Iasillo and Chris T. Kiranoudis (2012)**, Mapping Seismic Vulnerability and Risk of Cities: The MASSIVE Project, *Journal of Earth Science and Engineering* Vol. 2, No 8, (2012) 496-513.

- [34] [\[IntJ-2.33\]](#) I. Papoutsis, X. Papanikolaou, M. Floyd, K. H. Ji, C. Kontoes, D., Paradissis, R. Reilinger, and V. Zacharis (2012), Mapping inflation at Santorini volcano, Greece, using GPS and InSAR, GEOPHYSICAL RESEARCH LETTERS, VOL. 40, 267–272, doi:10.1029/2012GL054137, 2013.
- [35] [\[IntJ-2.34\]](#) Evangelos Mitsakis, Iraklis Stamos, Anestis Papanikolaou, Georgia Aifadopoulou, Haris Kontoes (2013), Assessment of climate change impacts and extreme weather events on transport networks: Case study of the 2007 wildfires in Peloponnesus, Natural Hazards, DOI 10.1007/s11069-013-0896-3.
- [36] [\[IntJ-2.35\]](#) Charalampos Kontoes, Iphigenia Keramitsoglou, Ioannis Papoutsis, Nicolas I. Sifakis and Panteleimon Xofis 2 (2013), National Scale Operational Mapping of Burnt Areas as a Tool for the Better Understanding of Contemporary Wildfire Patterns and Regimes, Sensors 2013, 13, 11146-11166; doi:10.3390/s130811146.
- [37] [\[IntJ-2.36\]](#) Earthzine C. Kontoes, I. Papoutsis, T. Herekakis, N. Sifakis, (2013), Wildfire Rapid Detection and Mapping and Post-fire Damage Assessment in Greece, Earthzine, Fostering Earth Observation & Global Awareness, In Earthzine magazine, posted online 14 September 2013.
- [38] [\[IntJ-2.37\]](#) K. Kyzirakos, M. Karpathiotakis, G. Garbis, C. Nikolaou, K. Bereta, I., Papoutsis, T. Herekakis, D. Michail, M. Koubarakis, and C. Kontoes (2014), Wildfire monitoring using satellite images, ontologies and linked geospatial data, Journal of Web Semantics Volume: 24 Pages: 18-26 P, DOI: 10.1016/j.websem.2013.12.002.
- [39] [\[IntJ-2.40\]](#) Iphigenia Keramitsoglou, Dimitris Stratoulis, MSc; Eleni Fitoka; Charalabos Kontoes; Nicolas Sifakis (2015), A transferability study of the kernel-based reclassification algorithm for habitat delineation. International Journal of Applied Earth Observation and Geoinformation 11/2014; <http://dx.doi.org/10.1016/j.jag.2014.11.002>, Vol. 37 (2015), pp. 38–47.
- [40] [\[IntJ-2.39\]](#) John Peter Merryman Boncori, Ioannis Papoutsis, Giuseppe Pezzo, Cristiano Tolomei, Simone Atzori, Athanassios Ganas, Vassilios Karastathis, Stefano Salvi, Charalampos Kontoes, and A. Antonioli (2014), The February 2014 Cephalonia Earthquake (Greece): 3D Deformation Field and Source Modeling from Multiple SAR Techniques, Seismological Research Letters Volume 86, Number 1, pp. 124-137, January/February 2015, doi: 10.1785/0220140126.
- [41] [\[IntJ-2.41\]](#) V. Amiridis, E. Marinou, A. Tsekeri, U. Wandinger, A. Schwarz, E. Giannakaki, R. Mamouri, P. Kokkalis, I. Binietoglou, S. Solomos, T. Herekakis, S. Kazadzis, E. Gerasopoulos, E. Proestakis, M. Kottas, D. Balis, A. Papayannis, C. Kontoes, K. Kourtidis, N. Papagiannopoulos, L. Mona, G. Pappalardo, O. Le Rille, and A. Ansmann, (2015), LIVAS: a 3-D multi-wavelength aerosol/cloud database based on CALIPSO and EARLINET, Atmos. Chem. Phys., 15, 7127–7153, 2015 www.atmos-chem-phys.net/15/7127/2015/ doi:10.5194/acp-15-7127-2015.
- [42] [\[IntJ-2.42\]](#) 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.
- [43] [\[IntJ-2.43\]](#) Balasis, G., I. A. Dagleis, Y. Contoyiannis, S. M. Potirakis, C. Papadimitriou, N. S. Melis, O. Giannakis, A. Papaioannou, A. Anastasiadis, and C. Kontoes (2015), Observation of intermittency-induced critical dynamics in geomagnetic field time series prior to the intense magnetic storms of March, June and December 2015, J. Geophys. Res., in revision.
- [44] [\[IntJ-2.44\]](#) Manolis Koubarakis, Kostis Kyzirakos, Charalampos Nikolaou, George Garbis, Konstantina Bereta, Roi Dogani, Stella Giannakopoulou, Panayiotis Smeros, Dimitrianos Savva, George Stamoulis, Giannis Vlachopoulos, Stefan Manegold, Charalampos Kontoes, Themistocles

- Herekakis, Ioannis Papoutsis, Dimitrios Michail (2016):** Managing big, linked, and open earth-observation data: Using the TELEIOS/LEO software stack., IEEE Geoscience and Remote Sensing Magazine, 09/2016; 4(3):23-37., DOI:10.1109/MGRS.2016.2530410.
- [45] **[IntJ-2.45] Anastasios L. Fytisilis , Anthony Prokos , Konstantinos D. Koutroumbas , Dimitrios Michail , Charalambos C. Kontoes (2016),** A methodology for near real-time change detection between Unmanned Aerial Vehicle and wide area satellite images, ISPRS Journal of Photogrammetry and Remote Sensing, ISPRS Journal of Photogrammetry and Remote Sensing 119 (2016) 165–186, <http://dx.doi.org/10.1016/j.isprsjprs.2016.06.001>
- [46] **[IntJ-2.47] Svigkas Nikos, Papoutsis Ioannis, Loupasakis Constantinos, Tsangaratos Paraskevas, Kiratzi Anastasia, Kontoes Charalambos (Haris), (2016),** Land subsidence rebound detected via multi-temporal InSAR and ground truth data in Kalochori and Sindos regions, Northern Greece, Engineering Geology 05/2016; 209:175-186., DOI:10.1016/j.enggeo.2016.05.017
- [47] **[IntJ-2.48] Ioannis Papoutsis Charalampos Kontoes, and Demitrios Paradissis, (2017),** Multi-Stack Persistent Scatterer Interferometry Analysis in Wider Athens, Greece, Remote Sens. 2017, 9, 276; doi:10.3390/rs9030276
- [48] **[IntJ-2.49] Charalampos Kontoes, Ioannis Papoutsis, Themistocles_Herekakis, Emmanuela Ieronymidi, and Iphigenia Keramitsoglou, (2016),** Remote Sensing Techniques for Forest Fire Disaster Management:The FireHub Operational Platform, Book Chapter No6, INTEGRATING SCALE IN REMOTE SENSING AND GIS, p.p. 157-187, Taylor & Francis Series in Remote Sensing Applications, Series Editor Qihao Weng, Indiana State University Terre Haute, Indiana, U.S.A, ISBN: 978-1-4822-1826-8, DOI:10.1201/9781315373720-7.
- [49] **[IntJ-2.50] Potirakis, S.M., Contoyiannis, Y., Melis, N.S., Kopanas, J., Antonopoulos, G., Balasis, G., Kontoes, C., Nomicos, C., and Eftaxias, K. (2016),** Recent seismic activity at Cephalonia (Greece): a study through candidate electromagnetic precursors in terms of non-linear dynamics. Nonlinear Processes in Geophysics, Geophysics 08/2016; 23(4):223-240., DOI:10.5194/npg-23-223-2016
- [50] **[IntJ-2.51] Panagiotis G.Kosmopoulos,Stelios Kazadzis, Michael Taylor, Eleni Athanasopoulou, Orestis Speyer, Panagiotis Raptis, Eleni Marinou, Emmanouil Proestakis, Stavros Solomos, Evangelos Gerasopoulos, Vassilis Amiridis, Alkiviadis Bais, and Charalabos Kontoes, (2017),** Dust impact on surface solar irradiance assessed with model simulations, satellite observations and ground-based measurements, Atmospheric Measurement Techniques, 07/2017; 10(7):2435-2453., DOI:10.5194/amt-10-2435-2017.
- [51] **[IntJ-2.52] G. A. Papadopoulos, A. Ganas, A. Agalos, A. Papageorgiou, I. Triantafyllou, Ch. Kontoes, I. Papoutsis, G. Diakogianni (2017):** Earthquake Triggering Inferred from Rupture Histories, DInSAR Ground Deformation and Stress-Transfer Modelling: The Case of Central Italy During August 2016–January 2017. Pure and Applied Geophysics 07/2017; 174(14)., DOI:10.1007/s00024-017-1609-8
- [52] **[IntJ-2.53] S. Solomos, S. Nickovic, V. Amiridis, G. Pejanovic, Y. Pradhan, F. Marengo, S. Petkovic, E. Marinou, B. Cvetkovic, C. Kontoes (2017):** Development of a Dust Assimilation System for NMM-DREAM Model Based on MSG-SEVIRI Satellite Observations. Perspectives on Atmospheric Sciences, 01/2017: pages 801-807; ISBN: 978-3-319-35094-3, DOI:10.1007/978-3-319-35095-0_115
- [53] **[IntJ-2.54] C. Kontoes, S. Solomos, V. Amiridis, T. Herekakis (2017):** Synergistic Satellite and Modeling Methods for the Description of Biomass Smoke Dispersion Over Complex Terrain. The FireHub Platform. Perspectives on Atmospheric Sciences, 01/2017: pages 809-815; ISBN: 978-3-319-35094-3, DOI:10.1007/978-3-319-35095-0_116
- [54] **[IntJ-2.55] Nikos Svigkas, Ioannis Papoutsis, Constantinos Loupasakis, Paraskevas Tsangaratos,**

Anastasia Kiratzi, Charalampos Haris Kontoes (2017): InSAR time-series monitoring of ground displacement trends in an industrial area (Oreokastro—Thessaloniki, Greece): detection of natural surface rebound and new tectonic insights. *Environmental Earth Sciences* 03/2017; 76(5):195., DOI:10.1007/s12665-017-6517-9

- [55] **[IntJ-2.56]** Ioanna Varkitzi, Anestis Trypitsidis, Alkis Astyakopoulos, Constantinos Rizogiannis, Beatriz Gómez Miguel, Alexia Tsouni, Konstantinos Topouzelis, Harris Kontoes, Ulrich Tagne, Fabio AL Vieira, Rafael Zurita, Sandra Silva, Vasilios Lykousis, Stelios CA Thomopoulos (2018), Designing innovative services for marine environment monitoring using earth-observation tools in the frame of the Pre-Commercial Procurement project MARINE-EO, *AIP Journal (American Institute of Physics)*, submitted.



7.4 PUBLICATIONS - PRESENTATIONS IN INTERNATIONAL CONFERENCES & WORKSHOPS

- [56] **[IntCon-2.1]** Kontoes C.C. (1990), "Multi-layered Model of Spectral, Textural and Contextual Features for Pixel Labelling", *Proceedings First European Conference on Geographical Information Systems EGIS' 90*, Vol.2, pp. 605-613, Amsterdam (NL).
- [57] **[IntCon-2.2]** Kontoes C.C., Rokos D., Wilkinson G.G., Megier J. (1991), "The Use of Expert System and Supervised Relaxation Techniques to Improve SPOT Image Classification Using Spatial Context", *IGARSS '91, IEEE Session WP-13*, Vol 3, pp. 1855-1858.
- [58] **[IntCon-2.3]** Wilkinson G.G., Kanellopoulos I., Kontoes C.C., Megier J. (1992), " A Comparison of Neural Network and Expert System Methods for Analysis of Remotely-Sensed Imagery", presented in *IGARRS '92*, Houston, U.S.A, International; 06/1992, DOI:10.1109/IGARSS.1992.576627.
- [59] **[IntCon-2.4]** Wilkinson G.G., Kontoes C.C. (1991), "Application of Artificial Intelligence in Land Use Mapping from Satellite Imagery", *Symposium International de Cartographie Thematique Derivees des Images Satellitaires*, Bulletin No 127-128, pp. 78-82, Saint-Mande; 10/1990, DOI:10.13140/2.1.3543.8400.
- [60] **[IntCon-2.5]** Wilkinson G.G., Kanellopoulos I., Kontoes C.C., Schoenmakers R. (1991), "Advances in the Automatic Processing of Satellite Imagery", presented in *Int. Conference on the Application of Remote Sensing to Agricultural Statistics*, Belgirate.
- [61] **[IntCon-2.6]** Kontoes C.C. (1989), "Classification Improvement of SPOT Data Based on the Use of Filtered Data and Contextual Features. Study of the Loir et Cher Region", *Proc. Int. Conf. on the Application of Remote Sensing to Agriculture Statistics*, Varese, pp. 303-306, 10/1989, DOI:10.13140/2.1.4068.1288.
- [62] **[IntCon-2.7]** Wilkinson G.G., Kontoes C.C., Murray C.N. (1992), "Recognition and Inventory of Oceanic Clouds from Satellite Data Using an Artificial Neural Network Technique", presented in the *International Symposium on Dimethylsulphide Oceans Atmosphere and Climate*, Organization DG XII/E CCE, Belgirate, Italy.
- [63] **[IntCon-2.8]** **[INVITED PRESENTATION]** Kontoes C.C., Folving S. (1991), "Methods and techniques applicable to the analysis of Remote Sensing Images. An overview", conference proc, Programm "Messinia", *European Collaboration Program*, EUR 13700 EN/1991, pp. 135-154.
- [64] **[IntCon-2.9]** **[INVITED PRESENTATION]** Kontoes C.C., Veis G. (1996), "Needs and Cooperation in Mediterranean: The Hellenic Case", to be presented in the colloquium on "Satellite Observation for Sustainable Development in the Mediterranean Area", *ESA/ESRIN*, Frascati, 2-3 October 1996, pp.

191-198.

- [65] **[IntCon-2.10] [INVITED PRESENTATION] Kontoes C.C. (1998)**, “Image Analysis Techniques for Urban Land Use Classification. The Use of Kernel Based Approaches to Process Very High Resolution Satellite Imagery”, presented in the “Machine Vision in Remotely Sensed Image Comprehension” conference held in London-Kingston, May 1998.
- [66] **[IntCon-2.11] [INVITED PRESENTATION] Kontoes C.C. Aifadopoulou D., Kanellopoulos I, (1998)**, “Land Use Mapping and Change Detection Study in Athens Using Very High Spatial Resolution Satellite Imagery (IRS-1C, KVR-1000)”, presented in the international conference “Space Techniques for Environmental Management in the Mediterranean”, EURISY Colloquium, Athens-Greece, 19-20 October 1998, 10/1998, DOI:10.13140/2.1.3216.1608.
- [67] **[IntCon-2.12] Kontoes C.C., Dialeitis D., Likiardopoulos A., Sifakis N., (1998)**, “Development And Use Through Internet A RDBMS System to Manage Meta-Information on Earth Observation Data, Services, Value Added Products And Advertisements Throughout the Greek Scientific And User’s Community, presented in 3rd EO/GEO Web/ Internet Workshop, 17-19 February 1998, Salzburg, Austria. Proceedings available in CD format, ISBN 3-85283-014-1, 02/1998, DOI:10.13140/2.1.2233.1204.
- [68] **[IntCon-2.13] [INVITED PRESENTATION] Kontoes C.C (1999)**, “High Resolution Satellite Imagery: The New Tool to Support Urban Monitoring and Mapping”, 21st Urban Data Management Symposium, UDMS’ 99, Venice, p. IX4.1-4.9, April 1999. Proceedings available on CD, DOI:10.13140/2.1.4789.0243.
- [69] **[IntCon-2.14] [INVITED PRESENTATION] Kontoes C.C., Briole P., Sachpazi M., Veis G., (2000)**, “Analysis of the September 7, 1999 Athens earthquake deformation field by ERS-2 SAR interferometry”, Nato Advanced Research Seminar, “Integration of Earth Sciences Research on the 1999 Turkish and Greek Earthquakes and Needs for Future Cooperative Research”, Istanbul, 14-17 May 2000, pp 89-90, Istanbul; 05/2000, DOI:10.13140/2.1.1381.1526.
- [70] **[IntCon-2.15] Kontoes C.C., Elias P., Sykioti O., Briole P., Remy D., Sachpazi M., Veis G., Kotsis I., (2000)**, “Two examples of using ERS-2 SAR interferometry in Greece. Study of: The September 7, 1999 Athens earthquake and the Nisyros volcanic activity” ESA ERS-Envisat Symposium, Goeteborg, Sweden, 16-20 October 2000, proc. CD format.
- [71] **[IntCon-2.16] Sifakis N., Kontoes C.C., (2001)**, “Two research studies of decision support for natural resources management based on Earth Observation satellite data: Optimisation of Air Pollution Monitoring and Water Resources Management”, International Workshop on Geo-Spatial Knowledge Processing for Natural Resource Management, European Commission-University of Insubria, 28-29 Iouvlou 2001, Varese, Italy, proc. CD format.
- [72] **[IntCon-2.17] [INVITED PRESENTATION] Kontoes C.C. (2001)**, “Wild-fire Management: Greece User View”, Conference on a European Perspective on Disaster Management, ESA ESRIN Symposium, 27th February-1st March 2001, Italy, proc. CD format.
- [73] **[IntCon-2.18] Sifakis N., Keramitsoglou I., Kontoes C.C., (2001)**, “Environmental protection and management related activities of the Institute for Space Applications and Remote Sensing/NOA”, 1st Hellenic-Turkish Conference in Physics, 15 September 2001, Kos Island, Hellas.
- [74] **[IntCon-2.19] Sifakis N., Paronis D., Kontoes H. (2001)**, “Operational application of satellite observations in monitoring of forest fires in quasi real time and guidance of firemen to impassable mountain areas”, conference on “Integrated development in mountain areas: Theory and Action”, 7-10 June 2001, Metsovo, Greece.

- [75] [\[IntCon-2.20\]](#) **Kontoes C.C., Sykioti O., Elias P., Briole P., Sachpazi M., Paradisis D., Kotsis I., (2002)**, “Crustal deformation associated with the 1995-1998 unrest of Nisyros volcano (Greece) as observed by radar SAR interferometry”, the 11th General Assembly of the WEGENER Project Conference, 12-14 June 2002, Athens, proc. CD format.
- [76] [\[IntCon-2.21\]](#) **Sykioti O., Kontoes C., Elias P., Briole P., Sachpazi M., Paradisis D., Kotsis I., (2003)**, “Inflation/deflation sequence on Nisyros active volcano (Greece) during 1995-2000 issued from SAR differential interferometry”, SPIE Remote Sensing Conference, The International Society for Optical Engineering 03/2003; 4886., Crete, 23-27 Σεπτεμβρίου 2002, proc. CD format, DOI:10.1117/12.463490.
- [77] [\[IntCon-2.22.a\]](#) **Tsouni A., Koutsoyiannis D., Kontoes C.C., Mamas N., Elias P., (2003)**, “Application of satellite based methods for estimating evapotranspiration in Thessalia plain”, EGS-AGU-EUG Joint Assembly, Nice, 6-11 Απριλίου 2003, proc. CD format, DOI:10.13140/RG.2.1.3221.7840.
- [78] [\[IntCon-2.22.b\]](#) **A Tsouni, D Koutsoyiannis, C Kontoes, N Mamas, P Elias (2003)**: Estimation of actual evapotranspiration by remote sensing: Application in Thessalia plain, Greece (Conference paper). Proceedings of the International Conference "Geographical Information Systems and Remote Sensing: Environmental Applications", Volos, Greece; 11/2003, DOI:10.13140/RG.2.1.3025.1763
- [79] [\[IntCon-2.23\]](#) **[INVITED PRESENTATION] Kontoes C. (2000)**, “SAR Interferometry at Athens and Nisyros (Greece)”, Meeting on GPS and SAR interferometry on volcanoes, June 12-13, 2002, IIV-CNR, Catania.
- [80] [\[IntCon-2.24\]](#) **Keramitsoglou I., Kontoes C.C., Elias P., Sifakis N., Fitoka E., Weiers S. (2003)**, “Kernel-based reclassification algorithm applied on very high spatial resolution satellite imagery of complex ecosystems”, Proceedings of the 10th International Symposium of Remote Sensing (SPIE 2003), Remote Sensing for Agriculture, Ecosystems and Hydrology V, 8-12 September 2003, Barcelona, Spain, Vol. 5232, pp. 276-284 The International Society for Optical Engineering, DOI:10.1117/12.511071.
- [81] [\[IntCon-2.25\]](#) **Sifakis N., Kontoes C. (2004)**, “Earth Observation Applications in the Domains of Natural Resources and Disasters Management. An Overview of the Activities in the Institute for Space Applications and Remote Sensing of the National Observatory of Athens”, Earth Observation Info-days by ESA and GSRT, 5-6 July 2004, Holiday Inn Hotel, Athens, Greece.
- [82] [\[IntCon-2.26\]](#) **Kontoes C., Sifakis N. (2004)**, Overview of EO activities in the Institute for Space Applications and Remote Sensing of the National Observatory of Athens (ISARS/NOA), Workshop: Greece joining the DRAGON Programme, 11 October 2004, Holiday Inn Hotel, Athens, Greece.
- [83] [\[IntCon-2.27\]](#) **Keramitsoglou I., Sarimveis H., Kiranoudis C.T., Kontoes C.C., Sifakis N. (2006)**, “Classification of habitats using satellite imagery”, MedWet / CODDE Workshop: Enrichment of the MedWet Inventory Method, 2 April 2006, EKBY, Thessaloniki, Greece.
- [84] [\[IntCon-2.28\]](#) **Massinas B., Frangos P., Kontoes C.C., Paradisis D., (2004)**, "GPS-Derived Ionospheric total electron content (TEC) response during two recent magnetic storms, 35th COSPAR Scientific Assembly. Held 18 - 25 July 2004, in Paris, France, p.4344, ADS 2004cosp.meet.4344M.
- [85] [\[IntCon-2.29\]](#) **Keramitsoglou I., Kontoes C.C., Koutroubas K., Sykioti O., Sifakis N. (2005)**, "Mapping of forest species and tree density using new Earth Observation sensors for wildfire applications", 12th International Symposium Remote Sensing, Remote Sensing for Agriculture, Ecosystems, and Hydrology VII, Proc. of SPIE Vol. 5976, 5976G-1, 19-22 Sep. 2005, Brugges, Belgium (2005), The International Society for Optical Engineering 10/2005,;

DOI:10.1117/12.626600.

- [86] [\[IntCon-2.30\]](#) **[INVITED PRESENTATION]** Keramitsoglou I., Kontoes C.C., Sifakis N., Haffner-Sifakis C., Fytoka E., Mazzilli S., Tromas-Vives P., Kouvelis S., Dimiza A. (2006), "Towards a standardised methodology for inventorying and monitoring Mediterranean wetlands using Earth Observation", in proceedings of the GLOBWETLAND SYMPOSIUM-Looking at wetlands from Space, p. 37, 19-20 October 2006, ESA-ESRIN, Frascati, Italy, proc. in CD., ISBN 92-9092-945-6-ISSN 1609-042X(2006), DOI:10.13140/2.1.2954.0160.
- [87] [\[IntCon-2.31\]](#) Stagakis S., Levizou E., Markos N., Sykioti O., Elias P., Kontoes C.C., Lolis Ch., Bartzokas A. & Kyparissis A. (2006), "The use of NDVI time-series for the study of ecosystem dynamics of two deciduous (*Fagus sylvatica*, *Quercus* sp.) and one conifer (*Pinus nigra*) forest, XV Congress of the Federation of European Societies of Plant Biology, Lyon 17-21 July, 2006.
- [88] [\[IntCon-2.32\]](#) Elias P., Kontoes C., Papoutsis I., Kotsis I. (2007), "Small Scale Deformation Detection Using Permanent Scatterers Technique Applied to Gulf of Corinth (Hellas)", ESA Envisat Symposium 2007, Montreux, Switzerland, 23-27 April, 2007, DOI:10.13140/2.1.1250.0801.
- [89] [\[IntCon-2.33\]](#) Elias P., Kontoes C., Papoutsis I., Kotsis I. (2007), "Small Scale Surface Deformation Detection of the Gulf of Corinth (Hellas) Using Permanent Scatterers Technique", IEEE International Geoscience and Remote Sensing Symposium IGARSS 2007, Barcelona, 23-27 July 2007, DOI:10.1109/IGARSS.2007.4423897.
- [90] [\[IntCon-2.34\]](#) Kontoes C., Elias P., Kotsis I., Paronis D., Keramitsoglou I. (2007), "A decision support system for wildfire management and impact assessment in affected zones", Proceedings of the 6th International Workshop of the EARSeL Interest Group on Forest Fires, Advances in Remote Sensing and GIS Applications in Forest Fire Management, 27-29 September 2007, Thessaloniki, pp. 194-197.
- [91] [\[IntCon-2.35\]](#) Sifakis N., Iossifidis C., Kontoes C. (2008), Fire detection and monitoring over Greece in 2007 summer period using satellite data. EGU General Assembly 2008, 13-18 April 2008, Vienna, Geophysical Research Abstracts, vol. 10, EGU2008-A-03989.
- [92] [\[IntCon-2.36\]](#) Sifakis N., Iossifidis C., Kontoes C., Sarigiannis D. (2008), Landsat satellite data analysis for high spatial resolution aerosol mapping and backscattering over the urban area of Athens (1986-2001). EGU General Assembly 2008, 13-18 April 2008, Vienna, Geophysical Research Abstracts, vol. 10, EGU2008-A-04038.
- [93] [\[IntCon-2.37\]](#) **[INVITED PRESENTATION]** Kontoes C. (2008), RISK-EOS/GSE project extension to Greece: Operational burn scar mapping and damage assessment through Greece using satellite observations, INTEREG IIIC South MedWet/CODDE project Closing Conference on Wetland Inventory and Assessment in the Mediterranean Region: Advanced Tools, Athens, 17-18 March 2008, Greece.
- [94] [\[IntCon-2.38\]](#) Papadopoulos G. A., Karastathis V., Kontoes C., Papoutsis I., Daskalaki E., (2008), Diakogianni G., Fokaefs A, The Earthquake of 8 June 2008 (Mw=6.3) in NW Peloponnese, Greece: First Results, European Seismological Commission ESC 2008, 31st General Assembly, Hersonissos, Crete, Greece, 7-12 September 2008.
- [95] [\[IntCon-2.39\]](#) **[INVITED PRESENTATION]** Marc Paganini, Agata Prilo, G. Florsch, Yves Desmazieres, Haris Kontoes, Iphigenia Keramitsoglou, Ricardo Amas, Ana Sá, Olivier Arino (2009), Global Monitoring of the Environment and Security: a comparison of the Burned Scar Mapping services of the RISK-EOS project, 7th International Workshop EARSeL, Advances in RS and GIS applications in Forest Fire Management - Towards an Operational Use of RS in Forest Fire Management, EARSeL Conference, Matera, Italy, 2-5 September 2009.

- [96] [\[IntCon-2.40\]](#) **G. Petropoulos, C. Kontoes, and I. Keramitsoglou (2010)**, Multispectral satellite observations for burnt area cartography from a uni-temporal perspective: results from two fire events in Greece during the summer of 2009, *Geophysical Research Abstracts Vol. 12, EGU2010-926-1*, 2010 EGU General Assembly 2010 © Author(s) 2009.
- [97] [\[IntCon-2.41\]](#) **I. Papoutsis, C. Kontoes, B. Massinas, D. Paradissis and P. Frangos (2009)**, Assessing pre-seismic and post-seismic displacement in the Athens metropolitan area by SAR Interferometric Point Target Analysis, using ERS and ENVISAT datasets, *Advances in the Science and Applications of SAR Interferometry ESA ESRIN 30th November - 4th December 2009 Frascati, Italy*.
- [98] [\[IntCon-2.42\]](#) **C. Kontoes, K. Kourtidis (2009)**, Greek Activities in Earth Observation for Monitoring the Environment and Protecting the General Public, *GEO South–Eastern Europe and Eastern Mediterranean Symposium on Earth Observation Services for Monitoring the Environment and Protecting the General Public, 8-10 June 2009, Athens, Greece*.
- [99] [\[IntCon-2.43\]](#) **Sifakis N., Iossifidis C., Kontoes C. (2010)**, CHRISTINE: code for high resolution satellite mapping of optical thickness and Ångstrom exponent, *SPIE 2010 Remote Sensing Conference, Paper 7827-20, 20-23 September 2010, Toulouse, France, DOI:10.1117/12.864453*.
- [100] [\[IntCon-2.44\]](#) **Konstandinidis P., Tsiourlis G., Gatzoyiannis S., Kontoes C., Andreadakis S., Santamouris M., Noitsis G. Petroulias N., Kalabokidis K., Zigoura V., Gatzoyannis Sp, Sifakis N., Doukas P., Boutsoukis P., Roussou O., Noitsis I., Stamou N. (2010)**: SITHON: Application and assessment of ground based and airborne Telematics methods for timely detection – announcement – monitoring of forest fires. *1st International Conference on Green Infrastructures; 11/2010*
- [101] [\[IntCon-2.45\]](#) **Kontoes C., Herekakis Th, Keramitzoglou I., Fokaefs A., Papadopoulos G. A., Kiranoudis C., Karakostas C., Lekidis V., Kappos A., Panagopoulos G., Aifantopoulou D., Paralikidis, S. Deflorio A.M., Iasillo D. (2011)**: The Project MASSIVE: Mapping Seismic Vulnerability and Expected Risk of Cities. *7th International Workshop in Statistical Seismology, Statsei7, Santorini; 05/2011*
- [102] [\[IntCon-2.46\]](#) **Manolis Koubarakis, Kostis Kyzirakos, Manos Karpathiotakis, Charalampos Nikolaou, Michael Sioutis, Stavros Vassos, Dimitrios Michail, Themistoklis Herekakis, Charalampos Kontoes, Ioannis Papoutsis (2011)**: Challenges for Qualitative Spatial Reasoning in Linked Geospatial Data. *IJCAI 2011 Workshop on Benchmarks and Applications of Spatial Reasoning (BASR-2011), Barcelona, Spain; 07/2011*
- [103] [\[IntCon-2.47\]](#) **Papoutsis I., Kontoes C., Paradissis D. (2011)**: ERS – ENVISAT cross-interferometry in the Athens metropolitan area, *Advances in the Science and Applications of SAR Interferometry from ESA and Third Party Missions. fringe 2011 workshop, ESA-ESRIN, Frascati, Italy; 09/2011*
- [104] [\[IntCon-2.48\]](#) **K. Kyzirakos, M. Karpathiotakis, G. Garbis, C. Nikolaou, K. Bereta, M Sioutis, S. Vassos, M. Koubarakis, I. Papoutsis, T. Herekakis, C. Kontoes, D. Michail (2011)**: TELEIOS: A Platform for Real Time Fire Monitoring. *11th International Semantic Web Conference (ISWC 12), Boston, USA; 11/2011*
- [105] [\[IntCon-2.49\]](#) **Christos Karakostas, Vasileios Lekidis, Andreas J Kappos, Georgios K Panagopoulos, Ifigeneia Keramitsoglou, Ch. Kontoes (2012)**: Evaluation of seismic vulnerability of buildings in Athens and L’Aquila in the framework of the MASSIVE seismic mitigation system. *15 WCEE; 01/2012*
- [106] [\[IntCon-2.50\]](#) **C. Kontoes, I. Papoutsis, D. Michail, T. Herekakis, M. Koubarakis, K. Kyzirakos, M. Karpathiotakis, C. Nikolaou, M. Sioutis, G. Garbis, S. Vassos, I. Keramitsoglou (2012)**: Wildfire monitoring via the integration of remote sensing with innovative information technologies.

European Geosciences Union General Assembly 2012 (EGU General Assembly 2012), Vienna, Austria; 04/2012

- [107] [\[IntCon-2.51\]](#) C. Kontoes, I. Keramitsoglou, I. Papoutsis, D. Michail, Th. Herekakis, P. Xofis, M. Koubarakis, K. Kyzirakos, M. Karpathiotakis, C. Nikolaou, M. Sioutis, G Garbis, S. Vassos, S. Manegold, M. Kersten, H. Pirk, M. Ivanova (2012): Operational Wildfire Monitoring and Disaster Management Support Using State-of-the-art EO and Information Technologies. Second International Workshop on Earth Observation and Remote Sensing Applications (EORSA 2012), Shanghai, China; 06/2012, DOI:10.1109/EORSA.2012.6261164
- [108] [\[IntCon-2.52\]](#) Manolis Koubarakis, Manos Karpathiotakis, Kostis Kyzirakos, Charalampos Nikolaou, Stavros Vassos, George Garbis, Michael Sioutis, Konstantina Bereta, Stefan Manegold, Martin L Kersten, Milena Ivanova, Holger Pirk, Ying Zhang, Charalambos Kontoes, Ioannis Papoutsis, Themistoklis Herekakis, Dimitrios Michail, Mihai Datcu, Gottfried Schwarz, Corneliu O Dumitru, Daniela Espinoza-Molina, Katrin Molch, Ugo D Giammatteo, Manuela Sagona, Sergio Perelli, Eva Klien, Thorsten Reitz, Robert Gregor (2012): Building Virtual Earth Observatories Using Ontologies and Linked Geospatial Data. Web Reasoning and Rule Systems - 6th International Conference; 09/2012, DOI:10.1007/978-3-642-33203-6_21
- [109] [\[IntCon-2.53\]](#) Koubarakis, Kyzirakos, Karpathiotakis, Nikolaou, Vassos, Garbis, Sioutis, Bereta, Kontoes, Papoutsis, Herekakis, Michail, Manegold, Kersten, Ivanova, Pirk, Zhang, Datcu, Schwarz, Dumitru, Molina, Molch, Giammatteo, Sagona, Perelli, Reitz, Klien, Gregor (2012): Building Remote Sensing Applications Using Scientific Database and Semantic Web Technologies. 8th Conference on Image Information Mining, ISPRA, Italy; 10/2012
- [110] [\[IntCon-2.54\]](#) K Kyzirakos, M Karpathiotakis, G Garbis, C Nikolaou, K Bereta, M Sioutis, I Papoutsis, T Herekakis, D Michail, M Koubarakis, C Kontoes (2012): Real Time Fire Monitoring Using Semantic Web and Linked Data Technologies. 11th International Semantic Web Conference, Boston, USA (paper winning the shared 3rd prize of best conference publication); 11/2012, DOI:10.13140/2.1.1946.4003
- [111] [\[IntCon-2.55\]](#) Ioannis Papoutsis, Xanthos Papanikolaou, Mike Floyd, Kang Hyeun Ji, Charalampos Kontoes, Demitris Paradissis, Demitris Anastasiou, Athanasios Ganas (2013): The Santorini inflation episode: from start to finish. ESA Living Planet Symposium, Edinburgh (Scotland); 01/2013, DOI:10.13140/2.1.3715.8724
- [112] [\[IntCon-2.55.b\]](#) C. Kontoes, I. Papoutsis, Th. Herekakis, D. Michail, E. Ieronymidi, (2013), A fully automatic processing chain to produce Burn Scar Mapping products, based on the Landsat archive, EGU General Assembly 2013, Vienna | Austria | April 07–12, 2013
- [113] [\[IntCon-2.56\]](#) Manolis Koubarakis, Charalambos Kontoes, Stefan Manegold (2013): Real-time wildfire monitoring using scientific database and linked data technologies. Proceedings of the 16th International Conference on Extending Database Technology; 03/2013, DOI:10.1145/2452376.2452452
- [114] [\[IntCon-2.56.b\]](#) Manolis Koubarakis, Stefan Manegold, Charalambos Kontoes (2013), Building Earth Observatories using Scientific Database and Semantic Web Technologies, EDBT/ICDT 2013 Joint Conference, March 18-22, 2013 - Genoa, Italy
- [115] [\[IntCon-2.57\]](#) Ioannis Papoutsis, Xanthos Papanikolaou, Mike Floyd, Kang Hyeun Ji, Charalampos Kontoes, Demitris Paradissis, Demitris Anastasiou (2013): The Santorini inflation episode: from start to finish. EGU General Assembly 2013, Vienna, Austria; 04/2013

- [116] [\[IntCon-2.58\]](#) **George P Petropoulos, C. Kontoes (2013)**: An exploration of CHRIS PROBA hyperspectral imagery for obtaining burnt area cartography from a uni-temporal perspective. ESA Living Planet Symposium, Edinburgh, UK; 09/2013, SP-722 CD proceedings
- [117] [\[IntCon-2.59\]](#) **Ioannis Papoutsis, Xanthos Papanikolaou, Mike Floyd, Hyeun Kang, Ji, Charalampos Kontoes, Demetris Paradissis, Demetris Anastasiou, Athanasios Ganas (2013)**: The Santorini inflation episode: from start to finish. ESA Living Planet Symposium, Edinburgh (Scotland); 09/2013, DOI:10.13140/2.1.1618.7202, SP-722 CD proceedings
- [118] [\[IntCon-2.61\]](#) **Iphigenia Keramitsoglou, Dimitris Stratoulas, Eleni Fitoka, Charalabos Kontoes, Nicolas Sifakis (2013)**: Wetland habitat mapping by applying advanced classification to very high spatial resolution satellite images. IALE 2013 European Congress, Changing European Landscapes, Landscape ecology, local to global, Manchester; 09/2013
- [119] [\[IntCon-2.62\]](#) **Charalabos Kontoes, Ioannis Papoutsis, Themistoklis Herekakis, Dimitrios Michail, Emmanuela Ieronymidi (2013)**: NATIONAL SCALE BURN SCAR MAPPING IN GREECE. 9th EARSeL Forest Fire Special Interest Group Workshop, University of Leicester, UK; 10/2013, DOI:10.13140/2.1.4657.9529
- [120] [\[IntCon-2.63\]](#) **Charalampos Kontoes, Ioannis Papoutsis, Vassilis Amiridis, George Balasis, Iphigenia Keramitsoglou, Themistocles Herekakis, Eleni Christia (2014)**: The BEYOND center of excellence for the effective exploitation of satellite time series towards natural disasters monitoring and assessment. EGU General Assembly 2014; 04/2014
- [121] [\[IntCon-2.64\]](#) **C. Kontoes (2014)**: The European Centre of Excellence BEYOND for Earth Observation based monitoring of Natural Disasters in South-Eastern Europe. Copernicus – Sentinels Serving Society and the Environment, EUGENIDES Foundation, Athens, Greece; 05/2014
- [122] [\[IntCon-2.65\]](#) **[INVITED PRESENTATION] Vassilis Amiridis, U Wandinger, E Marinou, A Tsekeri, S Basart, S Kazadzis, J Baldasano, A Ansmann, Stavros Solomos, C Kontoes (2014)**: Dust model validation using CALIPSO. 12th International Conference on Meteorology, Climatology and Atmospheric Physics COMECAP 2014, Heraklion (Crete); 05/2014
- [123] [\[IntCon-2.65b\]](#) **Vassilis Amiridis, Ulla Wandinger, Eleni Marinou, Alexandra Tsekeri, Sara Basart, Stelios Kazadzis, Jose M.Baldasano, Albert Ansmann, Stavros Solomos, Haris Kontoes (2014)**, "Dust Model Validation using CALIPSO", International Conference on Atmospheric Dust, Castellana Marina, Italy - June 1-6, 2014
- [124] [\[IntCon-2.66\]](#) **[INVITED PRESENTATION] Sofiou F.I., Solomos S., Amiridis V., Herekakis T., Argialas D., Kontoes C. (2014)**: EVALUATION OF FLEXPART SMOKE DISPERSION USING MISR PLUME HEIGHTS. 12th International Conference on Meteorology, Climatology and Atmospheric Physics COMECAP 2014, Heraklion (Crete); 05/2014
- [125] [\[IntCon-2.67.a\]](#) **I. Papoutsis, C. Kontoes, A. Ganas (2014)**, BEYOND Center of Excellence for monitoring geophysical activity and geo-hazard mapping, Oral Presentation, 2nd Tectonic Geodesy Workshop, Earthquake Planning and Protection Organization, Athens, Greece on May 14, 2014
- [126] [\[IntCon-2.67.b\]](#) **C. Kontoes (2014)**: The European Centre of Excellence BEYOND for Earth Observation based monitoring of Natural Disasters in South-Eastern Europe. 8TH GEO EUROPEAN PROJECTS WORKSHOP; 06/2014
- [127] [\[IntCon-2.68\]](#) **[INVITED PRESENTATION] Charalampos Kontoes, Themistoklis Herekakis, Ioannis Papoutsis, Ioannis Mitsopoulos, Stavros Solomos, Vassilis Amiridis (2014)**: Operational fires

disaster management via Earth Observation in BEYOND. 1st International GEOMAPPLICA Conference 2014, Skiathos Island, Greece; 09/2014

- [128] [\[IntCon-2.69\]](#) **Vassilis Amiridis, Stavros Solomos, Alexandra Tsekeri, Eleni Marinou, Stylianos Kazadzis, Evangelos Gerasopoulos, Themistocles Herekakis, Charalampos Kontoes (2014):** Atmospheric hazards monitoring and forecasting. 1st International GEOMAPPLICA Conference 2014, Skiathos Island, Greece; 09/2014
- [129] [\[IntCon-2.70\]](#) **[INVITED PRESENTATION] Alexia Tsouni, Charalambos Kontoes, Emmanouela Ieronymidi, Antonios Koukouvinos, Demetris Koutsoyiannis (2014):** BEYOND Center of Excellence: flood mapping and modelling. 1st International GEOMAPPLICA Conference 2014, Skiathos Island, Greece; 09/2014, DOI:10.13140/RG.2.1.1129.7520
- [130] [\[IntCon-2.71\]](#) **[INVITED PRESENTATION] Ioannis Papoutsis, Charalampos Kontoes, Athanassios Ganas, Vassilis Karastathis, Stavros Solomos, Vassilis Amiridis (2014):** BEYOND Center of Excellence: geophysical activity 'seen' from space. 1st International GEOMAPPLICA Conference 2014, Skiathos Island, Greece; 09/2014
- [131] [\[IntCon-2.72\]](#) **C. Kontoes, Themistocles HEREKAKIS, Emmanouela IERONYMIDI, Ioannis PAPOUTSIS, Stavros SOLOMOS (2014):** FireHub: A Space based Fire Management Hub. 2nd South Eastern Europe GEO Workshop, Athens, Greece; 10/2014
- [132] [\[IntCon-2.73\]](#) **C. Kontoes, K. Tsinganos, X. Tsilimparis (2014):** Greece's Collaborative Ground Segment Initiatives-The Greek Mirror Site for receiving Sentinels' Missions Data. Sentinel Collaborative Ground Segment Workshop 2014, ESA ESRIN-Frascati (Italy); 12/2014
- [133] [\[IntCon-2.74\]](#) **Charalampos Kontoes (2014),** "FireHub: A Space based Fire Management Hub". Participation of BEYOND at the GEO XI Plenary, Geneva, Switzerland, on November 13-14, 2014
- [134] [\[IntCon-2.75\]](#) **C. Kontoes (2014),** BEYOND Center of Excellence: concept and first outcomes, GEO X Plenary, the GEO Ministerial Summit and the parallel EC Side Events, Presentation of BEYOND Center of Excellence: concept and first outcomes, Geneva Switzerland, January 13-17, 2014
- [135] [\[IntCon-2.76\]](#) **Maria Kaskara, Aggeliki Barberopoulou, Ioannis Papoutsis, Charalampos Kontoes, Athanassios Ganas, Vassilios Karastathis (2015):** Analysis of the deformation pattern along the subduction zone of Crete, Greece, using multi-temporal ERS and Envisat data. Fringe2015: Advances in the Science and Applications of SAR Interferometry and Sentinel-1 InSAR Workshop; 05/2015, DOI:10.5270/Fringe2015.pp122
- [136] [\[IntCon-2.77\]](#) **Christina Psychogyiou, Ioannis Papoutsis, CHARALAMBOS (HARIS) KONTOES, Eleftheria Poyiadji, Natalia Spanou, Nikolaos Klimis (2015):** Multi-temporal Monitoring of Slow-moving Landslides in South Pindus Mountain Range, Greece. FRINGE 2015 WORKSHOP, ESA ESRIN, Frascati, Rome, Italy; 03/2015, DOI:10.5270/Fringe2015.pp67
- [137] [\[IntCon-2.78\]](#) **Nikos Svigkas, Ioannis Papoutsis, Constantinos Loupasakis, Charalampos Kontoes, Anastasia Kiratzi (2015):** Geo-hazard Monitoring in Northern Greece Using InSAR techniques: The Case Study of Thessaloniki. FRINGE 2015; 03/2015, DOI:10.5270/Fringe2015.pp33
- [138] [\[IntCon-2.79\]](#) **E Nikolaeva, O Sykioti, P Elias, C Kontoes (2015):** Multi-temporal intensity and coherence analysis of SAR images for land cover change detection on the Island of Crete. SPIE Remote Sensing Conference, France, Toulouse; 09/2015

- [139] [\[IntCon-2.80\]](#) **C. Kontoes, X. Tsilimparis (2015)**: Greece's Collaborative Ground Segment Initiatives-The Greek Mirror Site for receiving Sentinels' Missions Data. Sentinel Collaborative Ground Segment Technical Workshop December 2015 (GOCG), 7 December 2015 - Brussels
- [140] [\[IntCon-2.81\]](#) **Haris Kontoes (2015)**, 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,
- [141] [\[IntCon-2.82\]](#) **Haris Kontoes (2015)**, 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
- [142] [\[IntCon-2.83\]](#) **Ch. Kontoes, Th. Herekakis, V. Tsironis, I. Papoutsis, S. Solomos, E. Ieronymidi, and V. Amiridis (2015)**, The FireHub Tool: NOA EO- based Fire Related Services in the framework of BEYOND, Participation of BEYOND in the EGU General Assembly 2015 Conference - Splinter Session ([SPM1.4](#)), Vienna, Austria, April 12 – 17, 2015
- [143] [\[IntCon-2.84\]](#) **Ch.Kontoes, V.Amiridis, I.Keramitsoglou, I.Papoutsis, A.Tsouni, G.Balasis and E.Christia (2015)**, BEYOND Center of Excellence for EO-based monitoring of natural disasters, Participation of BEYOND in the EGU General Assembly 2015 Conference - Splinter Session ([SPM1.4](#)), Vienna, Austria, April 12 – 17, 2015
- [144] [\[IntCon-2.85\]](#) **A. Tsouni, E. Ieronymidi, Ch. Kontoes (2015)**, Flood mapping and modelling in the framework of BEYOND Center of Excellence, Participation of BEYOND in the General Assembly 2015 Conference - Splinter Session ([SPM1.4](#)), Vienna, Austria, April 12 – 17, 2015
- [145] [\[IntCon-2.86\]](#) **I. Keramitsoglou, P. Sismanidis, and Chris T. Kiranoudis (2015)**, EO-based System for monitoring the Urban Thermal Environment, Participation of BEYOND in the General Assembly 2015 Conference - Splinter Session ([SPM1.4](#)), Vienna, Austria, April 12 – 17, 2015
- [146] [\[IntCon-2.87\]](#) **I. Papoutsis, Ch. Psychogyiou, N. Svigkas, M. Kaskara, Ch. Kontoes, A. Ganas, V. Karastathis, G. Balasis, A. Barberopoulou (2015)**, Monitoring geophysical activity from Space, in the framework of BEYOND Center of Excellence, Participation of BEYOND in the General Assembly 2015 Conference - Splinter Session ([SPM1.4](#)), Vienna, Austria, April 12 – 17, 2015
- [147] [\[IntCon-2.88\]](#) **V. Amiridis, S. Solomos, H. Kontoes, E. Marinou, A. Tsekeri, T. Herekakis, S. Nickovic (2015)**, Atmospheric activities in the framework of BEYOND, Participation of BEYOND in the EGU General Assembly 2015 Conference - Splinter Session ([SPM1.4](#)), Vienna, Austria, April 12 – 17, 2015
- [148] [\[IntCon-2.89\]](#) **Haris Kontoes (2015)**, Greece's Collaborative Ground Segment Initiatives, SENTINEL COLLABORATIVE GS WORKSHOP 2015, 28 May 2015 – Matera
- [149] [\[IntCon-2.90\]](#) **Balasis, G., I. A. Daglis, N. Melis, C. Papadimitriou, and C. Kontoes (2015)**, The upgraded ENIGMA magnetometer array, International Union of Geodesy and Geophysics General Assembly 2015, Prague, Czech Republic, 22 June – 2 July 2015.
- [150] [\[IntCon-2.91\]](#) **A. Tsouni, Ch. Kontoes, E. Ieronymidi and Th. Herekakis (2015)**, "Beyond Floods Monitoring", Oral Presentation in the One Step BEYOND Workshop, in Frascati, Rome, Italy on October 15, 2015
- [151] [\[IntCon-2.92\]](#) **Haris KONTOES, Xenofon Tsilimparis (2015)**, BEYOND Ground Segment: The Hellenic Mirror Site Initiative, Oral Presentation in the One Step BEYOND Workshop, in Frascati, Rome, Italy on October 15, 2015

- [152] [\[IntCon-2.93\]](#) **Haris KONTOES, [Keynote speech] (2015)**, FireHub: A Space based Fire Management Hub, Oral Presentation in the One Step BEYOND Workshop, in Frascati, Rome, Italy on October 15, 2015
- [153] [\[IntCon-2.94\]](#) **Maria Kaskara, Simone Atzori, Ioannis Papoutsis, Kontoes Charalabos, Stefano Salvi, Athanassios Ganas (2016)**: Geodetic analysis and modelling of the Santorini volcano, Greece, for the period 2012-2015. Living Planet Symposium 2016, Prague, Czech Republic; 05/2016
- [154] [\[IntCon-2.95\]](#) **C. Kontoes, X. Tsilimparis (2016)**: Greece's Collaborative Ground Segment Initiatives-The Greek Mirror Site for receiving Sentinels' Missions Data. Sentinel Collaborative Ground Segment Technical Workshop 8 June 2016 - Frascati, Italy
- [155] [\[IntCon-2.96\]](#) **C Loupasakis, S Moretti, F Raspini, N Svigkas, I Papoutsis, D Rozos, Paraskevas Tsangaratos, N Adam, An Kiratzi, Ch Kontoes (2016)**: Advancements in the Research of the land subsidence phenomena at the wider coastal area of Thessaloniki, Greece. 2nd International Workshop on Coastal Subsidence, Venice (Italy); 05/2016
- [156] [\[IntCon-2.97\]](#) **Haris Kontoes (2016)**, The Centre of Excellence for EO-based monitoring of Natural Disasters: "BEYOND", Conference entitled "Space 2016 - Challenges and Perspectives", Athens, 27th January 2016, Armed Forces Communications and Electronic Association (AFCEA), LAED
- [157] [\[IntCon-2.98\]](#) **Balasis, G., I. A. Daglis, C. Papadimitriou, N. Melis, O. Giannakis, and C. Kontoes (2016)**, The upgraded ENIGMA magnetometer array, European Geosciences Union General Assembly 2016, Vienna, Austria, 17 – 22 April 2016.
- [158] [\[IntCon-2.99\]](#) **Dr. Haris Kontoes (2016), BEYOND Products and Services. The awarded FIREHUB Service**, BEYOND Final Workshop, Electra Palace Hotel, Athens, Greece, 17 May 2016
- [159] [\[IntCon-2.100\]](#) **Solomos S., Nickovic S., Amiridis V., Pejanovic G., Pradhan Y., Marenco F., Petkovic S., Marinou E., Cvetkovic B., Kontoes C (2016)**: Development of a dust assimilation system for NMM-DREAM model based on MSG-SEVIRI satellite observations, COMECAP 2016
- [160] [\[IntCon-2.101\]](#) **Kontoes C., Solomos S., Amiridis V., Herekakis T. (2016)**: Synergistic satellite & modeling methods for the description of biomass smoke dispersion over complex terrain. The FireHub platform. COMECAP 2016.
- [161] [\[IntCon-2.102\]](#) **Kontoes C. (2016)**, The GEO-CRADLE & BEYOND EU projects for building capacity, synergies, and infrastructures in the Earth Observation domain; address disaster management, adaptation to climate change, food security, access to raw materials and energy related societal needs in the Mediterranean, North Africa, Middle East, and the Balkans, EGM for Water-Food-Energy Resilience under SDGs and Paris Agreement in Mid-Latitude Region (Draft), SDGs and Paris Agreement Mainstreaming: Focusing on water, food and energy, United Nations Office for Sustainable Development, Incheon, Republic of Korea 28-29 November 2016, Seoul, Republic of Korea
- [162] [\[IntCon-2.103\]](#) **Alexia Tsouni, Haris Kontoes, Emmanouela Ieronymidi, Themistocles Herekakis (2016)**, Floods monitoring at national scale - FloodHUB service, BEYOND Final Workshop, Electra Palace Hotel, Athens, Greece, 17 May 2016
- [163] [\[IntCon-2.104\]](#) **C Kontoes (2016)**, The European Centre of Excellence BEYOND for Earth Observation based monitoring of Natural Disasters in South-Eastern Europe, 10th GEO European Projects Workshop, Session: Mitigating the effects Natural Hazards and strengthening Disaster Resilience, 1 June 2016, Ministry of Transport and Digital Infrastructure of Germany (BMVI), Berlin

- [164] [\[IntCon-2.105\]](#) **C Kontoes (2016)**, Accelerating EO-powered businesses and market take-up in Balkans, GEO-CRADLE Regional Workshop, Novi Sad, Serbia, 14-15 July 2016
- [165] **IntCon-2.106** **C. Kontoes, X. Tsilimparis (2016)**: Greece's Collaborative Ground Segment Initiatives-The Greek Mirror Site for receiving Sentinels' Missions Data. 15 December 2016, Oberpfaffenhofen, Germany
- [166] [\[IntCon-2.107\]](#) **[INVITED PRESENTATION], C Kontoes (2016)**, GEO-CRADLE: Adaptation to Climate Change Pilot Activity, MEDCLIVAR 2016 Conference, Learning from the past, perceiving, engaging for the future, 26-30 September 2016, Athens, Greece
- [167] [\[IntCon-2.108\]](#) **C Kontoes (2016)**, Survey of the regional EO capacities & information needs, GEO-CRADLE & the 2nd EuroGeoSurveys Networking Meeting, GEO-CRADLE Regional Workshop, Morocco and Algeria, 17-23 October 2016
- [168] [\[IntCon-2.109\]](#) **C. Kontoes, X. Tsilimparis (2016)**: The challenge to identify regional datasets to be linked to the GEO-CRADLE Regional Data Hub GEO Plenary XIII, 7-10 November 2016, St Petersburg, Russian Federation
- [169] [\[IntCon-2.110\]](#) **Georgios Balasis, Ioannis A. Dagleis, Yiannis Contoyiannis, Stelios M. Potirakis, Constantinos Papadimitriou, Nikolaos S. Melis, Omiros Giannakis, Anastasios Anastasiadis, and Charalampos Kontoes (2017)**, Intermittent criticality revealed in the ENIGMA magnetometer array time series prior to the strongest magnetic storms of the present solar cycle, European Geosciences Union General Assembly 2017, Vienna, Austria, 23 – 28 April 2017.
- [170] [\[IntCon-2.111\]](#) **C. Kontoes (2017)**, The GEO-CRADLE project in support to the SDGs implementation and EO industry's engagement , European GEO Workshop, EUROGEOS: Shaping the European Contribution to GEOSS, 19-21 June 2017, Helsinki
- [171] [\[IntCon-2.112\]](#) **S. Kazadzis, P. Kosmopoulos, M. Taylor, P. Raptis, H. El-Askary, H. Kontoes (2017)**, The Solar Energy Nowcasting System (SENSE), **GEO-CRADLE Regional Workshop**, Cairo, Egypt, 25 May 2017
- [172] [\[IntCon-2.113\]](#) **C. Kontoes (2017)**, GEO-CRADLE opportunities for Egypt and the region, Assessing Regional Needs in the Middle East by enhancing Earth Observation uptake and relevant business performances, **GEO-CRADLE Regional Workshop**, Cairo, Egypt, 25 May 2017
- [173] [\[IntCon-2.114\]](#) **C. Kontoes (2017)**, GEO-CRADLE project in context of regional needs , Assessing EO capacities in Balkans for Climate Change, GEO-CRADLE Regional Workshop, Bucharest, Romania, 9 May 2017
- [174] [\[IntCon-2.115\]](#) **C. Kontoes (2017)**, Improving EO services industry involvement in EU space programmes and initiatives, GEO-CRADLE Industry Information Workshop, Brussels, 26 April 2017
- [175] [\[IntCon-2.116\]](#) **A. Polychroniou, V. Tsironis, C. Kontoes (2017)**, The GEO-CRADLE Regional Data Hub tool: A vision for a regional GEOSS Portal, 2nd GEO Data Providers workshop, 20th-21st April 2017, Florence, Italy
- [176] [\[IntCon-2.117\]](#) **V. Tsironis, A. Polychroniou, C. Kontoes (2017)**, The GEO-CRADLE Regional Data Hub tool: Utilizing the GEO DAB APIs for easy access and discovery of regional EO data, 2nd GEO Data Providers workshop, 20th-21st April 2017, Florence, Italy
- [177] [\[IntCon-2.118\]](#) **C. Kontoes (2017)**, GEO-CRADLE: Fostering regional cooperation and roadmap for GEO and Copernicus implementation in North Africa, Middle East and Balkans, Earth observation

and planetary science symposium, Global Space Congress, UAE, Abu Dhabi, 31 January-1 February 2017

- [178] [\[IntCon-2.119\]](#) **Diofantos G. Hadjimitsis, Charalambos C. Kontoes, Gunter Schreier, Albert Ansmann, Georgios Komodromos, Kyriacos Themistocleous, Rodanthi-Elisavet Mamouri, Silas Michaelides, Argyro Nisantzi, Christiana Papoutsas, Christodoulos Mettas, Marios Tzouvaras (2017):** The Establishment of the EXcellence Research Centre for Earth Surveillance and Space-Based Monitoring of the Environment (EXCELSIOR) for the Eastern Mediterranean Region. 15th International Conference on Environmental Science and Technology - CEST2017, Rhodes, Greece; 08/2017
- [179] [\[IntCon-2.120\]](#) **C. Kontoes (2017),** The GEO-CRADLE in the context of Regional Needs, The GEO-CRADLE regional workshop, Tel Aviv, 14 - 09 - 2017, The Porter School of Environmental Studies, Tel-Aviv University
- [180] [\[IntCon-2.121\]](#) **Michael Nolde, Simon Plank, Christian Strobl, Doris Klein, Christian Fischer, Charalampos Kontoes (2017):** Application of Level Set Methods for burned area mapping and evaluation against DLRs TET-1 hotspot data - a case study in Portugal. EARSeL SIG 2017; 09/2017
- [181] [\[IntCon-2.122\]](#) **Kontoes, C., Herekakis, T., Papoutsis, I., Ieronymidi, E., Antoniadis, S. (2017),** The Algorithms Behind The Burnt Scar Mapping Module of FireHub: A Scalable And Robust Approach For Multimodal Earth Observation Data, EARSeL SIG 2017; 09/2017
- [182] [\[IntCon-2.123\]](#) **Rodanthi-Elisavet Mamouri, Albert Ansmann, Diofantos G. Hadjimitsis, Johannes Bühl, Argyro Nisantzi, Silas C. Michaelides, Patric Seifert, Ronny Engelmann, Ulla Wandinger, Charalampos C. Kontoes, Gunter Schreier, Georgios Komodromos, Kyriacos Themistocleous (2017):** Strategic positioning of the ERATOSTHENES Research Centre for atmospheric remote sensing research in the Eastern Mediterranean and Middle East region. Lidar Technologies, Proc. SPIE 10429, Lidar Technologies, Techniques, and Measurements for Atmospheric Remote Sensing XIII, 1042906 (4 October 2017); doi: [10.1117/12.2281777](https://doi.org/10.1117/12.2281777)
- [183] [\[IntCon-2.124\]](#) **Diofantos G. Hadjimitsis, Haris Kontoes, Gunter Schreier, Albert Ansmann, George Komodromos, Kyriacos Themistocleous, Rodanthi Mamouri, Silas Michaelides, Argyro Nisantzi, Christiana Papoutsas, Kyriacos Neocleous, Christodoulos Mettas, Marios Tzouvaras, Evagoras Evagorou, Andreas Christofe, George Melillos, Ioannis Papoutsis (2017),** ERATOSTHENES: excellence research Centre for Earth surveillance and space-based monitoring of the environment, the EXCELSIOR Horizon 2020 teaming project, Earth Resources and Environmental Remote Sensing/GIS Applications VIII; edited by Ulrich Michel, Karsten Schulz, Proc. of SPIE Vol. 10428, doi: 10.1117/12.2279500
- [184] [\[IntCon-2.125\]](#) **C. Kontoes (2017),** GEO-CRADLE Regional Data Hub Using GEO DAB APIs, session on GEO - GCI In Action, GEO WEEK 2017-Insight for a Changing World, 23-27 October 2017, Washington DC USA
- [185] [\[IntCon-2.126\]](#) **C. Kontoes (2017),** GEO-CRADLE project in context of regional needs, GEO-CRADLE Regional Workshop, December 7th 2017, Tunis
- [186] [\[IntCon-2.127\]](#) **Panagiotis Kosmopoulos, Stelios Kazadzis, Hesham El-Askary, Charalampos Kontoes, Iphigenia Keramitsoglou, Chris Kiranoudis (2018):** EO-based solar energy applications into a wider GEOSS driven system through the GEO-CRADLE project in the international scale. EO-based solar energy applications into a wider GEOSS driven system through the GEO-CRADLE project in the international scale; Geophysical Research Abstracts, Vol. 20, EGU2018-9402, 2018

- [187] [[IntCon-2.128](#)] **C. Kontoes, X. Tsilimparis (2018)**: Greece's Collaborative Ground Segment Initiatives-The Greek Mirror Site for receiving Sentinels' Missions Data. Sentinels Collaborative Ground Segment Workshop, 7 February 2018, Brussels
- [188] [[IntCon-2.129](#)] **C. Kontoes (2018)**, The GEO-CRADLE network, GEOSS, and Copernicus in context of regional needs, GEO-CRADLE Regional Workshop, Istanbul, Turkey 15-16 March 2018.
- [189] [[IntCon-2.130](#)] **Georgios Balasis, Ioannis A. Daglis, Yannis Contoyiannis, Stelios M. Potirakis, Constantinos Papadimitriou, Nikolaos S. Melis, Omiros Giannakis, Athanassios Papaioannou, Anastasios Anastasiadis, and Charalampos Kontoes (2018)**, Observation of intermittency-induced critical dynamics in geomagnetic field time series prior to the intense magnetic storms of March, June and December 2015, European Geosciences Union General Assembly 2018, Vienna, Austria, 8 – 13 April 2018.
- [190] [[IntCon-2.131](#)] [**INVITED PRESENTATION-Keynote Speech**], **C. Kontoes, N. Tsakiridis (2018)**, Soil spectral libraries in N. Africa, M. East, and Balkans in support to the Food Security Pilot of GEO-CRADLE, International Conference on Soil Sciences, Remote Sensing for Sustainable Soil Management, ICOS'2018, 17 - 19th March 2018, Hammamet, Tunisia
- [191] [[IntCon-2.132](#)] [**INVITED PRESENTATION-Keynote Speech**] **C. Kontoes (2018)**, Greek Collaborative Mirror Site: a Platform as a Service for the deployment of EO applications, 2nd international geomatics applications conference (GEOMAPPLICA), Syros - Myconos Island, Greece, June 25th to 29th, 2018



7.5 GREEK SCIENTIFIC CONFERENCES WITH PROCEEDINGS AND ANNOUNCEMENTS

- [192] [[HelCon-2.2](#)] **Kartalis K., Kontoes C., Tsilimbaris X. (1995)**, "Remote sensing in Greece: Present situation, Needs, Perspectives ", proceedings of the 1st Workshop held within the project "development of Greek national strategy in the fields of Earth Observation and Monitoring", EIE, pp. 39-60.
- [193] [[HelCon-2.3](#)] **Kartalis K., Kontoes C., Tsilimbaris X. (1995)**, "Towards a National Strategy for the Development of Remote Sensing in the fields of Earth Observation and Monitoring" in proc.of 1st Workshop held within the project "development of Greek national strategy in the fields of applications of Earth Observation and Monitoring, EIE, p. 68-75.
- [194] [[HelCon-2.4](#)] **Kartalis K., Kontoes C., Tsilimbaris X. (1996)**, "Proposal for an operational programme for the development of Remote Sensing in Greece", working paper presented at the 2nd workshop organized by the Hellenic Space Research and Technology Committee in cooperation with the European Commission, in framework of the project "Development of Greek national strategy in the fields of Earth Observation and Monitoring". 50 pages.
- [195] [[HelCon-2.5](#)] [**INVITED PRESENTATION**] **Kontoes C. Aifantopouloy D, (1997)**, "Integrated solutions for the monitoring, and assessment of natural environment parameters by the use of Earth Observation Data", Conference entitled "From the Topography to Geoinformatics", invited presentation/communication, Technological Educational Institute of Athens , May 1997.
- [196] [[HelCon-2.6](#)] [**INVITED PRESENTATION**] **Kontoes C (1998)**, "The use of satellite remote sensing in the public sector", presented at the Conference entitled "Use of satellite remote sensing for the needs of the public sector", 15 January 1998, Univ. Athens, Oral Communication.

- [197] [\[HelCon-2.7\]](#) Sifakis N, Kontoes C., Elias P. (2000), "Activities and research achievements of the Institute for Space Applications and Remote Sensing", Zappeion, General Secretariat for Research and Technology, Athens, May 6-26, 2000.
- [198] [\[HelCon-2.8\]](#) Vavasis G., Geirgopoulos D., Kontoes C., Nakos V., Paradisis D. (2002), "Processing and visualization of SeaWiFS satellite image data", 7th National Congress of Cartography «Island cartography», 24-25 October 2002, Mitilini, proceedings of 5th session: Cartographic technology and remote sensing in the island environment, p.p. 11.
- [199] [\[HelCon-2.9\]](#) Kontoes C., Sykioti O., Paronis D., Perivoliotis L., Charisi A, (2004), "Early warning system for oil spill pollution on the seas based on the use of SAR satellite observations and advanced pollution dispersion models", proceedings of the 6th Panhellenic Conference Environment-Integrated Development and Environment, MODULE: 1 c. WATER ENVIRONMENT, Thessaloniki, 9-12 December 2004.
- [200] [\[HelCon-2.10\]](#) Vavasis G., Kontoes C., Nakos V. (2006), "Estimation of physical and dynamic parameters of the sea surface in Greece, using satellite remote sensing", in proc. of the 6th Panhellenic Conference of Greek Physical Environment-Integrated Development Environment, Thessaloniki & 9-12 December 2004.
- [201] [\[HelCon-2.11\]](#) Vavasis G., Kontoes C., Nakos V. (2006), "The introduction of using satellite remote sensing for marine environment in Secondary Education", in proc. 11th Pan-hellenic Conference of Greek Association of Physicists "New horizons of Physics in our century". Larisa, 30 March-2 April 2006.
- [202] [\[HelCon-2.12\]](#) [INVITED PRESENTATION] Kontoes C. (2006), "The contribution of remote-sensing techniques in the monitoring and management of natural disasters in Greece", workshop of the thematic network Geo-Impact – AUTH Research Committee, December 18, 2006, Thessaloniki, communication.
- [203] [\[HelCon-2.13\]](#) [INVITED PRESENTATION] Kontoes C., Elias P., Kotsis I., Paronis D., Sifakis N. (2007), "Operational remote sensing and dynamic imaging system for natural disasters and assessment of environmental impacts ", Conference on Remote Sensing: Developments and Applications, TEE, GEOTEE, Hellenic Society of Photogrammetry and Remote Sensing, 22-23 February 2007, Athens, proceedings in CD.
- [204] [\[HelCon-2.14\]](#) Sifakis N., Kontoes C., Keramitsoglou I. (2007), "Modern Research and applications, using remote sensing satellite data, for detecting, monitoring and mapping the spatial distribution of air pollution in urban and industrial areas", Conference on Remote Sensing: Developments and Applications, TEE, GEOTEE, Hellenic Society of Photogrammetry and Remote Sensing, 22-23 February 2007, Athens, proceedings in CD.
- [205] [\[HelCon-2.15\]](#) Keramitsoglou I., Kontoes C., Sifakis N., Xofis P., Fytoka E. (2007), "Wetlands classification using satellite imagery", Remote Sensing Conference: Advances and Applications TEE, GEOTEE, Hellenic Society of Photogrammetry and Remote Sensing, 22-23 February 2007, Athens, proceedings in CD.
- [206] [\[HelCon-2.16\]](#) [INVITED PRESENTATION] Sifakis N., Kontoes C., Keramitsoglou I., Iosifidis Ch. (2007), "Operational use of satellite remote sensing in prevention, preparedness, detection, dynamic monitoring and management of forest fires, and assessment of damages, workshop on Parnitha Disaster, ATHENS, July 20, 2007, oral presentation.
- [207] [\[HelCon-2.17\]](#) Elias P., Kontoes C., Papoutsis I., Kotsis I. (2007), "Detection of nonlinear distortions of small scale in the Gulf of Corinth, using the permanent scatterer technique", proceedings of the

8th National Geographic Conference of the Hellenic Geographic Society, Department of Geology & Geoenvironment, 4-7 October 2007, Athens.

- [208] [\[HelCon-2.18\]](#) **[INVITED PRESENTATION] Kontoes C. (2007)**, "RISK-EOS Programme/GMES Service Element: Large scale operational mapping of burnt areas in Greece using satellite remote sensing", communication within the framework of the 1st meeting of PROTIPA "Advanced Network of Remote Sensing Techniques for the Management and Protection of the Environment ", 1-2 December 2007, Aspropotamos, Trikala.
- [209] [\[HelCon-2.19\]](#) **Sifakis N., Kontoes C., Vavasis G., Keramitsoglou I. (2007)**, "The use of satellite remote sensing in the management of flood prone ecosystems and timely forecasting and mitigation of flooding events", proceedings of the Conference Flood Risk Management, Technical Chamber of Greece, December 5, 2007, Athens.
- [210] [\[HelCon-2.20\]](#) **Sifakis N., Kontoes C., Keramitsoglou I., Iosifidis Ch. (2008)**, Integrated application of satellite observations for the prevention, detection, monitoring and assessment of forest fires in Greece, Conference on Forest Fires, Hellenic Sciences Initiative, 15-16 May 2008, Athens.
- [211] [\[HelCon-2.21\]](#) **Kontoes C. (2010)**, Continuous monitoring, early detection and mapping of forest fires within the program Global Monitoring for Environment and Security (GMES), Workshop on Earth Observation in Greece, Athens, 18/5/2010, National Institute of Research (EIE).



7.6 ARTICLES IN PRESS AND PUBLIC MEDIA - TECHNICAL REPORTS

- [212] [\[TechRep-2.1\]](#) **Dialetis D., Diamantides D., Kontoes C., Sarris M., Trochoutsos F. (1995)**, "Critical Review of the COSMO Satellite System and Suggested Greek Priorities". Technical report prepared for the purposes of the Ministry of Industry, Energy and Technology, aiming at evaluating the development of a satellite system COSMO dedicated to Mediterranean EO needs. Pages 125.
- [213] [\[TechRep-2.2\]](#) **Kartalis K., Karfakis I., Kontoes C., Koukos I., Sifakis N., Tsilimparis X. (1996)**, "Towards the Development of the Hellenic National Strategy for Earth Observation and Monitoring", results from the 2nd workshop organised by the Hellenic Space Research and Technology Committee in collaboration with the European Commission, aiming at developing a roadmap towards the implementation of Earth Observation to achieve national environmental challenges in Greece. The study submitted to the European Commission assessing the Greece's maturity and funding priorities in EO. Pages 45.
- [214] [\[TechRep-2.3\]](#) **Kontoes C., Nakos B., Filippakopoulou B. (1999)**, "Specifications for the Production of a New Series of Topographic Maps at the Scale of 1:25000". The study was conducted for the needs of the Hellenic National Cadastral Organisation of the Greek Ministry of Environment. It analysed the technical details of using very high spatial resolution satellite data, and provided the full list of technical specifications for the production of the map sheets (full national coverage) at the scale of 1:25000. The study consisted of two volumes, which were submitted to the Cohesion Funding Instrument (3rd Cohesion Support Framework), claiming financial support for the relevant project development. Pages a) volume 1: 44, and b) volume 2: 47.
- [215] [\[TechRep-2.4\]](#) **Katsina A., Kontoes C., Romaidou K. (2000)**, "Photo-interpretation of LANDSAT TM Satellite Images for the Mapping of Land Use/Land Cover Classes for Statistical Purposes in Greece - Hellenic National Statistical Service". The study was conducted after a Ministerial decision (A.Π. 443/Φ60.01κ) of the BoD of the Hellenic National Cadastral Organisation of the Ministry of Environment. It analysed the technical details and provided the methodology of exploiting LANDSAT

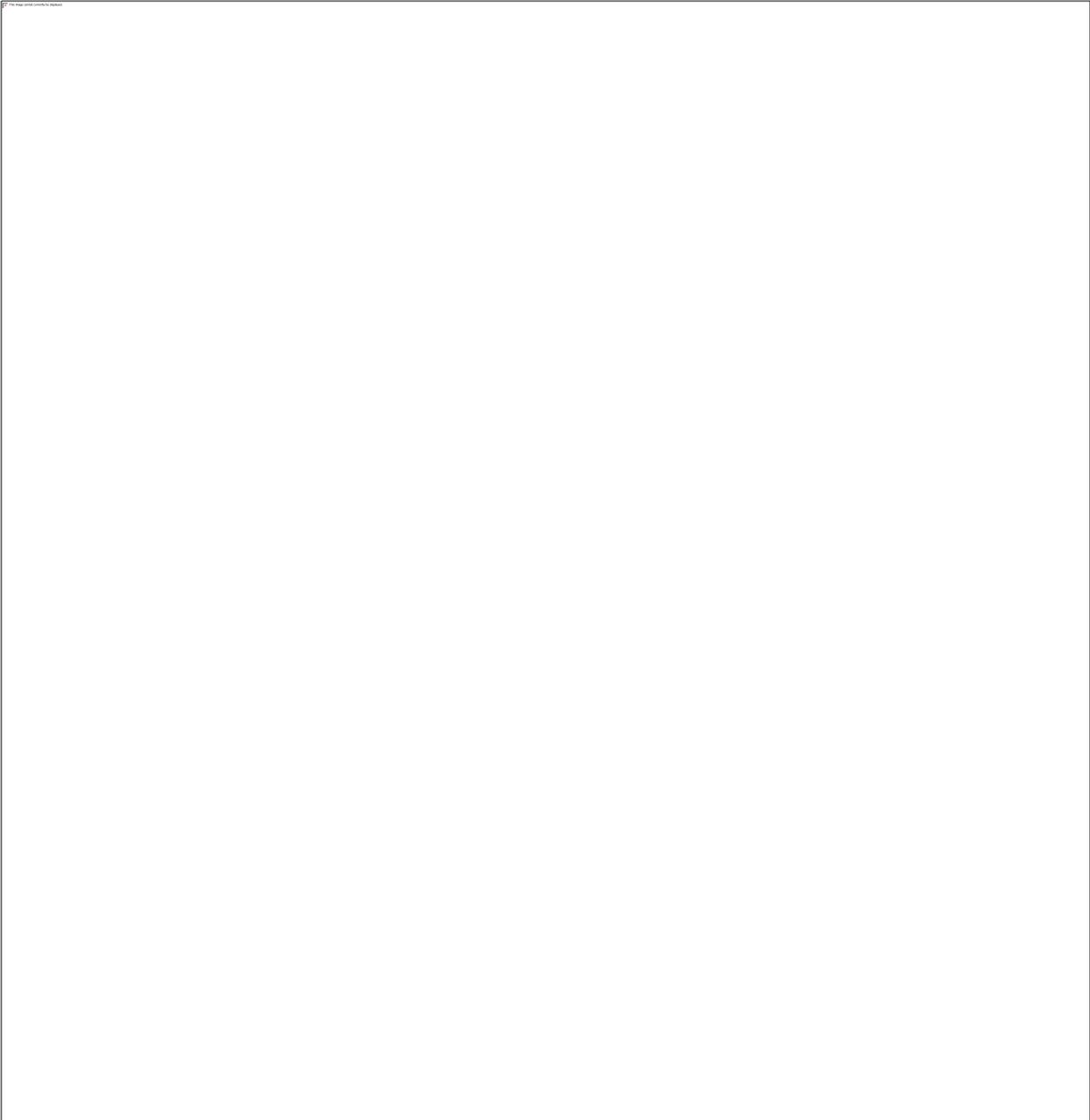
TM imagery for the production of Land Use/Land Cover maps to base upon the 2001 Greece's statistical reporting at national level. The map production was followed a year later using the derived specification documents. Pages 30.

- [216] **[TechRep-2.5] Kontoes C. (2000)**, “Monitoring Earthquakes from Space. Greek Satellite based Facilities Observe the Seismic Activations”, Newspaper Exousia, April 17 2000, page 16.
- [217] **[TechRep-2.6] Kontoes C. (2000)**, **Surface subsidence** of around 6 cm in a large part of the Attica Region due to the Strong Earthquake that occurred on September 7, 1999, and the After-Socks”, Newspaper TA NEA, February 19-20, 2000, page 26.
- [218] **[TechRep-2.7] Kontoes C. (2000)**, “How the Sea Surface Temperature Changes on Seasonal Basis in Greece”, Newspaper TA NEA, May 24, 1999, page 22.
- [219] **[TechRep-2.8] Kontoes C. (2001)**, “**Nisyros is growing up**” (2001), Newspaper TA NEA, February 10-11, 2001, page 32.
- [220] **[TechRep-2.9] Kontoes C. (2001)**, “With the Eyes on our Planet: The Satellite Remote Sensing in Support to the Earth and its Citizens”, Newspaper Eleftherotypia, September 25, 2001, Volume 129, Special Issue: Europe-USA, the non declared war of the stars, pages 6-8.
- [221] **[TechRep-2.10] Κοντοές Χ. (2007)**, “Satellites Eyes for Seeing the Burned Areas. A National Mapping Program Developed by the Scientists of the National Observatory of Athens in Collaboration with the European Space Agency”, Newspaper Eleftheros Typos, August 2, 2007, POLISET2, pages: 24-25.
- [222] **[TechRep-2.11] Kontoes C., Sifakis N., Keramitsoglou I. (2008)**, "Assessment of burnt areas in Greece using satellite data - Reference year: 2007", Satellite data used: Landsat 5 TM, SPOT XS, FORMOSAT 2 (P+XS), bilingual report in Greek and English languages; produced and circulated under the auspices of the Hellenic Ministry of Agricultural Development and Foods - General Directorate of Forests.
- [223] **[TechRep-2.12] Kontoes C., Sifakis N., Keramitsoglou I., Papoutsis I. (2009)**, "Mapping of 2007-2008-2009 burnt areas in Greece using satellite data", bilingual report in Greek and English languages; produced and circulated under the auspices of the Hellenic Ministry of Agricultural Development and Foods - General Directorate of Forests.
- [224] **[PressMedia-2.13] e-Roads of Fire, from 1984 to Today**, First Article in Greek Independent Press, Eleftherotypia, June 09, 2013 , [Article \(in Greek\)](#)
- [225] **[PressMedia-2.14] Digital mapping of points of fire origins in real time**, Kathimerini, August 07, 2013, [Link](#), [Press Article \(in Greek\)](#)
- [226] **[PressMedia-2.15] National Observatory of Athens on Battle of Firefighting**, E-typos, August 07, 2013, [Press Article \(in Greek\)](#)
- [227] **[PressMedia-2.16] National Observatory of Athens... As a Fireman**, Real News, August 07, 2013, [Link](#), [Press Article \(in Greek\)](#) , EURO2DAY, [Link](#)
- [228] **[PressMedia-2.17] Real Time Fire Monitoring**, Efimerida Syntaktwn, August 07, 2013, [Article \(in Greek\)](#)
- [229] **[PressMedia-2.18] Presentation of the BEYOND project at the Parliament Magazine**, issue 381, December 16, 2013 , [Article](#)

- [230] **[PressMedia-2.19]** BEYOND, Press Release, ESA Mirror Sites of Collaborative Ground Segment, May 2014, [Press Release GR](#)
- [231] **[PressMedia-2.20]** National Observatory of Athens Offers on-line Fire Monitoring, **Hunter and Nature Online Magazine, July 03, 2014, [Link](#)**
- [232] **[PressMedia-2.21]** Real Time Fire Data Provided by NOA, [enet.gr](#), **Eleytherotypia Press, July 02, 2014, [Link \(in Greek\)](#)**
- [233] **[PressMedia-2.22]** Real Time Points of Fire Detection, **Crash Magazine Online, July 2014**
- [234] **[PressMedia-2.23]** Real-time fire monitoring services by NOA, GSRT (General Secretariat for Research and Technology), **July 2014, [Press Article \(in Greek\)](#)**
- [235] **[PressMedia-2.24]** Best Award on Space Technology for the National Observatory of Athens, **Telecast "Good News" at SKAI TV, October 31, 2014,**
- [236] **[PressMedia-2.25]** The Greek Ministry of Environment uses real time satellite data to detect fires, **February 2015, Eurisy, [On-Site Article](#)**
- [237] **[PressMedia-2.26]** FireHub: A Space Based Fire Management Hub, **Athina 9.84 (athina984.gr), Interview on radio show "Athens Today", 11 December, 2014, [Radiocast Link](#), [Interview \(Audio\)](#)**
- [238] **[PressMedia-2.27]** FireHub: A Space Based Fire Management Hub, **Skai TV (skai.gr), December 03, 2014, [Video \(Interview only\)](#)**
- [239] **[PressMedia-2.28]** FireHUB: Fire Monitoring from Space, **Ethnos Newspaper (ethnos.gr), Saturday November 29, 2014**
- [240] **[PressMedia-2.29]** International Distinction for the National Observatory of Athens on Space Technology, **Telecast "eco News" on SKAI TV, November 04, 2014**
- [241] **[PressMedia-2.30]** International Distinction for the National Observatory of Athens on Space Technology, **Interview at (Live U), Star Channel, November 04, 2014, [Link](#)**
- [242] **PressMedia-2.31** Copernicus Masters Award 2014, **Interview at 90.4, Kanali Ena - November 03, 2014**
- [243] **PressMedia-2.32** "Space" awards for Greece, **tovima.gr, November 02, 2014, [Link](#)**
- [244] **PressMedia-2.33** Greek Satellite Applications, **TO BHMA (tovima.gr), November 02, 2014, [Link](#)**
- [245] **PressMedia-2.34** Best Award on Space Technology for the National Observatory of Athens, **SKAI TV "the Good News of the Day" (skai.gr), October 31, 2014**
- [246] **PressMedia-2.35** Four Greek distinctions at the European Satellite Navigation Competition 2014, **SBC TV (sbctv.gr), October 30, 2014**
- [247] **PressMedia-2.36** NOA's Remote Sensing Research Team won the prize of the «Best Service Challenge 2014», **H APOPSI, October 30, 2014, [H Apopsi \(iapopsi.gr\)](#)**
- [248] **PressMedia-2.37** International «Space» Distinction for the National Observatory of Athens, **October 30, 2014, Crash Online Magazine (crashonline.gr), [dasarxeio.com](#), 7imeres.gr**

- [249] **PressMedia-2.38** International Distinction for the National Observatory of Athens on Space Technology, **October 30, 2014**, [AlphaTV](#), [Enikos.gr](#), [Imerisia.gr](#), [Tilegrafos.gr](#), [Zougla.gr](#), [Matrix24.gr](#), [tanea.gr](#), [Radio Gamma \(radiogamma.gr\)](#), [iNewsgr.com](#), [NOOZ.gr](#), [NewsBomb \(newsbomb.gr\)](#), [My Way Press \(mywaypress.gr\)](#), [newslog.gr](#), [InsideNews.gr](#), [ANATOLH online \(anatolh.com\)](#), [e-Kriti \(ekriti.gr\)](#), [Hellas Online \(hol.gr\)](#), [exit News \(exitnews.gr\)](#), [Top7News \(top7news.gr\)](#), [TIPOS \(tipos.gr\)](#), [Proto Thema \(protothema.gr\)](#), [Eleftheria \(eleftheria.gr\)](#), [NewsBeast \(newsbeast.gr\)](#), [Kathimerini \(kathimerini.gr\)](#)
- [250] **PressMedia-2.39** International Competition of Satellite Applications in Berlin: Important distinctions for 4 Greek Researchers, **SKAI TV "the Good News of the Day" (skai.gr), October 28, 2014**
- [251] **PressMedia-2.40** Quad distinction of Greece in the International Competition of Satellite Applications, **October 24, 2014**, [in.gr](#), [EMEA \(emea.gr\)](#)
- [252] **PressMedia-2.41** International Competition of Satellite Applications in Berlin: Important distinctions for 4 Greek Researchers, **Telecast "Good News" at SKAI TV, October 28, 2014**, [Video](#)
- [253] **PressMedia-2.42** BEYOND, Press Release, "FireHub" - winner of the Best Service Challenge of the Copernicus Masters 2014, October 2014, [[Press Release EN](#)], [[Press Release GR](#)]
- [254] [**PressMedia-2.43**] BEYOND at European Space Expo in Athens, [ethnos.gr](#), Saturday, **March 28, 2015**, [European Space Expo Athens 2015](#)
- [255] [**PressMedia-2.44**] Video on Academic and Research Excellence in Higher Education, **Excellence Centre for monitoring natural disasters**, <http://excellence.minedu.gov.gr>, **June 12, 2015**, [YouTube Video Link](#), [Full Article Link](#)
- [256] [**PressMedia-2.45**] **E.Gerasopoulos, Dr. S.Solomos, Dr. Haris Kontoes**, Simulation of smoke dispersion from the fire accident occurred on 6th June 2015, at the premises of "GENIKI ANAKIKLOSEOS – KTIMATIKI XENODOXIAKI SA", Aspropyrgos, Pefko Mavraki site, (Patima Aspropyrgos), **June 10, 2015**, [Article](#)
- [257] [**PressMedia-2.46**] **Lefkada moved 36 cm**, [ethnos.gr](#), **Friday, November 20, 2015**, [Link](#)
- [258] [**PressMedia-2.47**] The Final BEYOND Workshop, Press Release, The BEYOND Center of Excellence as a national infrastructure for the management of natural disasters using satellite remote sensing, May 2016, [Press Release GR](#)
- [259] [**PressMedia-2.48**] [GEO-CRADLE regional workshop in Abu Dhabi in propaganda newspaper](#), **09.02.2017 17:10 SCIENCE & ENVIRONMENT**
- [260] [**PressMedia-2.49**] National Observatory of Athens coordinates GEO-CRADLE in [newsbeast.gr](#) , in [Ethnos](#)
- [261] [**PressMedia-2.50**] **Dr. Haris Kontoes on ERT talking about 1st Copernicus Information day**, [Link](#)

8. ANNEX I: BEYOND FIREHUB PATTENT



9. ANNEX I: BEYOND Activities



ΤΟ ΕΥΡΩΠΑΪΚΟ ΚΕΝΤΡΟ ΑΡΙΣΤΕΙΑΣ ΔΙΑΣΤΗΜΙΚΩΝ ΕΦΑΡΜΟΓΩΝ ΚΑΙ ΤΗΛΕΠΙΣΚΟΠΗΣΗΣ BEYOND ΓΙΑ ΤΗΝ ΔΙΑΧΕΙΡΙΣΗ ΚΙΝΔΥΝΩΝ ΚΑΙ ΦΥΣΙΚΩΝ ΚΑΤΑΣΤΡΟΦΩΝ

ΓΕΩΓΡΑΦΙΚΗ ΚΑΛΥΨΗ ΚΕΝΤΡΟΥ: Το Κέντρο BEYOND <http://www.beyond-eocenter.eu/> παρέχει υπηρεσίες προσαρμοσμένες στις ανάγκες της Νοτιοανατολικής Ευρώπης, των Βαλκανίων, της Μέσης Ανατολής και της Βορείου Αφρικής.

ΧΡΗΜΑΤΟΔΟΤΙΚΟ ΠΛΑΙΣΙΟ: Το Κέντρο Αριστείας BEYOND αναπτύχθηκε στο πλαίσιο του προγράμματος FP7-REGPOT-2012-2013-1 της ΕΕ με χρηματοδότηση που ανήλθε στα 2,3 ΜΕυρώ. Δημιούργησε αριστεία και υποδομές κλίμακας στο τομέα του. Εξασφαλίζει μια πλήρως αυτόνομη επιχειρησιακή λειτουργία, μέσω χρηματοδοτήσεων από ανταγωνιστικά ερευνητικά και επιχειρησιακά προγράμματα αριστείας στη Διαστημική (FP7, H2020, ESA EOEP). Η λειτουργία του εξυπηρετεί την Ελληνική και Παγκόσμια κοινότητα Υπηρεσιών Πολιτικής Προστασίας και Διαχείρισης Κρίσεων. Το Κέντρο έχει πιστοποιημένη αναγνώριση στην παροχή υπηρεσιών στο πλαίσιο του προγράμματος Παγκόσμιας Παρακολούθησης της Γης και της Ασφάλειας των πολιτών (Copernicus/GMES) της Ευρωπαϊκής Ένωσης, καθώς και του Ευρωπαϊκού Οργανισμού Διαστήματος (ESA), με έμφαση στην αντιμετώπιση καταστάσεων έκτακτης ανάγκης (Copernicus / Emergency Management Support), παρακολούθηση και προστασία του Θαλασσιού, και Ατμοσφαιρικού περιβάλλοντος, καθώς και θέματα εφαρμογών Γεωργίας, Ανανεώσιμων Μορφών Ενέργειας, και την Κλιματική Αλλαγή και των επιπτώσεως αυτής στην ποιότητα της ζωής (π.χ. φυσικές καταστροφές).

ΔΙΕΘΝΗΣ ΔΡΑΣΤΗΡΙΟΤΗΤΑ-ΕΝΕΡΓΟΠΟΙΗΣΗ: Ενδεικτικά, μόνο την περίοδο 2016-2018 το Κέντρο έχει ενεργοποιηθεί επισήμως μέσω του προγράμματος Copernicus EMS από περισσότερες των 20 Αρχών Πολιτικής Προστασίας ανά τον κόσμο, για την έγκαιρη εκτίμηση κινδύνων σε ευρεία γκάμα φυσικών καταστροφών όπως σεισμοί, ηφαίστεια, κατολισθήσεις, διάβρωση πρανών και ακτών, πυρκαγιές, πλημμύρες, διαρροή τοξικών αερίων, μετάδοση καπνού και βιομηχανικά ατυχήματα. Από το 2017 το Κέντρο BEYOND έχει επιλεγεί από την ΕΕ να προσφέρει τις υπηρεσίες του δορυφορικής παρακολούθησης και εκτίμησης των καταστροφών από δασικές πυρκαγιές σε πραγματικό χρόνο (υπηρεσία FireHub) για τις ανάγκες του Ευρωπαϊκού Πληροφοριακού Συστήματος Δασικών Πυρκαγιών (EFFIS).

ΕΞΑΣΦΑΛΙΣΗ ΕΡΕΥΝΗΤΙΚΩΝ ΚΟΝΔΥΛΙΩΝ: Το Κέντρο BEYOND εξασφαλίζει ίδιες χρηματοδοτήσεις από την λειτουργία του ύψους 1.2ΜΕ ετησίως. Ταυτόχρονα υποστηρίζει με τις υποδομές του την έρευνα εντός του ΕΑΑ η οποία αποτιμάται ότι αποφέρει μια επιπρόσθετη εισροή ερευνητικών κονδυλίων (ΕΕ, ESA, Εθνικά) ύψους 1,2 ΜΕ.

ΥΠΟΣΤΗΡΙΞΗ ΕΡΕΥΝΑΣ - ΔΙΕΘΝΕΙΣ ΔΙΑΚΡΙΣΕΙΣ - ΒΡΑΒΕΙΑ: Η λειτουργία του Κέντρου BEYOND συνεισφέρει στην παραγωγή ερευνητικού έργου, που αποτιμάται ότι έχει συμβάλει μόνο κατά την τελευταία πενταετία στην παραγωγή περισσότερων από 100 επιστημονικές δημοσιεύσεις σε περιοδικά με κριτές, και 150 άρθρα σε διεθνή συνέδρια, με περισσότερες από 1400 ετεροαναφορές.

Η υπηρεσία πραγματικού χρόνου FireHub του Κέντρου για την έγκαιρη ανίχνευση, συνεχή παρακολούθηση και διαχείριση των ενεργών μετώπων δασικών πυρκαγιών, καθώς και της εκτίμησης των καταστροφών, χρησιμοποιείται σε βάση ρουτίνας από το Κέντρο Επιχειρήσεων του Πυροσβεστικού Σώματος, και έχει διακριθεί διεθνώς (Διαγωνισμός Copernicus Masters 2014) κερδίζοντας το 1^ο βραβείο ως η καλύτερη λειτουργούσα διαστημικής υπηρεσία ανάμεσα σε 70 ανταγωνιστικές προτάσεις.

ΕΘΝΙΚΕΣ ΥΠΟΔΟΜΕΣ ΔΟΡΥΦΟΡΙΚΗΣ ΤΗΛΕΠΙΣΚΟΠΗΣΗΣ: Το Κέντρο BEYOND έχει αναπτύξει και εξασφαλίζει την αδιάλειπτη λειτουργία εθνικών υποδομών για την συστηματική λήψη, διαχείριση, και αναδιανομή σε πραγματικό χρόνο δεδομένων Παρατήρησης της Γης προερχόμενων από διαστημικές δορυφορικές αποστολές και επίγεια συστήματα. Η **εμβέλεια των υποδομών είναι διεθνής** και καλύπτει ανάγκες της ερευνητικής κοινότητας καθώς και των θεσμικών φορέων λήψης απόφασης (decision makers) σε ολόκληρη την **NA Ευρώπη, Β. Αφρική, Μ. Ανατολή και τα Βαλκάνια**. Περιλαμβάνει:

1. Το **Ελληνικό Mirror Site** (<https://sentinels.space.noa.gr/>) που παρέχει σε πραγματικό χρόνο στην διεθνή ερευνητική κοινότητα και ιδιωτικό τομέα, δεδομένα των δορυφορικών αποστολών Sentinels (S-1, S-2, S-3, S-5P) (Copernicus) που καλύπτουν την ευρύτερη περιοχή της NA Ευρώπης. Η υποδομή υποστηρίζεται σε υπολογιστικές μονάδες από την ΕΔΕΤ ΑΕ.
2. Το **κόμβο IntHub (International Hub) που λειτουργεί για λογαριασμό της ESA**, και διαχειρίζεται την διανομή σε πραγματικό χρόνο στις Διαστημικές Υπηρεσίες παγκοσμίως (NASA, NOAA, USGS, GA) περισσότερα από 15Tbytes δεδομένων ημερησίως των αποστολών Sentinels (Copernicus). Η υποδομή υποστηρίζεται σε υπολογιστικές μονάδες και αρχείο από την ΕΔΕΤ ΑΕ.
3. **Κεραία (X-/L-band) συλλογής και επίγειο σύστημα αρχειοθέτησης** δορυφορικών δεδομένων σε πραγματικό χρόνο των δορυφορικών αποστολών EOS(AQUA, TERRA)/NASA, SUOMI-NPP/NASA, NOAA/AVHRR, METOP, FY. Η εμβέλεια λήψης της κεραίας είναι ολόκληρη η **NA Ευρώπη, Β. Αφρική, Μ. Ανατολή και τα Βαλκάνια**.
4. **Κεραία (DVB-2) συλλογής και επίγειο σύστημα αρχειοθέτησης** δορυφορικών δεδομένων σε πραγματικό χρόνο των δορυφορικών αποστολών EUMETSAT (MSG1, MSG2, MSG3).
5. Προηγμένο επίγειο σύστημα **ατμοσφαιρικού lidar PollyXT**, καθώς και κινητή μονάδα **lidar system EMORAL**.
6. Κέντρο επεξεργασίας αποτελούμενο από **severs μεγάλης υπολογιστικής ισχύος** καθώς και **αρχείο 300Tbytes** για την επεξεργασία των δεδομένων, και την υλοποίηση έρευνας, και παροχής των υπηρεσιών των συστημάτων **FireHub, FloodHub, GeoHub του Κέντρου BEYOND**.

ΣΥΝΤΟΝΙΣΜΟΣ COPERNICUS και GROUP on EARTH OBSERVATIONS (GEO/GEOSS): Το Κέντρο υποστηρίζει ερευνητικά το έργο συντονισμού **GEO-CRADLE** (www.geocradle.eu) που χρηματοδοτείται από την ΕΕ. Σκοπός της δράσης είναι η **εφαρμογή των προγραμμάτων Copernicus και GEO** στις χώρες της **Β. Αφρικής, Μ. Ανατολής, και Βαλκανίων**. Στο πλαίσιο αυτό η ερευνητική ομάδα του Κέντρου οργανώνει και **συντονίζει ένα δίκτυο από 255 ερευνητικούς και επαγγελματικούς φορείς**, που δραστηριοποιούνται σε περισσότερες από 22 χώρες στις περιοχές αυτές. Μεταξύ των αρμοδιοτήτων του είναι να **επικουρεί το δίκτυο των φορέων σε θέματα μεταφοράς τεχνολογίας Παρατήρησης της Γης, και εκπαίδευσης των φορέων** για την αξιοποίηση των δεδομένων ΕΟ (Sentinels/Copernicus). Τέλος συντονίζει την **υποβολή προς την ΕΕ του Οδικού Χάρτη** για την εφαρμογή των προγραμμάτων Copernicus και GEO στην βάση των αναγνωρισμένων προτεραιοτήτων και αναγκών των χωρών Β. Αφρικής, Μ. Ανατολής, και Βαλκανίων.

ΦΟΡΕΙΣ ΠΟΥ ΥΠΟΣΤΗΡΙΖΟΝΤΑΙ ΑΠΟ ΤΟ ΚΕΝΤΡΟ BEYOND: Το Κέντρο BEYOND υποστηρίζει την **ερευνητική κοινότητα της χώρας και διεθνώς** με την συστηματική παροχή δεδομένων και τεχνολογίας στη Δορυφορική Τηλεπισκόπηση. Επίσης **υποστηρίζει Επιχειρησιακά Κέντρα αρμόδιων κρατικών Υπηρεσιών και Υπουργείων** της Ελλάδας και του εξωτερικού. Ενδεικτικά παραδείγματα στην Ελληνική επικράτεια αποτελούν το **Κέντρο Επιχειρήσεων της Πυροσβεστικής**

Υπηρεσίας, η ΔΑΕΦΚ, το ΥΠΟΜΕΔΙ, η ΓΓΠΠ, η ΓΓΥ, το ΥΠΕΚΑ, οι ΠΠ Τοπικών Αυτοδιοικήσεων και Περιφερειών, οι Δασικές Υπηρεσίες, το Υπ. Γεωργίας σε θέματα γεωργικής παραγωγής, και η Αρχή Διαχείρισης της Ενέργειας κυρίως σε θέματα αξιοποίησης Ανανεώσιμων Μορφών Ενέργειας. Επιπλέον προσφέρει υπηρεσίες σε κρατικές αρχές και υπηρεσίες διεθνώς, μέσω της ενεργούς συμμετοχής του στο [Παγκόσμιο Πρόγραμμα Παρατήρησης και Παρακολούθησης της Γης για την Διαχείριση Φυσικών Καταστροφών και Ανθρωπιστικών Κρίσεων \(Copernicus Emergency Management Services -http://emergency.copernicus.eu/\)](http://emergency.copernicus.eu/). Τα τελευταία χρόνια ενεργοποιείται τουλάχιστον μια φορά κάθε μήνα και αναλαμβάνει την εξυπηρέτηση των κρατικών φορέων οπουδήποτε ανά τον κόσμο σε ποικίλα θέματα Παρατήρησης της Γης και Προστασίας του Περιβάλλοντος.

ΕΝΔΕΙΚΤΙΚΕΣ ΥΠΗΡΕΣΙΕΣ (Φυσικές Καταστροφές, Κλιματική Αλλαγή, Ενέργεια, Γεωργία):

Υπηρεσία: Παρακολούθηση δασικών πυρκαγιών – Σύστημα FireHub

- Υπηρεσία ανίχνευσης και παρακολούθησης δασικών πυρκαγιών, κάθε 5 λεπτά της ώρας, σε 500 μέτρα χωρική ανάλυση
 - Υπηρεσία μοντελοποίησης της χωρικής διασποράς του καπνού της πυρκαγιάς
 - Υπηρεσία ημερήσιας και εποχικής χαρτογράφησης των καμένων εκτάσεων σε υψηλή χωρική ανάλυση (~ 10-20 μέτρα)
 - 1^ο βραβείο στον διαγωνισμό Copernicus Masters για την καλύτερη επιχειρησιακή υπηρεσία που στηρίζεται σε επεξεργασία δορυφορικών δεδομένων.
- Μεθοδολογία που στηρίζεται συνδυαστικά σε πολλαπλές δορυφορικές εικόνες, σε μετεωρολογικά μοντέλα (διεύθυνση και ταχύτητα του ανέμου) και σε γεωχωρικές πληροφορίες να την υποκείμενη κάλυψη της (είδος βλάστησης, πυκνότητα, ευφλεξιμότητα, κτλ.).

Use Case: Δασική πυρκαγιά στον Κάλαμο Αττικής, Αύγουστος 2017



Στις 13 Αυγούστου 2017 και ώρα 16:50 τοπική, το σύστημα FireHub του Εθνικού Αστεροσκοπίου Αθηνών ανίχνευσε για πρώτη φορά την πυρκαγιά στον Κάλαμο Αττικής. Η πυρκαγιά έλαβε γρήγορα διαστάσεις λόγω της μεταβλητότητας του ανέμου, του είδους της βλάστησης και της ποσότητας της καύσιμης ύλης, και του ανάγλυφου της περιοχής. Η πυρκαγιά τέθηκε υπό έλεγχο στις 15 Αυγούστου αργά το απόγευμα. Καθ' όλη τη διάρκεια της πυρκαγιάς, το FireHub δίνει σε πραγματικό χρόνο και σε 500 μέτρα χωρική ανάλυση, τη διασπορά των εστιών, και την εξέλιξη του φαινομένου και του μετώπου της φωτιάς, με χρήση όλων των διαθέσιμων δορυφορικών μέσων.



Παράλληλα, το σύστημα FireHub παρέχει την υπηρεσία της ημερήσιας χαρτογράφησης των καμένων εκτάσεων, με χρήση των πρώτων διαθέσιμων δορυφορικών δεδομένων μέσων και χαμηλής χωρικής ανάλυσης. Ο στόχος είναι να δοθεί στις Αρχές έγκαιρα μια πρώτη εκτίμηση του αποτυπώματος της καταστροφής. Στην περίπτωση της πυρκαγιάς του Κάλαμου, στις 16 Αυγούστου, μία ημέρα αφού τέθηκε η πυρκαγιά υπό έλεγχο, χρησιμοποιήθηκαν δεδομένα MODIS και VIIRS με ανάλυση τα 400 μέτρα περίπου για την ταχεία χαρτογράφηση των καμένων εκτάσεων. Η πρώτη αυτή εκτίμηση έδωσε 26,900 στρέμματα καμμένης γης, με το 44% να είναι μεταβαστικές δασώδεις και θάμνωδεις εκτάσεις.



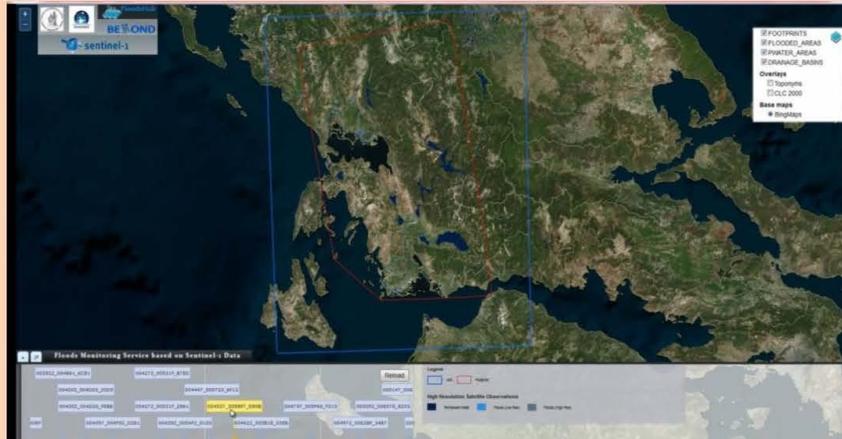
Το σύστημα FireHub χαρτογράφησε την καμμένη έκταση, με δεδομένα Sentinel υψηλής ανάλυσης στα 10 μέτρα. Στη περίπτωση του Κάλαμου, η πρώτη κατάλληλη εικόνα ήρθε από τον Sentinel-2B με ημερομηνία λήψης 19/8/2017. Τα δεδομένα έγιναν διαθέσιμα στις 20/07, στις 02:00, μέσα από το Ελληνικό Sentinel Mirror Site που λειτουργεί στο BEYOND/ EAA. Λίγες ώρες μετά, η ομάδα FireHub επεξεργάστηκε τα δεδομένα και δημοσίευσε το παραπάνω θεματικό προϊόν με την λεπτομερή καταγραφή των καμμένων εκτάσεων. Συνολικά, κάπκαν 29.530 στρέμματα δασικής και αγροτικής γης, πολύ κοντά στην αρχική εκτίμηση που έγινε με βάση την υπηρεσία της ταχείας ημερήσιας χαρτογράφησης.

Υπηρεσία: Παρακολούθηση πλημμυρικών γεγονότων – Σύστημα FloodHub

1. Συστηματική παρακολούθηση και χαρτογράφηση όλων των πλημμυρικών συμβάντων σε επιλεγμένες λεκάνες απορροής ιδιαίτερου ενδιαφέροντος όπου βρίσκονται ζώνες υψηλής επικινδυνότητας (π.χ. πόλεις) ή σημαντικά έργα υποδομής (π.χ. φράγματα με σταθμούς παραγωγής υδροηλεκτρικής ενέργειας). Δυνατότητα έκδοσης ειδοποίησης όταν εντοπιστεί αξιόλογη απόκλιση από το σύνηθες.
 - Μεθοδολογία που στηρίζεται στην πλήρως αυτοματοποιημένη διαχρονική χαρτογράφηση της έκτασης του νερού επί σειρά υδρολογικών ετών. Η λεκάνη απορροής παρακολουθείται δορυφορικά με επεξεργασία δεδομένων Sentinel από το Ελληνικό Collaborative Ground Segment.
2. Χαρτογράφηση με περαιτέρω ανάλυση συγκεκριμένων πλημμυρικών συμβάντων σε οποιαδήποτε λεκάνη απορροής.
 - Μεθοδολογία που περιλαμβάνει χρήση δορυφορικής τηλεπισκόπησης και φωτοερμηνείας, υδρολογική ανάλυση και προσομοίωση σε υδραυλικό μοντέλο, αλλά και αυτοψία στην περιοχή ενδιαφέροντος για συλλογή στοιχείων και λεπτομερέστερη ανάλυση, συμπεριλαμβανομένου του εντοπισμού των ακάλυπτων και καλυμμένων τμημάτων των ρεμάτων αλλά και της παλαιότερης φυσικής ροής τους, καθώς και της επισημάνσης των κρίσιμων σημείων, της εξέτασης της επάρκειας της διατομής των ρεμάτων και των τεχνικών έργων, της λήψης φωτογραφιών και της διατύπωσης κατάλληλων μέτρων αποκατάστασης και πρόληψης μελλοντικών αστοχιών και καταστροφών.

Use Case 1: Διαχρονική παρακολούθηση των λεκανών απορροής των ποταμών Άραχθου και Αχελώου

- Με αρχή το υδρολογικό έτος 2014-2015 και επεξεργασία όλων των δορυφορικών δεδομένων Sentinel-1 στην περιοχή ενδιαφέροντος, συνεχίζουμε την πλήρως αυτοματοποιημένη συλλογή και επεξεργασία όλων των δορυφορικών εικόνων Sentinel που καλύπτουν τις λεκάνες απορροής των δυο αυτών ποταμών για την χαρτογράφηση όλων των πλημμυρικών συμβάντων, με δυνατότητα έκδοσης ειδοποίησης όταν εντοπιστεί αξιόλογη απόκλιση από το σύνηθες.
- Οι λεκάνες αυτές επιλέχθηκαν επειδή, αφενός η ΔΕΗ λειτουργεί φράγματα με σταθμούς παραγωγής υδροηλεκτρικής ενέργειας τόσο στον ποταμό Άραχθο όσο και στον ποταμό Αχελώο, και αφετέρου η πόλη της Άρτας βρίσκεται κατάντη των φραγμάτων Πουρνάρι Ι και ΙΙ στον ποταμό Άραχθο, δηλαδή σε ζώνη υψηλής επικινδυνότητας.

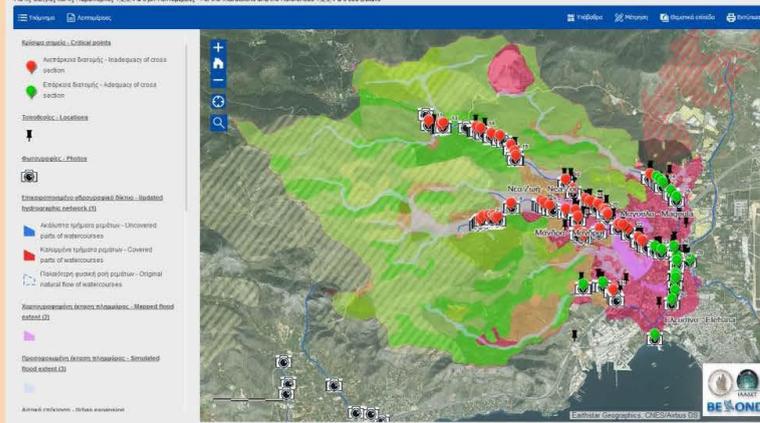


Use Case 2: Πλημμύρα στη δυτική Αττική, 15 Νοεμβρίου 2017

- Στις 15/11/2017 σημειώθηκε αιφνίδια πλημμύρα μετά από έντονη βροχόπτωση στη δυτική Αττική, πλήττοντας κυρίως τις περιοχές της Μάνδρας και της Νέας Περάμου. Ο τραγικός απολογισμός είναι ότι 24 άτομα έχασαν τη ζωή τους, και πολλές υποδομές και περιουσιακά στοιχεία καταστράφηκαν ολοσχερώς ή μερικώς.
- Το BEYOND ενεργοποιήθηκε και μελέτησε την περιοχή, τόσο με την χρήση δορυφορικής τηλεπισκόπησης και φωτοερμηνείας όσο και με αυτοψία στην περιοχή για συλλογή στοιχείων και λεπτομερέστερη ανάλυση, συμπεριλαμβανομένου του εντοπισμού των ακάλυπτων και καλυμμένων τμημάτων των ρεμάτων αλλά και της παλαιότερης φυσικής ροής τους, καθώς και της επισημάνσης των κρίσιμων σημείων (65), της εξέτασης της επάρκειας της διατομής των ρεμάτων και των τεχνικών έργων, της λήψης φωτογραφιών (301) και της διατύπωσης κατάλληλων μέτρων αποκατάστασης και πρόληψης μελλοντικών αστοχιών και καταστροφών.
- Μεταξύ άλλων δημιούργησε μια διαδραστική διαδικτυακή εφαρμογή και παρήγαγε λεπτομερείς χάρτες που απεικονίζουν το επικαιροποιημένο υδρογραφικό δίκτυο ως έχει σήμερα, μετά τις ανθρώπινες παρεμβάσεις, την μέγιστη έκταση της πλημμύρας (τόσο με χαρτογράφηση όσο και με προσομοίωση) καθώς και μερικούς από τους κρίσιμους παράγοντες που συνέβαλαν στην τεράστια καταστροφή: αυθαίρετες ανθρώπινες παρεμβάσεις εντός της κοίτης των ρεμάτων, απουσία ή ανεπάρκεια τεχνικών έργων, και εν μέρει αλλαγές τοπίου αφενός λόγω καμένων εκτάσεων ανάντη και κυρίως λόγω των αστικών επεκτάσεων όπου η δόμηση παρεμποδίζει τη ροή των ρεμάτων.
- Η χαρτογράφηση της μέγιστης έκτασης της πλημμύρας έγινε με χρήση δορυφορικής τηλεπισκόπησης (επεξεργασία εικόνας WorldView-4 πολύ υψηλής ανάλυσης 0,31 m της 21/11/2017), φωτοερμηνεία, και αξιοποίηση των στοιχείων που συλλέχθηκαν κατά την αυτοψία στην περιοχή (21-23/11/2017) αλλά και επιπλέον στοιχείων που είδαν το φως της δημοσιότητας.
- Η προσομοίωση της μέγιστης έκτασης της πλημμύρας έγινε με χρήση του λογισμικού HEC-RAS (έκδοση 5.0.1), προσομοιώνοντας διαδιάστατη ροή στο ψηφιακό μοντέλο εδάφους EU-DEM (ανάλυσης 25 m), θεωρώντας βροχή διάρκειας 6 ωρών και περιόδου επαναφοράς 1000 ετών, και λαμβάνοντας υπόψη τις χρήσεις γης, με επικαιροποίηση της Βάσης Δεδομένων του CORINE 2012 σύμφωνα με τις αλλαγές τοπίου, τόσο λόγω της αστικής επέκτασης την τελευταία 20ετία (από ιστορικές αεροφωτογραφίες και δορυφορικά δεδομένα πολύ υψηλής ανάλυσης - εικόνα WorldView-4), όσο και λόγω των καμένων διαχρονικά εκτάσεων την τελευταία 30ετία όπως δίνονται στο σύστημα διαχρονικής χαρτογράφησης της υπηρεσίας FireHub του BEYOND.

Ανάλυση της πλημμύρας στη δυτική Αττική στις 15/11/2017 Analysis of the flood in west Attica on 15/11/2017

Για τις Οδηγίες και τις Πρακτικές 1, 2, 3, 4 & 5 Δλ. Αιτιολογίες - For the Instructions and the References 1, 2, 3, 4 & 5 see Details

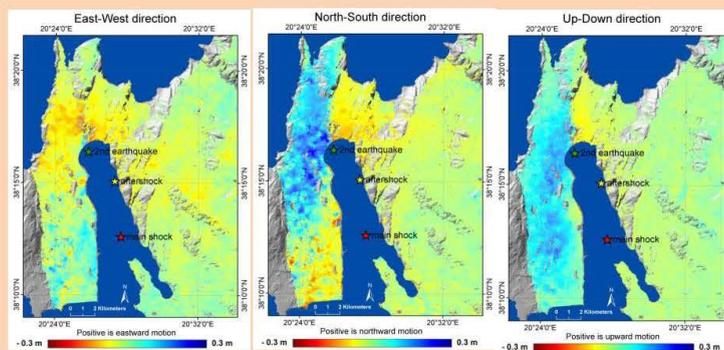


Υπηρεσία: Παρακολούθηση γεωφυσικών καταστροφών – Σύστημα [GeoHub](#)

- Σεισμοί: Γεωδαιτική μέτρηση της παραμόρφωσης του εδάφους μετά από ένα καταστροφικό σεισμό με χρήση δορυφορικών δεδομένων ραντάρ. Η μέτρηση αυτή χρησιμοποιείται στη συνέχεια για τον εντοπισμό του ρήγματος και των παραμέτρων αυτού.
 - Ηφαιστειακή δραστηριότητα: Παρακολούθηση των κατακόρυφων μετατοπίσεων του Γήινου φλοιού σε ηφαιστειογενείς περιοχές, με στόχο τον έγκαιρο εντοπισμό επιταχυνόμενης μαγματικής δραστηριότητας που μπορεί να οδηγήσει στην εκτόνωση του ηφαιστείου μέσα από κάποια έκρηξη.
 - Ηφαιστειακή στάχτη: Μοντελοποίηση της ενέργειας διασποράς και της εναπόθεσης στην επιφάνεια της Γης ηφαιστειακής στάχτης, με αντίκτυπο στην αεροπλοΐα και την υγεία.
 - Κατολισθήσεις: Χρήση δορυφορικών δεδομένων για τον εντοπισμό πρηνών που έρπουν και δυνητικά μπορεί να αποκολληθούν, απειλώντας κατοικημένες περιοχές και χωριά σε ορεινές περιοχές ή/και το τοπικό οδικό δίκτυο.
 - Κατασκευαστική δραστηριότητα: Εκτίμηση των επιφανειακών τάσεων που δημιουργούνται στον αστικό ιστό, σαν συνέπεια έργων κατασκευής (π.χ. κίνδυνοι αστοχίας του εδάφους λόγω εργασιών του μετροπόντικα, και εδαφικές πιέσεις λόγω των έργων κατά την προετοιμασία των Ολυμπιακών αγώνων του 2004, κ.α.)
- Μεθοδολογία που στηρίζεται στην ανάλυση χρονοσειρών δορυφορικών εικόνων ραντάρ. Το δορυφορικό ραντάρ μπορούμε να το φανταστούμε σα να βρισκόμαστε πάνω σε ένα δορυφόρο που βρίσκεται σε τροχιά γύρω από τη Γη, κρατώντας μια τεράστια μεζούρα. Με αυτή τη μεζούρα μπορούμε να μετράμε συνέχεια την απόσταση δορυφόρου-γης, σε διαφορετικές χρονικές στιγμές, και συνεπώς να μετράμε τις ελαστικές και πλαστικές παραμορφώσεις/μεταβολές της επιφάνειας της γης, που λαμβάνουν χώρα σαν συνέπεια γεωφυσικών διεργασιών.

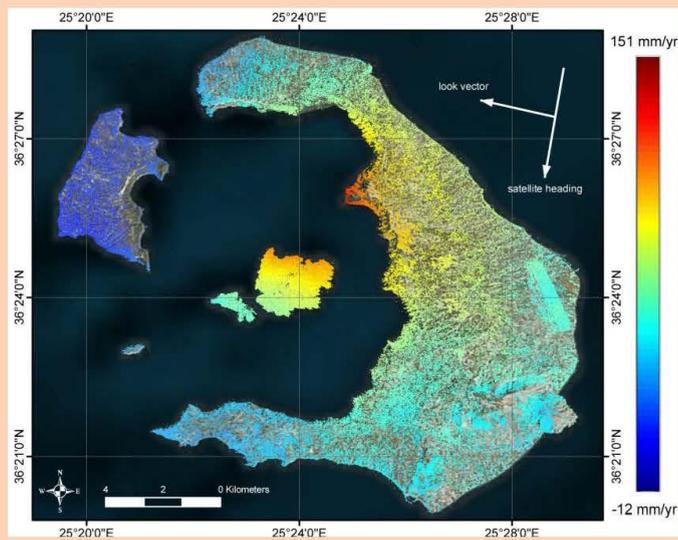
Use Case 1: [Σεισμός στην Κεφαλονιά, Φεβρουάριος 2014](#)

- Στις 26/1/2014 (M_w 5.9) ο πρώτος σεισμός και 3/2/2014 (M_w 5.7) ο δεύτερος.
- Το BEYOND εξασφάλισε άμεσα και κατά προτεραιότητα δορυφορικά δεδομένα από την Ιταλική και τη Γερμανική διαστημική υπηρεσία, στο πλαίσιο της συμμετοχής του Αστεροσκοπείου στην Ευρωπαϊκή πλατφόρμα CEOS (κλειστό club που συμμετέχουν κατά βάσει οι φορείς που δραστηριοποιούνται στην τηλεπισκόπηση).
- Άμεση εκτίμηση της εδαφικής παραμόρφωσης μέσα από το GeoHub: η χερσόνησος της Παλλικής μετατοπίστηκε κατά 30 περίπου εκατοστά βορειοδυτικά, ενώ βυθίστηκε ταυτόχρονα άλλα 30 εκατοστά.



Use Case 2: Ηφαιστειακή δραστηριότητα στη Σαντορίνη το 2011-2012

- Η Σαντορίνη βρισκόταν σε γεωφυσική ηρεμία από το 1950.
- Αυτή η ηρεμία διαταράχθηκε το Γενάρη του 2011, όταν παρατηρήθηκε έντονη μικρο-σεισμική δραστηριότητα στην περιοχή της Νέας Καμένης.
- Το BEYOND άμεσα παρήγγειλε και κατέβασε δεδομένα ραντάρ Envisat, από τον Ευρωπαϊκό Οργανισμό Διαστήματος.
- Το GeoHub τα επεξεργάστηκε και αποκάλυψε ότι η Σαντορίνη στο σύνολό της ανυψωνόταν, με ρυθμούς που έφταναν τα 15 εκατοστά ανά έτος στο Ημεροβίγλι και τα Φηρά.
- Αυτό που αποκαλύφθηκε είναι το εξής: Σε ένα μαγματικό θόλο που βρίσκεται περίπου 4 km κάτω από τη Σαντορίνη, άρχισε να εισρέει μαγματικό υλικό. Αυτό είχε σαν αποτέλεσμα ο θόλος να αρχίσει να φουσκώνει σαν μπαλόνι, και με την σειρά του το μπαλόνι αυτό πίεσε και ανύψωσε την Σαντορίνη.
- Αυτού του τύπου η δραστηριότητα αυξάνει τον κίνδυνο για επικείμενη έκρηξη.
- Το BEYOND αποκάλυψε ότι το φαινόμενο σταμάτησε τον Μάρτιο του 2012. Από τότε παρακολουθούμε την περιοχή συστηματικά με πολλαπλά δορυφορικά και επίγεια (GPS) γεωδαιτικά όργανα.



Υπηρεσία: Συλλογή πληροφοριών με τη συμμετοχή των πολιτών - DisasterHub

- Εφαρμογή σε Smartphone όπου εξειδικευμένο προσωπικό, τοπικοί παράγοντες και πολίτες σημειώνουν πάνω σε ένα online χάρτη πληροφορίες που αφορούν φυσικές καταστροφές.
- Ο online χάρτης περιλαμβάνει και θεματική πληροφορία για την εν εξελίξει φυσική καταστροφή, που έχει παραχθεί από ανάλυση δορυφορικών δεδομένων.
- Οι συμμετέχοντες έχουν τη δυνατότητα να αναρτήσουν και φωτογραφίες από το πεδίο.
- Το σύστημα DisasterHub στηρίζεται στην ενσωμάτωση των υφιστάμενων υπηρεσιών παρακολούθησης φυσικών καταστροφών του BEYOND, σε ένα application για κινητά, όπου παρέχεται στο χρήστη η δυνατότητα αλληλεπίδρασης με την πλατφόρμα, πέρα από το απλό viewing της δορυφορικής θεματικής πληροφορίας.

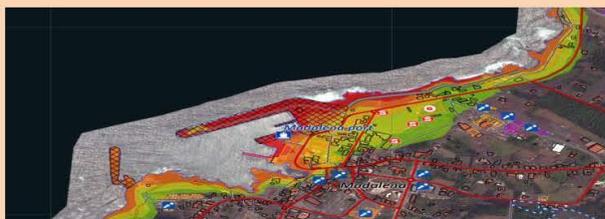


Υπηρεσία: Ενεργοποίηση Copernicus EMS: Εκτίμηση έκθεσης, επικινδυνότητας, τρωτότητας και ρίσκου περιοχών σε διάφορες φυσικές καταστροφές, εκπόνηση σχεδίων εκκένωσης, κα.

- Ενεργοποίηση υπηρεσίας από θεσμικούς φορείς (π.χ. πολιτικές προστασίες) μέσα από το πρόγραμμα **Copernicus EMS**.
- Παγκόσμια κάλυψη υπηρεσίας.
- Επιχειρησιακή δράση, παράδοση των θεματικών προϊόντων 20 εργάσιμες ημέρες μετά την ανακοίνωση της ενεργοποίησης.
- Μέχρι στιγμής κατά την τελευταία μόνο διετία έχουν αναληφθεί από το BEYOND περισσότερες από 22 ενεργοποιήσεις του Copernicus EMS σε πολλές διαφορετικές χώρες και έχει αναλάβει την παραγωγή περισσότερων από 10,000 προϊόντα σε υψηλή ανάλυση στο πλαίσιο των ενεργοποιήσεων. Ενδεικτικές περιπτώσεις ενεργοποιήσεων δίνονται στην συνέχεια:
 - Multiple natural hazard risk assessment - Planning and Recovery, Azores Islands
 - Multiple natural hazard risk assessment - Planning and Recovery, Madeira and Porto Santo islands, Portugal
 - Earthquake risk assessment Austria – Planning and Recovery
 - Post-disaster analysis, damage assessment, recovery and rehabilitation planning and monitoring, flood risk assessment, disaster preparedness in Bulgaria
 - Forest fire damage assessment – Planning and Recovery in Greece
 - Post-disaster assessment of toxic cloud dispersion after an industrial accident in Catalonia
 - Ground deformation mapping and monitoring by satellite based multi-temporal DInSAR technique, in Solotvyno, Zakarpattya region, Ukraine
 - EMSN031: Forest fire damage assessment and landslide risk, Madeira Island, Portugal
- Καλύπτονται όλες οι φυσικές καταστροφές (π.χ. φωτιά, πλημμύρες, σεισμοί, τσουνάμι, ηφαιστειακές εκρήξεις, κατολισθήσεις, διάβρωση του εδάφους, διάβρωση των ακτών, αμμοθύελλες, βιομηχανικά ατυχήματα)
- Διαφορετικές μεθοδολογίες και μοντέλα έχουν αναπτυχθεί για τον υπολογισμό των ρίσκων, ανάλογα με την φυσική καταστροφή.

Use Case: Ενεργοποίηση Copernicus EMS για τις Αζόρες, Σεπτέμβριος 2015

- Η υπηρεσία ενεργοποιήθηκε από θεσμικούς φορείς της Πορτογαλίας:
 - Περιφερειακή Διεύθυνση Δημοσίων Έργων και Επικοινωνιών
 - Περιφερειακή και Πυροσβεστική Υπηρεσία Πολιτικής Προστασίας, Αζόρες
 - Κέντρο Ενημέρωσης και Παρακολούθησης Σεισμο-ηφαιστειακής δραστηριότητας
- Ζητήθηκε η παραγωγή θεματικών χαρτών για την εκτίμηση των ακόλουθων κινδύνων: σεισμικού, πλημμύρας, τσουνάμι και καταιγίδας, κατολίθησης και διάβρωσης του εδάφους, ηφαιστειακής λάβας, παράκτιας διάβρωσης
- Ζητήθηκε επίσης να προταθούν μέτρα και έργα άμβλυνσης των παραπάνω κινδύνων για να συμπεριληφθούν στον τοπικό επιχειρησιακό σχεδιασμό, την ενίσχυση της ετοιμότητας του περιφερειακού μηχανισμού και τη βελτίωση των χρόνων απόκρισης αυτού.
- Τέλος ζητήθηκαν προϊόντα ανάλυσης των παραπάνω πληροφοριών, όπως:
 - Εκτίμηση πληθυσμού στα αστικά κέντρα
 - Αναγνώριση βασικών και εναλλακτικών δρόμων για την προσέγγιση των πυκνοκατοικημένων πόλεων
 - Χωροθέτηση νοσοκομείων, σημείων προσγείωσης ελικοπτέρων, στρατοπέδων, υποδομών που εξασφαλίζουν την πρόσβαση στο νερό και την ενέργεια, κ.α.
 - Εντοπισμός πιθανών καταφυγίων στην περιοχή και προσδιορισμός διαδρομών εκκένωσης που οδηγεί σε ασφαλή καταφύγια
 - Εντοπισμός και θέση των συστημάτων επικοινωνίας έκτακτης ανάγκης
 - Προσδιορισμός πιθανών χώρων αποθήκευσης για τρόφιμα και νερό (επιδημίες)
- Παρήχθησαν 2000 προϊόντα ----- Η Κοινότητα και οι χρήστες έδωσαν συγχαρητήρια για την ποιότητα της δουλειάς.



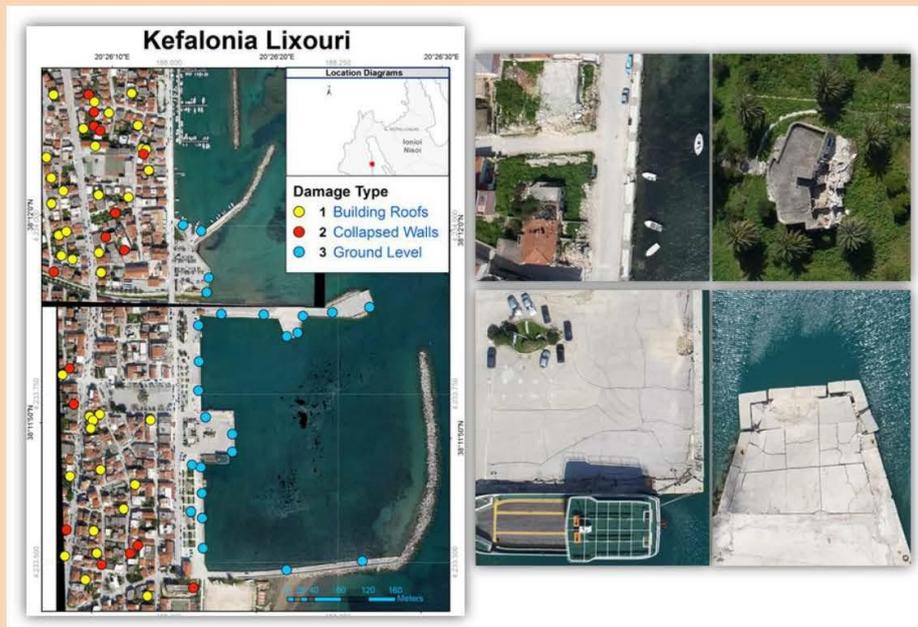
Υπηρεσία: Καταγραφή ζημιών με drones

- Το BEYOND διαθέτει 2 μονάδες drones, που χρησιμοποιούνται επιχειρησιακά για την εκτίμηση καταστροφών μετά από σεισμούς, δασικές πυρκαγιές, κτλ.
- Μεθοδολογία που στηρίζεται στην ανάλυση εικόνων που έρχονται από τα drones για την αυτοματοποιημένη καταγραφή των ζημιών.



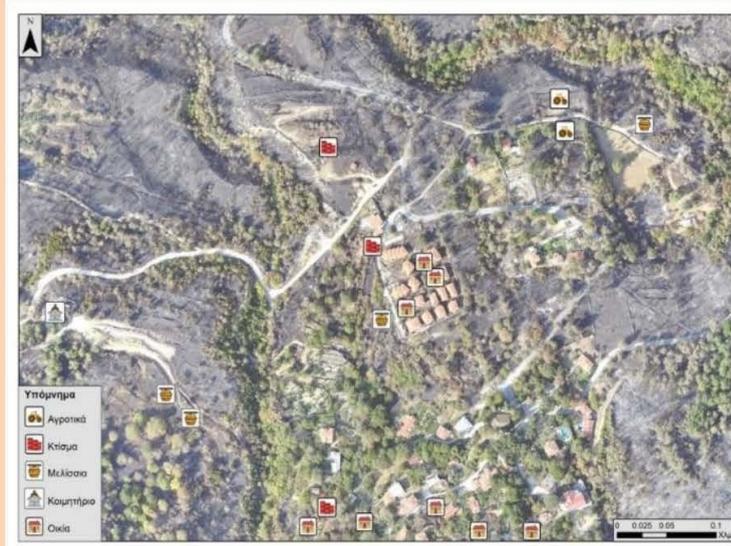
Use Case 1: Σεισμός στην Κεφαλονιά, Φεβρουάριος 2014

- Την επομένη του σεισμού, το BEYOND πήγε στην περιοχή με το drone, και έκανε 10 πτήσεις πάνω από περιοχές της Κεφαλονιάς που αναμένονταν να έχουμε τις μεγαλύτερες καταστροφές.
- Καλύφθηκαν αρκετά χωριά και κυρίως η πόλη του Ληξουρίου.
- Σε δεύτερη φάση αναλύσαμε τις οπτικές εικόνες από το Drone και εξάγαμε γεωχωρική πληροφορία σχετικά με τις αστοχίες που παρατηρήθηκαν σε σπίτια, στο οδικό δίκτυο και το φυσικό περιβάλλον.
- Η πληροφορία αυτή επικοινωνήθηκε στους αρμόδιους φορείς που κάνουν τις επιτόπιες καταγραφές, ώστε να ενεργήσουν στοχευμένα.



Use Case 2: Δασική πυρκαγιά στη Θάσο το Σεπτέμβριο του 2016

- Το Υπουργείο Υποδομών, Μεταφορών και Δικτύων ανέθεσε στο BEYOND να αναλάβει μια πιλοτική αποστολή για την καταγραφή των ζημιών που προκλήθηκαν από την πυρκαγιά στο νησί της Θάσου στις 09/10/2016
- Η αποστολή περιελάμβανε πτήσεις drone πάνω από τις πληγείσες περιοχές, λαμβάνοντας ψηφιακές φωτογραφίες υψηλής ανάλυσης και παραδίδοντας φωτοερμηνεμένα μοσαϊκά των περιοχών.
- Έγιναν πέντε πτήσεις εντός τριών ημερών, καλύπτοντας 16.188 km² στις περιοχές της Καζαβίτι (Μικρός και Μεγάλος Πρίνος), Αλίκη και Θημωνιά.
- Ανάλυση των εικόνων ανέδειξε καταστροφές σε ιδιοκτησίες και άλλα assets του νησιού

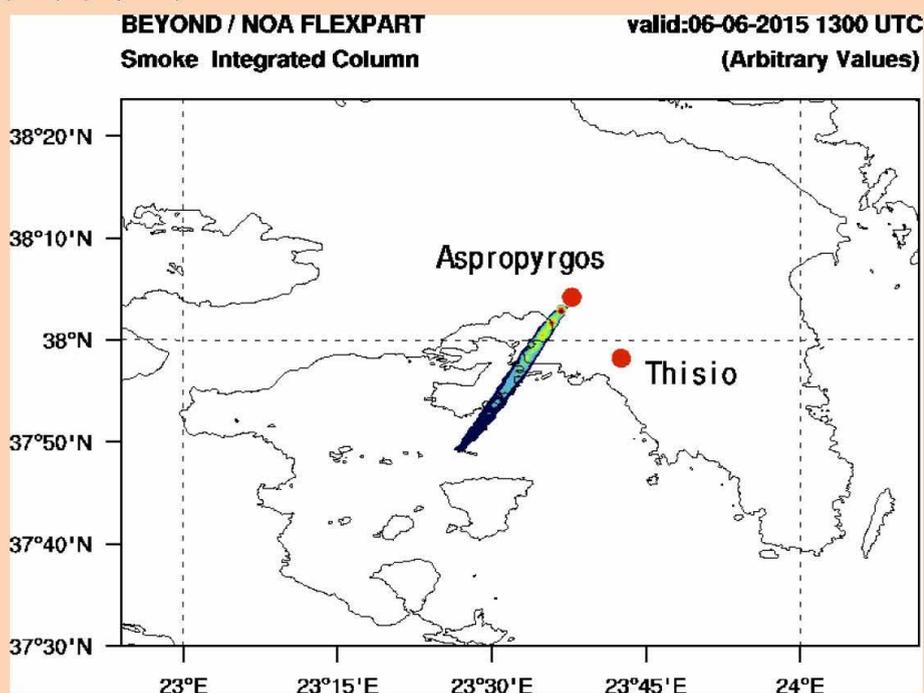


Υπηρεσία: Ατμοσφαιρικοί κίνδυνοι

- Επεισόδια μεταφοράς Σαχαριανής σκόνης: Μοντέλο πρόβλεψης της διασποράς της σκόνης σε μεγάλη γεωγραφική κλίμακα.
- Παρακολούθηση συγκέντρωσης ατμοσφαιρικών σωματιδίων.
- Μέτρηση της υπεριώδους ακτινοβολίας και εκτίμηση της δυνητικής επίπτωσης στην ανθρώπινη υγεία.
- Μεθοδολογία που στηρίζεται σε μετεωρολογικά μοντέλα, μοντέλα μεταφοράς και δορυφορικές παρατηρήσεις.

Use Case: Ατμοσφαιρική ρύπανση στην Αττική από την πυρκαγιά σε εργοστάσιο ανακύκλωσης, Ιούνιος 2015

- Προσομοίωση διασποράς αερίων ρύπων προερχόμενων από την πυρκαγιά που ξεκίνησε την 6 Ιουνίου 2015, στις εγκαταστάσεις «ΓΕΝΙΚΗ ΑΝΑΚΥΚΛΩΣΕΩΣ – ΚΤΗΜΑΤΙΚΗ ΞΕΝΟΔΟΧΕΙΑΚΗ Α.Ε.» (Δραστηριότητα Ανακύκλωσης μη Μεταλλικών Αποβλήτων) στον Ασπρόπυργο Θέση Πεύκο Μαυράκη (Πάτημα Ασπρόπυργου).
- Η υπηρεσία συμπεριλαμβάνεται στις ενέργειες έγκαιρης ενημέρωσης για την διαχείριση φαινομένων φυσικών και ανθρωπογενών καταστροφών του Κέντρου Αριστείας BEYOND.
- Για την εκτίμηση της διασποράς χρησιμοποιείται το ατμοσφαιρικό μοντέλο FLEXPART-WRF. Η υπηρεσία βασίζεται στην παραδοχή ότι η ένταση του καπνού παραμένει σταθερή καθ' όλη τη διάρκεια του συμβάντος. Η χρωματική κλίμακα είναι ενδεικτική της ποιοτικής επιβάρυνσης της ατμόσφαιρας με τις χαμηλότερες συγκεντρώσεις να απεικονίζονται με αποχρώσεις του μπλέ και τις υψηλότερες με αποχρώσεις του κόκκινου και δεν αποτελούν εκτιμήσεις συσχετιζόμενες με τα όρια επιφυλακής, όρια για τα οποία το ΕΑΑ κάνει ειδικές επιτόπιες μετρήσεις και δειγματοληψίες.
- Με το σύστημα LIDAR του Εθνικού Αστεροσκοπείου Αθηνών δόθηκε η δυνατότητα καταγραφής των στρωματώσεων του καπνού στην ατμόσφαιρα κατά το πέρασμά του πάνω από το κέντρο της Αθήνας (σταθμός Θησείου).

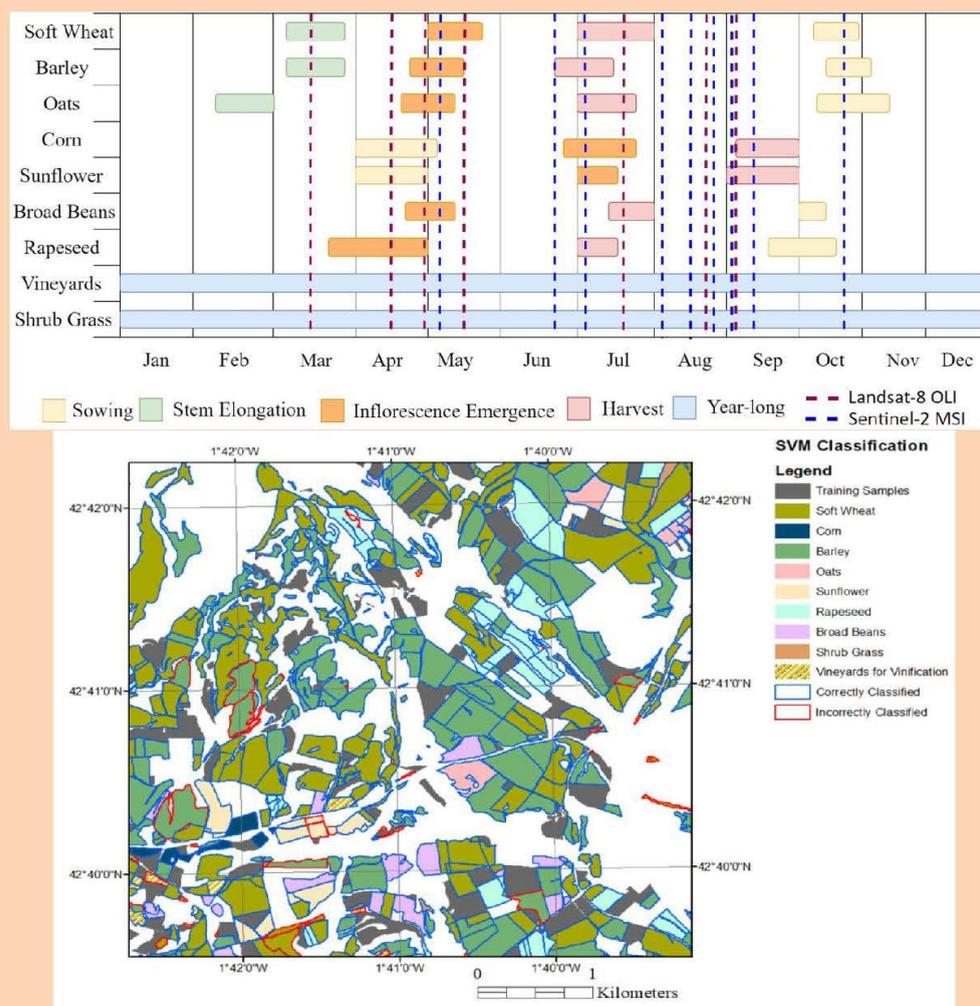


Υπηρεσία: Παρακολούθηση αγροτικής παραγωγής σε διάφορες κλίμακες

- Αυτοματοποιημένη ανίχνευση και ταξινόμηση των αγροτεμαχίων στις διάφορες καλλιέργειες, ακόμα και για τεμάχια μικρότερα τους ενός εκταρίου.
 - Υπηρεσία ειδοποίησης του Οργανισμού Πληρωμών (ΟΠΕΚΕΠΕ) για παραβίαση των κανόνων Πολλαπλής Συμμόρφωσης και της πολιτικής πρασίνισματος, σύμφωνα με το Πλαίσιο της Κοινής Αγροτικής Πολιτικής.
 - Υπηρεσία βοήθειας των αγροτών στις Πύλες που υποβάλλουν της ετήσιες δηλώσεις τους, για τον σωστό εντοπισμό και οριοθέτηση των αγροτεμαχίων τους.
 - Υπηρεσίες σχετικές με την γεωργία ακριβείας για την παρακολούθηση της ανάπτυξης των καλλιεργειών στις διάφορες φαινολογικές τους φάσεις. Εκτίμηση της υγιεινής ή μη ανάπτυξης σε επίπεδο αγρού.
- Μεθοδολογίες που έχουν βαθμονομηθεί στο πλαίσιο πιλοτικών έργων της ΕΕ με τη συμμετοχή του ΕΑΑ.

Use Case: Παρακολούθηση φαινολογικής ανάπτυξης στην περιοχή της Ναβάρρας, Ισπανία

- Χρήση αγροτικών δηλώσεων για 9,052 αγροτεμάχια στην βορειοανατολική Ισπανία, για το 2017.
- Ανάλυση 10 Sentinel-2 και 7 Landsat-8 δορυφορικών εικόνων, σε όλα τα στάδια ανάπτυξης των καλλιεργειών.
- Μελετήθηκαν 9 διαφορετικές καλλιέργειες.
- Αναπτύχθηκαν τεχνικές Τεχνητής Νοημοσύνης για την ταξινόμηση των 9,052 αγροτεμαχίων στις 9 διαθέσιμες καλλιέργειες.
- Η συνολική ακρίβεια της μεθόδου ξεπερνάει το 85%.

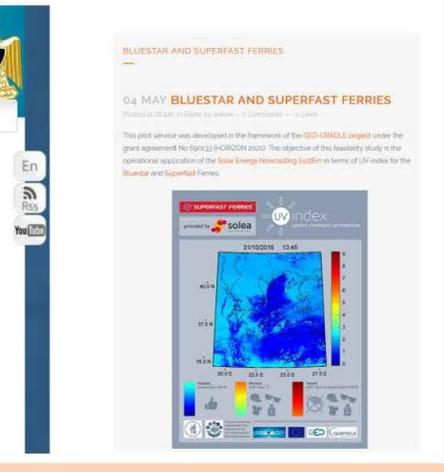
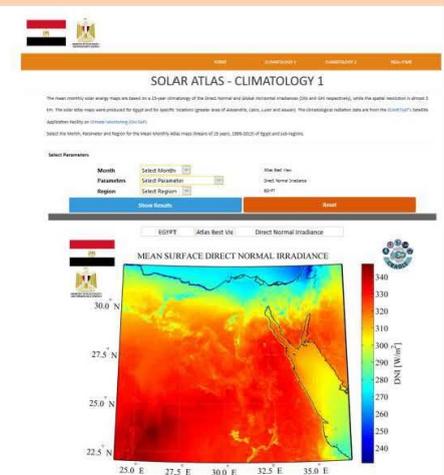
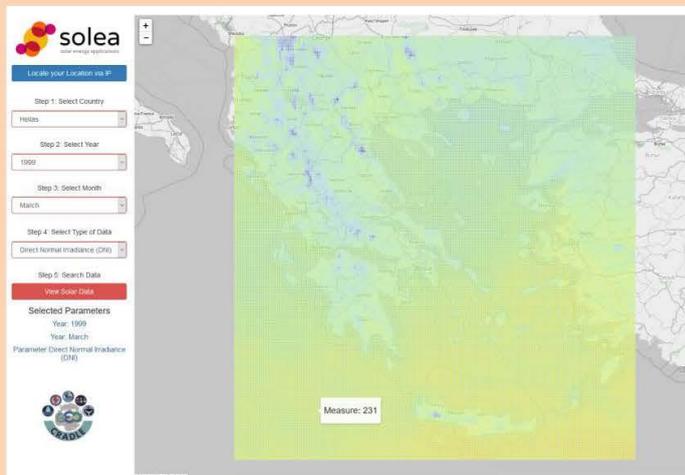


Υπηρεσία: Εκτίμηση ηλιακής ενέργειας σε πραγματικό χρόνο – Σύστημα **SENSE**

- Γνώση και πρόγνωση ηλιακής ενέργειας σε πραγματικό χρόνο (από t+0 λεπτά μέχρι t+2 ώρες μπροστά), με χρονικό βήμα από 5 λεπτά σε υψηλή χωρική και φασματική ανάλυση (3 km, 1 nm)
- Προγνώσεις σε πολλαπλές χωρικές κλίμακες: από την τοπική παραγωγή σε μεμονωμένα ηλιακά πάρκα μέχρι την κάλυψη χωρών και ηπείρων (προσομοιώσεις σε περισσότερα από 1 εκ. εικονοστοιχεία παράγονται σε χρόνους μικρότερους του 1 λεπτού)
- Κλιματολογικές βάσεις δεδομένων (15ετίας) για την άμεση, ολική και διάχυτη ηλιακή ακτινοβολία
- Ενσωμάτωση σε οποιοδήποτε ήδη υπάρχον σύστημα πληροφοριών (από πραγματική λειτουργία ηλιακών πάρκων μέχρι επιχειρησιακή λειτουργία και υποστήριξη διαχειριστών μεταφοράς ηλεκτρικής ενέργειας)
- Χρήση της φασματικής πληροφορίας της ηλιακής ακτινοβολίας για εφαρμογές και μελέτες υγείας, βιολογικές αλλά και γεωργικές
- Μεθοδολογία που στηρίζεται συνδυαστικά σε μοντέλα διάδοσης της ακτινοβολίας, τεχνικές υπολογιστικής επιτάχυνσης (νευρωνικά δίκτυα, εξισώσεις πολλαπλής παλινδρόμησης) και δεδομένα εισόδου πραγματικού χρόνου από μοντέλα (**CAMS**) και δορυφόρους (**MSG**). Αναπτύχθηκε από το **EAA** με την υποστήριξη του **PMOD/WRC** (Παγκόσμιο Κέντρο Ακτινοβολίας).

Use Cases: Υπουργείο Ενέργειας Αιγύπτου, ΑΔΜΗΕ, Superfast ferries

- Για το Υπουργείο Ενέργειας της Αιγύπτου αναπτύχθηκε ένας αναλυτικός άτλαντας ηλιακής ενέργειας ο οποίος βρίσκεται ηλεκτρονικά αναρτημένος στον επίσημο ιστότοπο του υπουργείου, ενώ έχει δημοσιευτεί και ως επίσημο κρατικό έγγραφο. Ταυτόχρονα παρείχαμε χάρτες πραγματικού χρόνου της ηλιακής ενέργειας για υποστήριξη της τοπικής παραγωγής ανανεώσιμων πηγών ενέργειας.
- Για τον Ανεξάρτητο Διαχειριστή Μεταφοράς Ηλεκτρικής Ενέργειας (ΑΔΜΗΕ) στην Ελλάδα λειτουργήσε επιχειρησιακά το σύστημα SENSE παρέχοντας κάθε 15 λεπτά χάρτες και βάσεις δεδομένων ηλιακής ενέργειας για τον Ελλαδικό χώρο σε υψηλή ανάλυση, ως υποστήριξη στο έργο του ΑΔΜΗΕ.
- Για τα πλοία της Attica Group με δρομολόγια στο Αιγαίο και την Αδριατική θάλασσα παρείχαμε επιχειρησιακά για όλο το 2017 εκλαϊκευμένους χάρτες του δείκτη υπεριώδους ακτινοβολίας.

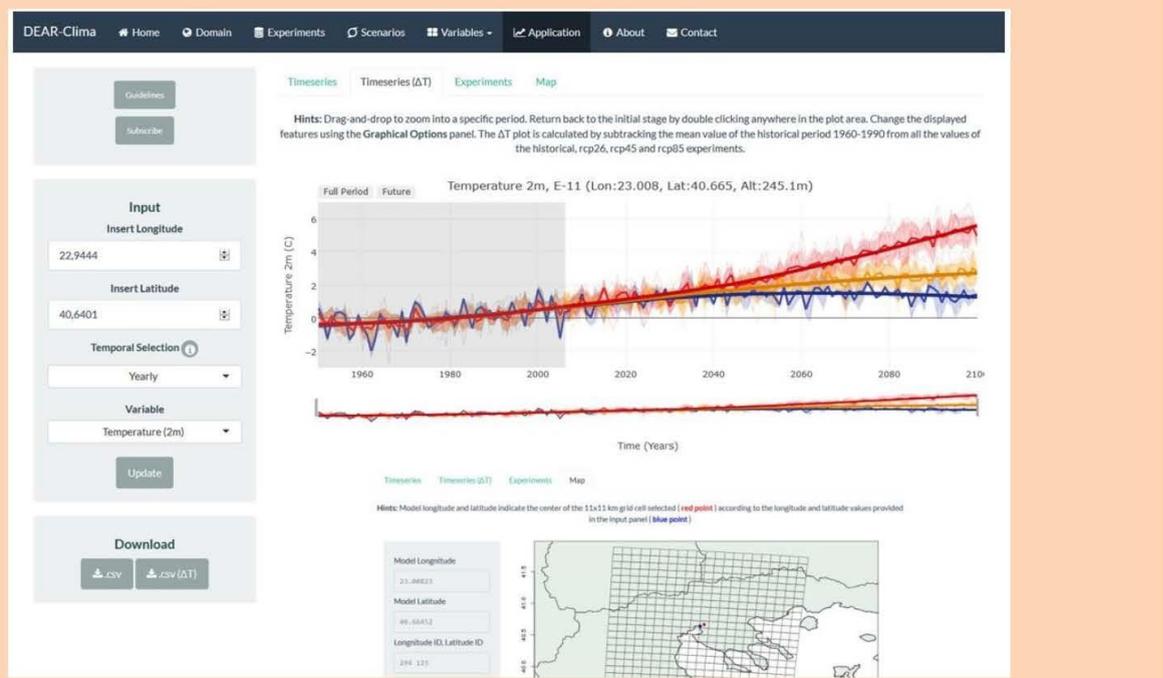


Υπηρεσία: Παρακολούθηση βασικών κλιματικών μεταβλητών και δεικτών κλίματος – DEAR-Clima

- Παροχή χρονοσειρών βασικών κλιματικών μεταβλητών και δεικτών κλίματος με την αξιόπιστη και φιλική προς τον χρήστη διαδικτυακή εφαρμογή με ανοιχτή και ελεύθερη πρόσβαση Data Extraction Application for Regional Climate (DEAR-Clima).
- Γεωγραφική κάλυψη: Ευρώπη.
- Χρονική κάλυψη: 1950-2100.
- Κρίσιμη για τη μελέτη των επιπτώσεων της κλιματικής αλλαγής, τη λήψη μέτρων και την προσαρμογή.
- Μεθοδολογία που στηρίζεται σε προσομοιώσεις Περιφερειακού Κλιματικού Μοντέλου (RCM) υψηλής χωρικής ανάλυσης (0.11°) από το ερευνητικό πρόγραμμα Coordinated Regional Downscaling Experiment (CORDEX). Η ιστορική περίοδος κάθε πειράματος είναι 1950-2004, ενώ η μελλοντική περίοδος είναι 2006-2100, υπό την επιρροή τριών Representative Concentration Pathways (RCPs) που υιοθετήθηκαν από την IPCC για το 5^ο Assessment Report (AR5) της: rcp26, rcp45 και rcp85. Τα πειράματα προσομοίωσης είναι προϊόν διάφορων RCMs από διάφορα Παγκόσμια Κλιματικά Μοντέλα (GCMs). Η ανάπτυξη αυτού του εργαλείου χρηματοδοτήθηκε από το πρόγραμμα GEO-CRADLE και έγινε στο Τμήμα Μετεωρολογίας και Κλιματολογίας της Γεωλογικής Σχολής του Αριστοτέλειου Πανεπιστημίου Θεσσαλονίκης (Αθανάσιος Τσικερδέκης, Δημήτρης Ακριτίδης, Πρόδρομος Ζάνης), σε συνεργασία με το Εθνικό Αστεροσκοπείο Αθηνών.

Use Case: Παρακολούθηση της θερμοκρασίας στον Ελλαδικό χώρο

- Επιλογή μιας περιοχής ενδιαφέροντος (π.χ. Θεσσαλονίκη) και μελέτη της θερμοκρασίας (2m) για την χρονική περίοδο 1950-2100 με βάση τα 3 πειράματα rcp26, rcp45 και rcp85.



10.ANNEX III: BEYOND COPERNICUS EMSN METHODOLOGIES

SEISMIC METHODOLOGIES

- **Seismic Hazard:** The Probabilistic Seismic Hazard assessment (PSHA) model is used, and the calculations are performed using the Cornell methodology¹, as applied by McGuire². The software used is CRISIS2007 (Ordaz et. al. 2007³).
- **Seismic Vulnerability:** The method used for the vulnerability assessment is the LM1 Method of the RISK-UE which is based on the implicit vulnerability model (qualitative damage matrices) included in the European Macroseismic Scale (EMS-98)⁴.
- **Seismic Vulnerability of Pipelines:** The vulnerability of utilities network pipelines to a specified earthquake scenario is estimated using the HAZUS-MH (FEMA, 2003) methodology, based on O'Rourke and Ayala (1993), importing the network database and calculating the number of leaks / breaks.
- **Seismic Risk:** Composition of damage scenarios in terms of discrete damage probability distribution. Calculation of the mean damage grade (μ_D) for each building, and their average value for each city block. Application of the probability distribution of the aforementioned average values. Definition of the final damage grade as the one that corresponds to the highest probability of occurrence of the average μ_D per block.

LAVA FLOW METHODOLOGIES:

- **Lava Flow Hazard:** Modified and extended implementations are performed of the QVAST tool for the estimation of volcanic susceptibility (Bartolini et al., 2013)⁵, and of the Q-LavHa tool for the estimation of the lava flow paths and their convergence, by exploiting probabilistic and deterministic simulation models, in order to evaluate channelized lava flow inundation probabilities, from regularly distributed eruptive vents (Mossoux et al., 2016)⁶.
- **Lava Flow Vulnerability:** The lava flow vulnerability is estimated for buildings (structural vulnerability), taking into account their material and height.
- **Lava Flow Risk:** Lava flow risk is estimated for the populated and built environment as well as points of interest as the combined effect of hazard, vulnerability and exposure; while for the natural environment and the transportation network as the combined effect of hazard and exposure.

FOREST FIRES METHODOLOGIES:

- **Fire Damage Delineation & Burn Severity Grading:** The method is based on thresholding of different spectral indices, and combinations of indices, namely Normalized Difference Vegetation Index (NDVI), Enhanced Vegetation Index (EVI) and their differentiation in time (dNDVI, dEVI) derived for the pre-fire and post-fire two date acquisitions (Kontoes et al., 2009a⁷; Kontoes et al., 2009b⁸; Petropoulos e

¹ Cornell, C. A. 1968. Engineering Seismic Risk Analysis. Bulletin of the Seismological Society of America, 58, 1583-1606

² McGuire, R.K., 1976. FORTRAN computer program for seismic risk analysis, in Open File Report 76-67, USGS, Menlo Park

³ Ordaz, M., Aguilar, A. and Arboleda, J. 2007. CRISIS2007 – Ver. 1.1: Program for Computing Seismic Hazard, Instituto de Ingenieria, UNAM, Mexico

⁴ Earthquake Loss Estimation Routine Methodology: Vulnerability Relationships, provided by the Network of Research Infrastructures for European Seismology

⁵ Bartolini, S., Cappello, A., Marti, J., Del Negro, C. (2013), QVAST: a new Quantum GIS plugin for estimating volcanic susceptibility. Nat. Hazards Earth Syst. Sci. 13, 3031-3042

⁶ Mossoux, S., Saey, M., Bartolini, S., Poppe, S., Canters, F., Kervyn, M., (2016). Q-LAVHA: A flexible GIS plugin to simulate lava flows., Comput. Geosci., 97, 98–109. doi:10.1016/j.cageo.2016.09.003

⁷ Kontoes C.C., Poilvé H., Florsch G., Keramitsoglou I., Paralikidis S. (2009), A Comparative Analysis of a Fixed Thresholding vs. a Classification Tree Approach for Operational Burn Scar Detection and Mapping, International Journal of Applied Earth Observation and Geoinformation, Vol. 11, Issue 5, October 2009, ISSN 0303 2434, DOI: 10.1016/j.jag.2009.04.001

⁸ Kontoes C.C., Sifakis N., Keramitsoglou I., (2009), GMES Burn Scar Mapping kicks into full gear after 2007 wildfires in Greece, Windows on GMES, A BOSS4GMES Publication, Issue 3, ISSN 2030-5419, pp. 58-63.

al., 2010⁹). The two vegetation indices complement each other in vegetation studies and improve upon the detection of vegetation changes and extraction of canopy biophysical parameters.

- **Damage/Biomass Loss Statistics:** The surface damages are based on statistical calculations using the LU/LC information, which indicates the fuel type of the area, and the burnt severity class. The biomass loss per LU/LC type is estimated by convoluting a set of weight factors that depict the burnt severity class (W_{sv}), the expected biomass amount per fuel type (W_{fb}) and, if available, the fuel population density (W_{fd}).
- **Forest Fire Hazard:** The assessment is based on geomorphological characteristics (elevation, orientation and slope inclination), climatological properties, vegetation cover susceptibility to fire, as well as spatial distribution of historical fire events after the investigation of available satellite (MODIS) data of Fire Radiative Power (FRP) (Solomos et al., 2015¹⁰).
- **Population & Assets Vulnerability to Forest Fires:** The assessment for the non-urban areas depends on the type of biomass fuel; while for the urban areas is based on (i) the proximity of the population assets to the most hazardous areas in terms of road type and forest fire capacity, (ii) the number of possible evacuation routes from the built-up area, (iii) the material and construction of buildings, and (iv) building and population density.
- **Forest Fire Risk – Population, Assets and Transportation network at risk:** The fire risk is estimated for the populated and built environment as well as points of interest as the combined effect of hazard, vulnerability and exposure; for the natural environment and LU/LC as the combined effect of hazard, vulnerability (as estimated using biomass), and exposure; and for the transportation network as the combined effect of hazard, vulnerability to disruption, and exposure.

INDUSTRIAL ACCIDENTS METHODOLOGIES:

- **Industrial Accidents Hazard:** Detailed mapping of all potential sources. Definition of possible accidents for each identified industry. Identification of certain pollutants (e.g. radioactive, gas, light oil) of each accident. Input of the above information in the Lagrangian dispersion simulations (FLEXPART, HYPACT, HYSPLIT) based on worst case scenario of contaminant release. These models are driven by atmospheric modeling data (GFS, WRF, RAMS). Computation of dispersion of pollutants and evaluation of the associated risk in a source -receptor approach.
- **Industrial Accidents Exposure:** Analysis of local and regional scale wind patterns and study of prevailing wind directions in the form of wind-rose diagrams. Implementation of idealized dispersion simulations (WRF, FLEXPART) based on the aforementioned analysis, for each one of the main wind directions. Production of scenario trajectory maps beginning from the industry site of interest at various heights indicating the path of released material after a few hours and up to 5-7 days during hypothetical accident scenarios. The elements at risk include population, services, hydrological network, transportation network, land cover (areas of high ecological value and crops). The exposure of the elements at risk is evaluated on a buffer zone around every industry depending on the dispersion model.
- **Industrial Accidents Risk:** The generated industrial accidents hazard map is served as input layer to further risk assessment in conjunction with the assets exposed to hazard located in the radius of influence of industrial accidents, as indicated by the release and dispersion modeling.

⁹ George P. Petropoulos, Charalambos Kontoes, Iphigenia Keramitsoglou, (2010), Burnt Area Delineation from a uni-temporal perspective based on Landsat TM imagery classification using Support Vector Machines, *Int. Journal of Applied Earth Observation and Geoinformation*, doi:10.1016/j.jag.2010.06.008.

¹⁰ Solomos, S., V. Amiridis, P. Zanis, E. Gerasopoulos, F. I. Sofiou, T. Herekakis, J. Brioude, A. Stohl, R. Kahn, and C. Kontoes (2015), Smoke dispersion modeling over complex terrain using high resolution meteorological data and satellite observations - The Fire Hub platform, *Atmos. Environ.*, 119, 348-361, doi:10.1016/j.atmosenv.2015.08.066.

TSUNAMI METHODOLOGIES:

- **Tsunami Hazard Assessment:** Okada's deformation model for the co-seismic sea floor displacement. Tsunami numerical simulations in open-ocean and shallow water based on GEPCO bathymetry. Tsunami inundation in coastal zone based on GRASS add-on module r.tsunami¹¹. Tsunami hazard estimation by certain hydrodynamic parameters, such as the wave amplitude, the maximum water elevation at all times, and the wave velocity.
- **Assets Vulnerability to Tsunami:** Estimation by the investigation of building stability, depending on the construction materials, the elevation, the building type, the number of floors, the existence of protected zones and the shoreline distance (FEMA¹²).
- **Storm Surge Hazard Risk:** Input data: (i) meteorological data (wind speed, atmospheric pressure), (ii) angle of approach relative to the coast, (iii) width and slope of continental shelf, (iv) bathymetry and (v) local topographic features (islands, bays, rivers, barriers, etc.). Based on the Saffir-Simpson approach, where the storm surge height is expressed as the relationship between hurricane intensity (from the hurricane landfalls historical events) and potential damage.

SOIL EROSION METHODOLOGY:

- **Soil Erosion Hazard:** Soil erosion hazard due to water is assessed by using the empirical model Revised Universal Soil Loss Equation (RUSLE) (Renard et al. 1991)¹³, an improved version of USLE model (Wischmeier and Smith 1958¹⁴, Wischmeier and Smith 1978¹⁵), adapted in GIS-based environment (Yitayew et al. 1999¹⁶; Fernandez et al. 2003¹⁷; Wu and Wang 2007¹⁸). It takes into consideration five major factors: the rainfall pattern, the soil type, the topography, the crop system, and the management practices.

COASTAL EROSION METHODOLOGY:

- **Coastal Erosion Vulnerability:** The Coastal Vulnerability Index (CVI) is used, which is based on the geomorphology, shoreline erosion and accretion rates, coastal slope, rate of relative sea-level rise, mean tidal range, and mean wave height.

GROUND DEFORMATION METHODOLOGY:

- **Ground Deformation Dynamics:** The Persistent Scatterers Interferometry (PSI) algorithm is used for the assessment of the ground movements, which comprises from two chains. The first chain relates to the generation of differential interferograms and orbits' optimization. In the second chain, the processing chain of the SqueeSAR algorithm, the phases of the Distributed Scatterers (DS) are optimally processed taking into account the noise covariance matrix in order to mitigate the temporal and geometrical noise contribution. The motion results refer to: mean displacement velocity, motion temporal series for each date of the images data-stack, and other parameters.

LANDSLIDES METHODOLOGY:

¹¹ <https://svn.osgeo.org/grass/grass-addons/grass6/raster/r.tsunami/r.tsunami>

¹² <http://www.fema.gov/media-library/assets/documents/14708>

¹³ Renard, K.G., Foster, G. R., Weesies, G.A., Porter, J.P. (1991). RUSLE, Revised Universal Soil Loss Equation. J. Soil Wat. Conserv. 46(1), 30-33. Available online: <http://www.jswnonline.org/content/46/1/30.extract#>

¹⁴ Wischmeier, W. H. & Smith, D. D. Rainfall energy and its relationship to soil loss. Eos Trans. AGU 1958, 39(2), 285–291, DOI: 10.1029/TR039i002p00285. Available online: <http://onlinelibrary.wiley.com/doi/10.1029/TR039i002p00285/abstract>

¹⁵ Wischmeier, W. H.; Smith, D. D.; Predicting Rainfall Erosion Losses – a guide to conservation planning. Agriculture Handbook No 537; US Department of Agriculture, Science and Education Administration, Washington, D.C., USA, 1978; 1-58. Available online: <https://naldc.nal.usda.gov/download/CAT79706928/PDF>

¹⁶ Yitayew, M., Pokrzywka, S. J., Renard, K.G. (1999). Using GIS for facilitating erosion estimation. Applied Engineering in Agriculture 07/1999; 15(4).

¹⁷ Fernandez C, Wu JQ, McCool DK, Stockle CO (2003) Estimating water erosion and sediment yield with GIS, RUSLE, and SEDD. J Soil Water Conserv 58:128–136

¹⁸ Wu Q., Wang M. (2007). A framework for risk assessment on soil erosion by water using an integrated and systematic approach. Journal of Hydrology, 337: 11–21

- **Landslide Hazard:** The landslide hazard is estimated by an appropriate combination of susceptibility factors and a triggering factor, following the heuristic method of the Norwegian Geotechnical Institute (NGI), which is a modified approach used by Nadim et al., 2006¹⁹. Susceptible factors are considered the slope inclination, lithology, land use and soil moisture, while triggering factors are referred to earthquake or precipitation.
- **Landslide Vulnerability:** The exposure of the elements at risk is evaluated based on their relative location in reference with the hazard zones they depict. The vulnerability assessment of the exposed elements takes into account physical-social and environmental criteria, and refers to the transport network and the assets, including buildings and points of interest, such as places of worship, schools, etc. Transportation network vulnerability assessment is estimated using three weighted criteria which are the hierarchy of road segments according to their capacity, the characteristics of the geology formation and the presence of highways and bridges. Buildings vulnerability assessment is calculated separately for the use categories of residence, utilities and services buildings, based on the indicators of construction material and building age.
- **Landslide Risk:** Landslide hazard and vulnerability assessment are classified into five distinct severity levels and are spatially overlaid for the risk assessment. The risk category of the exposed elements follows the EC matrix²⁰.

SUBSIDENCE AND LANDSLIDE METHODOLOGY:

- **Subsidence and Landslide Risk:** The risk is estimated taking into consideration the ground movement evolution using time series deformation velocities (Persistent Scatterers). Firstly a raster intermediate product derived from the Persistent Scatterers processing chain is used, in qualitative terms, as an indicator of subsidence and uplift areas, for risk delineation. Subsidence and landslide risks are separated based on slope inclination (estimated from the DEM) and geological and geotechnical characteristics. The delineation is made for each time period and the risk level is determined by the average deformation rate of the Persistent Scatterers. An integrated product is formed to estimate current risk levels, after applying a weighting to the time series datasets, with more heavily weighted the more recent measurements dataset.

FLOODS METHODOLOGY:

- **Flood Delineation at peak conditions:** A multi-temporal approach is adopted acquiring SAR images at different times, due to the scale and the evolution of the flood, as well as the availability of satellite imagery. A hybrid methodology is applied including the delineation of the observed flood extent which is used as input for the maximum flood extent estimation. Change detection using pre-, peak- and post-flood event pre-processed Synthetic Aperture Radar (SAR) images, based on radar backscatter estimation and interferometric coherence, is the core algorithm for the observed flood extent delineation. Various techniques for flood detection from SAR imagery are used, including mainly image histogram thresholding (Brivio et al., 2002²¹; Schuman, 2010²²) and automatic classification algorithms (Hess et al., 1995²³; Bonn and Dixon, 2005²⁴; Martinis et al. 2015²⁵).

¹⁹ Nadim F, Kjekstad O, Peduzzi P, Herold C, Jaedicke C (2006) Global landslide and avalanche hotspots. *Landslides*, Vol. 3, No. 2, 159–174.

²⁰ Risk Matrix, In Overview of natural and man-made disaster risks in the EU, European Commission, 2014; Annex 2, 66, SWD/2014/0134 final. Available online: <http://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:52014SC0134>

²¹ Brivio PA, Colombo R, Maggi M, Tomasoni R. 2002. Integration of remote sensing data and GIS for accurate mapping of flooded areas. *International Journal of Remote Sensing* 23, 429-441.

²² Schumann, G., G. Di Baldassarre, D. Alsdorf, and P. D. Bates (2010). Near real-time flood wave approximation on large rivers from space: Application to the River Po, Italy, *Water Resour. Res.*, 46, W05601, doi:10.1029/2008WR007672.

²³ Hess LL, Melack JM, Filoso S, Yong W. 1995. Delineation of inundated area and vegetation along the Amazon floodplain with the SIR-C synthetic aperture radar. *Geoscience and Remote Sensing, IEEE Transactions on* 33, 896-904. DOI:10.1109/36.406675

²⁴ Bonn, F., and R. Dixon [2005], Monitoring flood extent and forecasting excess runoff risk with RADARSAT-1 data, *Nat. Hazards*, 35, 377-393.

²⁵ Martinis, S., J. Kersten, and A. Twele. 2015. “ A Fully Automated TerraSAR-X Based Flood Service. *ISPRS Journal of Photogrammetry and Remote Sensing* 104, 203-212. doi:10.1016/j.isprsjprs.2014.07.014.

Maximum flood extent is estimated by a propagation model of observed flood extent, using DEM and LU/LC.

- **Flood Depth at peak conditions:** A modification of the methodological approach proposed in Cenci et al, 2017²⁶ is used, taking as input the maximum flood extent, and starting from the shoreline extraction via GIS processing.
- **Flood Damage Assessment:** A damage assessment map is produced using the flood dynamics of the event and the map of the exposed elements (points of interest, transportation network, etc.). More specifically, damage assessment uses specific damage/vulnerability curves assigned to each asset by using a portfolio of standard literature. Damages can also be obtained starting from the maximum flood extent and flood depth, using the Rapid Analysis and Spatialisation Of Risk (RASOR) web-based platform²⁷.
- **Flood Hazard:** The methodology is based on the calculation of the Flood Susceptibility Index (FSI), proposed by Manfreda et al, 2017²⁸. This index is given by the combination of different thematic maps that describe hydraulic, hydrological, geographical and morphological properties. This approach is particularly useful in data-scarce environments, as the required information can be extracted from a DEM. In case of flood hazard estimation after a fire event, the FSI value is rescaled on the basis of the percentage of area burned for the individual analyzed watersheds. According to the results in Diakakis, 2011²⁹, pre- and post- fire LU/LC maps associated to the Soil Conservation Service - Curve Number (SCS-CN)³⁰ method are used in order to evaluate the decrease of soil permeability. In other cases, where discharge values are available, flood modelling is implemented on a high resolution DEM by the TELEMAC-2D model, part of the Open Source suite TELEMAC-MASCARET³¹, and a suite of finite element computer programs.
- **Flood Vulnerability:** Starting from flood hazard maps, using exposure map (POIs, buildings, roads, LU/LC) and a portfolio of standard literature lookup tables, a vulnerability class is associated to every exposed element/category. A holistic, qualitative index is used for assessing population vulnerability by taking into account different typologies: physical (building density, number of floors), social (population density, percentage of specific categories at risk, i.e. children and elders), environmental (land cover). The road network vulnerability is classified according to the road type. Building blocks vulnerability is assessed considering the different building uses (residential, commercial, industrial and so on).
- **Flood Risk:** The risk level is mapped combining hazard and vulnerability values through specific lookup tables.
- **Flash Flood Hazard triggered by earthquakes:** Flash flood hazard can be triggered by the formation of natural dams due to landslides triggered by earthquakes, and is calculated by the following steps: Preprocessing of the input data. Generation of the hydrography layer. Intersection of river network with landslide hazard triggered by earthquake. Identification of river branch potentially subject to flood risk for the formation of natural dams, through expert visual analysis of the morphology (DEM), hydrography, the landslide hazard on the slopes upstream the river branch, and the presence of artificial dams. Assignment to any river branch potentially subject to flood risk for the formation of

²⁶ L. Cenci, G. Boni, L. Pulvirenti, G. Squicciarino, S. Gabellani, F. Gardella, N. Pierdicca. Monitoring Reservoirs' Water Level from Space for Flood Control Applications. A Case Study in the Italian Alpine Region. Geoscience and Remote Sensing Symposium (IGARSS), 2017 IEEE International.

²⁷ <http://www.rasor-project.eu>

²⁸ Samela, C., Troy, T.J., Manfreda, S., (2017). Geomorphic classifiers for flood-prone areas delineation for data-scarce environments, *Advances in Water Resources*, 102: 13-28

²⁹ Diakakis, M. Effects on flood hazard in Marathon plain from the 2009 wildfire in Attica, Greece. In *Advances in the Research of Aquatic Environment*; Springer Berlin Heidelberg, 2011; 1, 155-162, Part of the series *Environmental Earth Sciences*; DOI: 10.1007/978-3-642-19902-8_17. Available online: http://link.springer.com/chapter/10.1007%2F978-3-642-19902-8_17

³⁰ National Resources Conservation Service. Chapter 10: Estimation of Direct Runoff from Storm Rainfall. In *National Engineering Handbook, Part 630: Hydrology*, Publisher: U.S. Department of Agriculture, USA, 2004. Available online: <https://www.wcc.nrcs.usda.gov/ftpref/wntsc/H&H/NEHhydrology/ch10.pdf>

³¹ www.opentelemac.org

natural dams of the hazard level (wet and dry) corresponding to the closest upstream landslide hazard triggered by earthquakes area.

- **Flash Flood Risk triggered by earthquakes:** The exposure of transport network is defined on the basis of network (road and rail) category. The assets exposure is defined on the basis of asset category. To each category a specific level of vulnerability is assigned. The risk level is mapped combining hazard and vulnerability through specific lookup tables.

DISRUPTION OF TRANSPORTATION NETWORKS METHODOLOGY:

- **Vulnerability of Disruption of Transportation Networks:** This is estimated using two parameters: road capacity inferred by the respective taxonomy (primary, secondary, local, trail, etc.), and proximity to population places. The algorithm commences by generating a capacity index [0-1] based on the road hierarchy. A 500 m buffer is formed around each road segment to retrieve the nearby population density, and this is then normalized again to a [0-1] range. Within the same buffer zone the number of higher or similar capacity transport segments is retrieved and normalized and an alternative routing index is formed. Finally, vulnerability of disruption is estimated for each transport asset and segment by the multiplication of the three aforementioned indices and segmentation to five different discrete classes.