

EO4GEO Training Actions

Change detection using EO Data

Romanian Space Agency

University of Bucharest
Faculty of Geography
Master studies
-online lecture-

Target group

Students



Master studies Intelligent Territorial Development

De ce DEZVOLTARE
TERITORIALĂ
INTELIGENTĂ ?

❖ Misiunea programului de master *Dezvoltare teritorială inteligentă* (derulat de cadre didactice de la *Universitatea din București* și *Universitatea de Arhitectură și Urbanism Ion Mincu*) este aceea de a forma specialiști înalt calificați cu pregătire complexă, inter- și transdisciplinară, în domeniul dezvoltării teritoriale, prin compatibilizarea viziunilor existente în prezent la nivelul celor două domenii (geografie și urbanism).

❖ Parcursul acestui program va furniza absolvenților competențe pentru gestionarea optimă a resurselor naturale și antropice la nivel micro sau macro teritorial, dar și pentru proiectarea socio-economică pe termen mediu și lung, prin formularea unor strategii, politici și planuri de dezvoltare teritorială inteligentă.

ADMITERE

CE SĂ ALEGEȚI?

Domeniul: Geografie
Programul de studii: Dezvoltare teritorială inteligentă
Forma de învățământ: Învățământ cu frecvență
Durata studiilor: 2 ani
Locație: București
Număr de locuri propuse: 20 buget

CÂND?

Sesiunea: iulie/septembrie 2016
Înscrieri: iulie/septembrie 2016

CUM ESTE CONCURSUL DE ADMITERE?

Examen scris din tematica propusă

CÂT ESTE TAXA DE ADMITERE?

Taxa de admitere: 250 lei

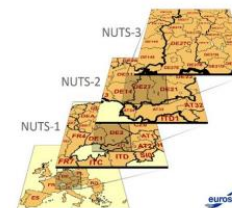
CUM AIUNGEȚI LA NOI?

Transport în comun: Metrou (M2, stația Universitate)
RATB: 61, 69, 70, 90, 122, 126, 137, 168, 226, 268, 300, 368, 381, 601, 783



Bd. Nicolae Bălcescu, nr. 1, Cod postal 010041, Sector 1, București
Tel: 021.305.38.10; 021.305.38.09;
021.305.38.13, Fax: 021.315.30.74
E-mail: secretariat@geo.unibuc.ro;
www.geo.unibuc.ro

FACULTATEA DE GEOGRAFIE
Programul de studii:
DEZVOLTARE TERITORIALĂ
INTELIGENTĂ

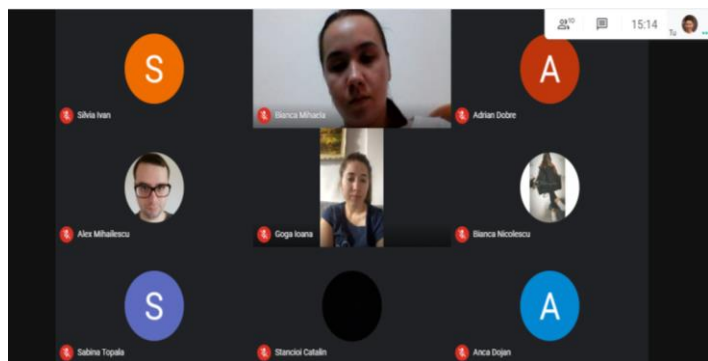


BUCUREȘTI 2016

Faculty of Geography



University of Bucharest



Detalii întâlnire

EO4GEO project



Co-funded by the
Erasmus+ Programme
of the European Union

The Space/Geospatial Sector Skills Alliance
Towards an innovative strategy for skills development and capacity building in the
space geo-information sector supporting Copernicus User Uptake

EO4GEO is an ERASMUS+ sector skills alliance
Sector Skills Alliances are transnational projects which aim to tackle skills gaps with
regard to one or more occupational profiles in a specific sector through a
coherent and comprehensive set of activities and outputs

EO4GEO project

KEY FIGURES

- Duration : 4 years from January the 1st, 2018
- Budget: 3,87 million € (funded by ERASMUS+)
- Partnership: 25 Partners + 30+ Associated Partners (from 16 EU Countries) from Academia, Companies and networks
- Coordinators: GISIG (General), KU Leuven (Scientific & Technological), PLUS (Education & Training), Climate-KIC (Exploitation)
- Romanian Space Agency : coordinator of task **Identifying business processes and occupational profile** and contributor to several other workpackages



EO4GEO Third Progress Meeting
27th – 28th June 2019, Leuven (BE)



EO4GEO project

THE PROJECT STRATEGY

EO4GEO aims at implementing a new approach (“Blueprint”) in the Space/Geospatial sector, in order to :

- to make skills more visible and comparable;
- to improve the quality and relevance of training and other ways of acquiring skills;
- identify the supply of GI and EO education and training at the academic and vocational levels;
- identify the current demand for GI and EO skills and occupational profiles;
- analysing trends, challenges and opportunities in the GI and EO sector.



EO4GEO project

- *WHAT CAN YOU EXPECT FROM EO4GEO?*

- develop a long-term and sustainable strategy to fill the gap between the supply and demand of space/geospatial education and training, taking into account the current and expected technological and non-technological developments.
- Creating and maintaining an ontology-based Body of Knowledge for the space/geospatial sector based on previous efforts.
- Developing and integrating a dynamic collaborative platform with associated tools.
- Designing and developing a series of curricula and a rich portfolio of training modules directly usable in the context of Copernicus and other relevant programmes;
- Conducting a series of training actions for a selected set of scenario's in the three sub-sectors - integrated applications, smart cities and climate change to test and validate the approach.

EO4GEO project

TARGET AUDIENCE

Primary audience

- High Education (HEI) and VET institutions
- SMEs and industry hiring EO/GI professionals
- Public administrations and agencies (all levels)
- EO/GI students
- Stakeholder associations in the EO/GI sector (students, universities, private sector)



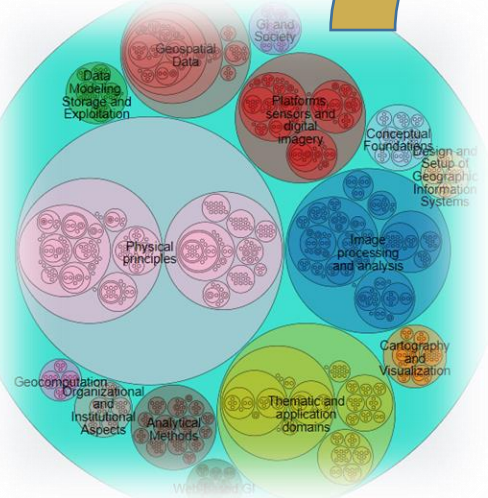
Secondary audience

- **Research centers** active in the field of Earth Observation
- Various **stakeholders** along the Earth Observation/ Geospatial value chain
- **European stakeholder associations** representing students, companies and public administrations in relevant sectors (space, geospatial, aerospace, public sector, innovation, training, digital skills, green skills and soft skills, climate change, integrated applications, smart cities, ecc.)
- Innovation agencies

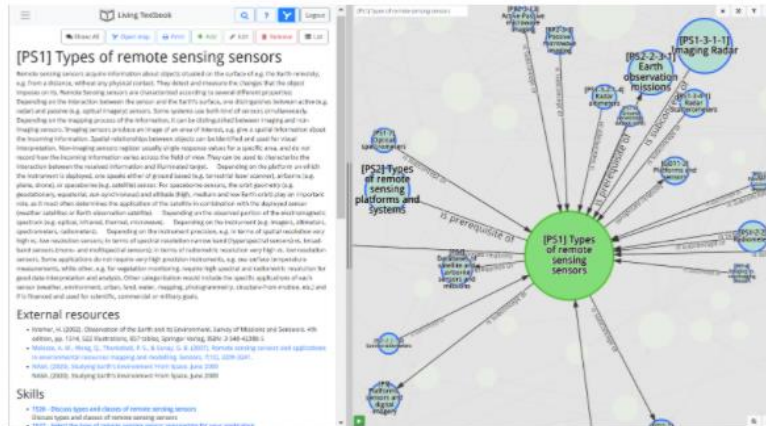
EO4GEO project

EO4GEO OUTCOMES

EO4GEO's BoK Visualization and Search



Living Textbook



- Occupational profile Tool
- Job Offer Tool
- Curriculum Design Tool
- BoK Annotation Tool
- BoK Matching Tool

EO4GEO project

....MORE OUTCOMES

- EO4GEO produces educational offers to address specific needs of knowledge and skills in the EO/GI sector.
- EO4GEO provides a set of training material addressing the needs of teachers in the field of EO/GI.
- EO4GEO developed a series of training actions (webinar, workshops, summer schools), in three sub-sectors (integrated applications, smart cities, climate change).
- EO4GEO provides a learning platform consisting in a Moodle instance, where the user can find the available training actions.
- EO4GEO offers mobility programs, promoting interships and project work by students in a working environment.

Copernicus in brief



What is Copernicus?

Copernicus is the European Union's Earth Observation Programme, which monitors our planet and its environment for the ultimate benefit of the citizens of Europe. It delivers data, information and services based on satellite Earth Observation data and in situ (non-space) data. The Programme is funded, coordinated and managed by the European Commission in cooperation with partners such as ESA and EUMETSAT.

The Copernicus programme is served by a set of dedicated satellites (the Sentinel family) and contributing missions (existing commercial and public satellites). The Sentinel satellites are specifically designed to meet the needs of the Copernicus information services and their users. Since the launch of Sentinel-1A in 2014, the European Union has initiated a process to place a complete constellation of

most 20 satellites in orbit before 2030. Today, there are seven Sentinel satellites in orbit, of four different types. Copernicus satellites, along with ground-based, airborne and sea-based measurement sensors, are providing vast amounts of global data.

The Copernicus services transform the wealth of satellite and in situ data into timely and actionable information by processing and analysing it. The services deliver datasets and time series that are comparable and searchable, ensuring that trends and changes are monitored. Patterns are examined and used to create better forecasts of, for example, the ocean and the atmosphere. Maps are derived from imagery, features and anomalies are identified and statistical information is extracted. These value-adding activities are streamlined through six thematic streams of Copernicus

services: the Copernicus Atmosphere Monitoring Service (CAMS), the Copernicus Marine Environment Monitoring Service (CMEMS), the Copernicus Land Monitoring Service (CLMS), the Copernicus Climate Change Service (C3S), the Copernicus Emergency Management Service (CEMS) and the Copernicus Security Service.

The information services, as well as the data from which they are derived, are accessible on a full, free and open basis by anyone. This data and information is used by service providers, public authorities and international organisations to improve the quality of life for citizens of Europe and around the world, to monitor and mitigate climate change, and to preserve our fragile environment.

More information on www.copernicus.eu/en

Atmosphere Monitoring Service CAMS

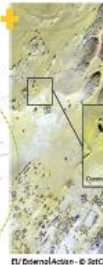
The Copernicus Atmosphere Monitoring Service (CAMS) provides continuous data and information on atmospheric composition by monitoring and forecasting constituents such as greenhouse gases, reactive gases, ozone and aerosols. CAMS delivers consistent and quality-controlled information useful to develop applications for air pollution, health, solar energy, greenhouse gases

Security Service

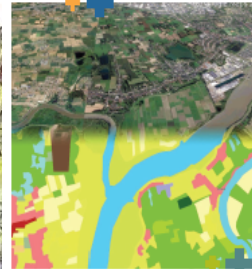
The Copernicus Security Service applications aim to support European Union policies by providing information in response to Europe's security challenges. The applications focus on three key areas:

- Copernicus Maritime Surveillance provides satellite image products for monitoring activities at sea by European maritime authorities.
- Copernicus Border Surveillance Service improves the situational awareness at the EU's external borders, contributing to saving lives at sea and tackling cross-border crime.
- Copernicus Service in Support to EU External Action provides geospatial intelligence in support of global EU security commitments, such as crisis mitigation and risk assessment outside the EU territory.

More information on <https://www.copernicus.eu/en/services/security>



EU External Action - © JRC



Harmen, East Flanders - Copernicus Land Cover

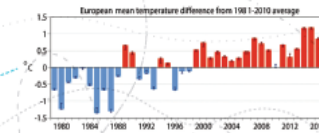
Land Monitoring Service - CLMS

The Copernicus Land Monitoring Service (CLMS) provides geospatial information on land cover and its changes, land use, vegetation state, water cycle, cryosphere and earth surface energy to a broad range of users in Europe and across the world in the field of environmental applications. The service is based on Earth Observation data combined with data from other sources.

It supports environmental and development policies, as well as applications in domains such as spatial and urban planning, forest management, water management, agriculture and food security, nature conservation and restoration, rural development, ecosystem accounting and mitigation/adaptation to climate change.

More information on <https://land.copernicus.eu/>

Climate Change Service - C3S



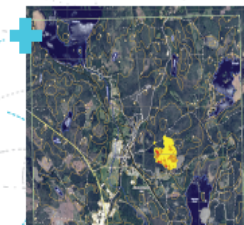
The Copernicus Climate Change Service (C3S) strongly supports the adaptation and mitigation policies of the European Union by providing consistent and authoritative information about the past, present and future climate change in Europe and the rest of the world.

C3S provides access to state-of-the-art quality-assured climate information, relevant to European Union sectoral policies. It delivers climate data records to monitor major climate drivers and document climate change fingerprints (e.g. surface air temperature).

European surface air temperature anomaly for annual averages from 1979 to 2017 relative to the annual average for the period 1981-2010. Data source: ERA-Interim. Credit: Copernicus Climate Change Service/ECMWF. More information on <https://climate.copernicus.eu/>

Emergency Management Service - EMS

Natural disasters affect thousands of people every year in the world. Thanks to satellite imagery, the Copernicus Emergency Management Service (EMS) provides maps to first responders, showing the impact on the ground in the first hours following a large natural disaster or a humanitarian crisis. These maps assist the organisation of the safe evacuation and sheltering of people affected by disasters such as earthquakes, volcanic eruptions, floods and forest fires.



Space Component

The Copernicus Sentinels are the programme's dedicated Earth Observation satellites. They ensure an independent and autonomous Earth Observation capability for Europe. There are six Sentinel families, covering a broad range of Copernicus observation needs, ranging from day-and-night all-weather observations, to land ocean surfaces, sea-surface topography, and air quality measuring trace gases in the atmosphere. In addition to these dedicated satellites, Copernicus is making use of satellite data from contributing missions, either from private companies or from institutional partners through dedicated agreements.

More information on <https://space.copernicus.eu/>



The Copernicus ecosystem: Rapidly growing user uptake

300,000 users of Copernicus data and services products.

Data Access

Copernicus data and information is available on a full, free and open basis. Data from the Copernicus Sentinels is accessible for download through dedicated infrastructures operated by the European Space Agency (ESA) and EUMETSAT. In addition to the data-hubs, EUMETSAT, a system that broadcasts data and transfers some Sentinel data directly to the users' desk. Copernicus services information is made available through dedicated websites. For users who do not wish to transfer data to their own systems, data is available through the DIAS (Data and Information Access Services) allowing users to process and analyse Copernicus data and information in the cloud. More information on <https://www.copernicus.eu/en/access-data>

Socio-Economic Benefits

Copernicus helps us address key societal challenges, such as climate change, natural disasters or border control. It also creates endless business opportunities.

Between 2017 and 2035, Copernicus is expected to generate €67 to €131 billion in benefits to the European society. This is ten to twenty times the cost of the programme. Interestingly, more than 80% of the benefits are expected to be generated outside of the space sector, through the use of Copernicus data in other parts of the economy (agriculture, fisheries, insurance, air quality...).

Copernicus benefits by sector (including economic, societal and environmental benefits)

User Uptake Activities

The European Commission has developed actions to support users of Copernicus and maximise the benefits of the programme. More than two hundred Copernicus Relays and Copernicus Academy members in all European regions act as local ambassadors and support over 300 awareness events every year. Copernicus info sessions and Copernicus Hackathons are organised every month. Dedicated training and course material has been developed in the context of the Copernicus Skills programme. Hundreds of start-ups are supported by the Copernicus Start-up programme, through funding, coaching or networking opportunities. Copernicus now has over 300,000 users, largely exceeding original expectations.

https://www.copernicus.eu/sites/default/files/Brochure_Copernicus_2019%20Updated.pdf

The user uptake context

EO4GEO is linked to the Copernicus Building Skills Actions for :

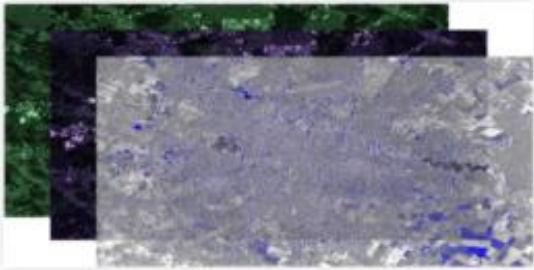
- Increasing the number of people to access and use Copernicus data and information ;
- Increase the supply of skills to stimulate the growth of geospatial-related jobs in Europe

Change detection using EO data academic lecture

eo4geocourses rosa

Change Detection Using EO Data

CHANGE DETECTION USING EO DATA



A Jupyter Notebook introduction to Change Detection
https://github.com/eo4geocourses/ROSA_Change-Detection-in-optical-Data/blob/master/jupyter_notebook/cdtut.ipynb

<http://www.eo4geo.eu/training/change-detection-using-eo-data/>

Evaluation of the training lecture offered by ROSA



  Co-funded by the Erasmus+ Programme of the European Union

Evaluation of EO4GEO training action [ROSA]

Academic course: Geospatial data and technologies applications for monitoring land use change

Each participant in the training action is warmly invited to fill in the following anonymous questionnaire, helping us to better manage and improve the quality of next EO4GEO trainings and to provide useful ideas for project activities.

* Obligatorii

Your details

1. Country *

https://forms.office.com/Pages/ResponsePage.aspx?id=wysxEyUoZEU0mIJhf4XJKZx0LBDtZNIgqs_Cf0DAGF9UMzhDMk5BOVhWRTBBUzREV0MyMUVXVThHWS4u

Future actions

The Change detection lecture and the other EO4GEO outcomes will be further addressed/promoted within other Master studies programs, at the University of Bucharest, Faculty of Geography.