Trans-Atlantic Training and Capacity Building Activities in EO

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CZECHIA
Aim of presentation

- To promote a relevancy of education aspect of EO
- Introduction of Trans-Atlantic Training (TAT)
- Presentation of selected results of GLOBE Programme
- Introduction of ESERO CZ Office
- Perspectives, planes…
ESa advanced training course in land remote sensing in Prague

28 June – 3 July 2009
Charles University and Czech Technical University
66 students from 22 countries
12 leading scientists in land RS techniques

Francesco Sarti (ESA)

NASA Valmiera Training Workshop

April 18, 2010
„Quantitative research methods in human dimensions of environmental change within Eastern Europe“

Garik Gutman (NASA)
Trans-Atlantic Training (TAT) initiative is an activity to develop stronger awareness of NASA and ESA products in EO.

LANDSAT and SENTINEL missions

to promote capacity building among recent university graduates and postgraduate in EO research area.

Training courses are focused on land-cover, social science processes, land-use modeling, ..... 

Trainers are invited from US and EU countries

http://web.natur.cuni.cz/gis/tat/
Trans-Atlantic Training (TAT)

http://web.natur.cuni.cz/gis/tat/

• **ESA support** – contract between Charles University and ESA

• **NASA support**

  *South Central European Regional Information Network (SCERIN)*
  *The Northern Eurasia Earth Science Partnership Initiative (NEESPI),*

  **START - Global change SysTem for Analysis, Research & Training**

**Coordination:** Charles University in Prague (Premysl Stych)
TAT - Trans Atlantic Training

3 events so far:

2013 – Prague (SCERIN):
Prague, Czech Republic, three days during 20-22 June 2013
“Classification methods in Land-Use/Land-Cover Change”.
22 participants from five countries

2014 – Krakow (SCERIN)
Krakow, Poland, from 5 to 7 June 2014.
“Land Use/Land Cover Change and Ecosystem Processes”
36 participants from 12 countries

2015 – Prague (NEESPI):
Charles University in Prague, Czech Republic during 8-12 April 2015,
“Earth Observation in Terrestrial Ecosystem Dynamics“
29 participants from 9 countries
Trans-Atlantic training and Capacity Building Activities in EO
**Venue**: TAT 2016 training “**Multi-sensor Approaches in Monitoring Ecosystem Dynamics**”, 23.-27.7. 2016

Coordinately with SCERIN

**Training location**: National Forest Centre and Technical University in Zvolen, Slovakia

**Goals and objectives**

“Multi-sensor Approaches in Monitoring Ecosystem Dynamics”.

Thematically focused on the new trends in optical remote sensing technics with emphasis on Landsat-8 and Sentinel-2 missions.

Applications in the ecosystems dynamics and biomass estimation, Lidar data

Registration: http://web.natur.cuni.cz/gis/tat/
Global Learning and Observations to Benefit the Environment

Program Goals:

- **Improve** student understanding across the curriculum;
- **Enhance** environmental awareness;
- **Contribute** to scientific understanding of Earth as a system;
- and
- **Inspire and Connect** the next generation of global scientists

[www.globe.gov](http://www.globe.gov)
Diversity of the activities

How to do a research in environmental disciplines

- **Education curricula** – GLOBE is implemented in many different ways
  - part of curricula (included in subjects)
  - school projects
  - after school activities (youth clubs)
- **Teaching approach** – sharing examples of good practice
- **School facilities**
- **Community involvement** - involving scientists, parents and public in the GLOBE Program
- **Environmental Education / Science Education**
- **Languages** - GLOBE is implemented in national language of each country – teachers/students need to know English for cooperation
- **Cultures and traditions** – intercultural learning
Region Annual Meeting 2015

• Poland, Warsaw on November 23rd - 27th
Regional Events – the start of cooperation

GLOBE Games in the Czech Republic – May 28th – June 1st 2015 students from Slovak republic, Poland, Germany + CC Netherlands, GIO Gary Randolph
Changes in land use and land cover in Medimurje between 2000 and 2014 using LANDSAT satellite images

Organization: Srednja skola Prelog
Student(s): Josipa Golombos Lara Klaric Patricija Furdi
Grade Level: Secondary (9-12)
GLOBE Teacher: Kristina Jancec
Contributors: Valentina Pirc Mezga, geography teacher, GLOBE

As high school students who actively take part in all GLOBE activities, we do a research every year.

This year we decided to dig into remote sensing and GIS analysis. The first step was finishing online certified ArcGIS and QGIS courses. We decided to help our local community and research the changes in land use and land cover from 2000 to 2014 in Medimurje.

After completing our spatial analysis in SAGA GIS program and QGIS program, we came to our results.

Furthermore, we are planning to expand our research and as a main focus, set our city Prelog...
The Effect of Land Use on Water Quality

Organization: St. Francis Xavier Catholic School
Student(s): Madison Sieg
GLOBE Teacher: Amy Woods

How does land usage affect the water quality of Rock Creek?
The effect of land usage on the health of the stream was tested.
The independent variable is the stream testing location.
The dependent variables measured are dissolved oxygen, nitrates, pH, water temperature, conductivity, and water transparency over a period of five weeks.

Results were analyzed and compared to land use using FieldScope 5.0.
A future experiment involves extending the testing process to determine to track patterns in changes of season and specifically involving weather events and resulting land use, tracking rainfall, blasting, wastewater discharge, alkalinity, and evaluating stream and watershed geology.
ESERO Czech Republic

ESA’s main way of supporting the primary and secondary education community in Europe.
ESERO CZ: Since 2015

Unique position: strongly oriented on EO/RS
Teachers’ Training School
Remote Sensing
(introduction to principles and function)

True and false colours
Choose a surface type and drag the bar across the image to see how false colours make the surface type stand out.

When processed by special software, satellite images can be displayed in true or false colours. A true-colour image shows surfaces the same way as the human eye sees them. By converting an image into a false-colour image, we can highlight things that are not distinguishable in a true-colour image, such as different types of vegetation.

In a true-colour image a forest looks completely uniform. In a false-colour image we can, for example, tell a coniferous forest from a deciduous one, or distinguish the height of the trees.

Orbits
- Geostationary orbit
  A geostationary orbit is an orbit above the Earth's equator. Since satellites in such an orbit move at the same speed and in the same direction as the Earth's rotation, they seem to "hang" in the sky above the same place on the Earth's surface (always above the equator). These satellites monitor the same area all the time, being unable to "see" the opposite hemisphere or the polar region.
- Polar orbit
  Satellites in a polar orbit fly in a plane that is approximately perpendicular to the equator. Due to the Earth's rotation they monitor a different area on each of their orbits and are thus able to cover the whole surface of the planet over time. However, they are not able to monitor one place on a continuous basis.

Why observe the Earth with satellites?
By clicking on the small satellite/eye, you can change the reflected spectrum. At the bottom, you can switch between a forest and a bus.

The human eye is only capable of distinguishing some of the reflected electromagnetic radiation – the visible light. Satellites, or more precisely, the instruments carried by satellites are able to record other parts of the electromagnetic spectrum as well (such as ultraviolet and infrared radiation), thus collecting more information than humans. After they are launched, they orbit the Earth for many years, sending out huge amounts of data without the need for human intervention.
Global Issues from Above (EO tablet app)

Czech and English,

Introduction to EO and Global issues applications
Global issues – EO applications

Tropical forests

Ocean pollution

Desertification
Specials

Augmented Reality
Art
Art and Networking – HURRAY TO SPACE!
Summary

• Making the science more relevant and visible for students: to show applications, present our projects and results, to explain relevancy of our research

• Linking closer the scientists and young generation: very important is personal experience, social networks

• Offering the new educational tools and approaches

• To motivate talented students for EO/Science

Thank you to many people and institutions: Garik Gutman, Chris Justice, Francesco Sarti, Petya Campbell, Pavel Groisman, Jana Albrechtova, Lucie Kupkova, Petr Mares, Antonios Mouratidis, Ivan Sackov, Julie Malmberg, Kasia Ostapowicz….teachers…students…and many more…
Thank you for your attention

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Looking forward to our collaboration in EO education!