

# SCERIN

## South/Central European Regional Information Network

### *South Central and Eastern European Regional Network (SCERIN)*

## SCERIN Summary of Activities

*Jana Albrechtova<sup>1</sup>, Petya Entcheva-Campbell<sup>2</sup>*

1. Charles University in Prague, Faculty of Science, Prague, Czech Republic,

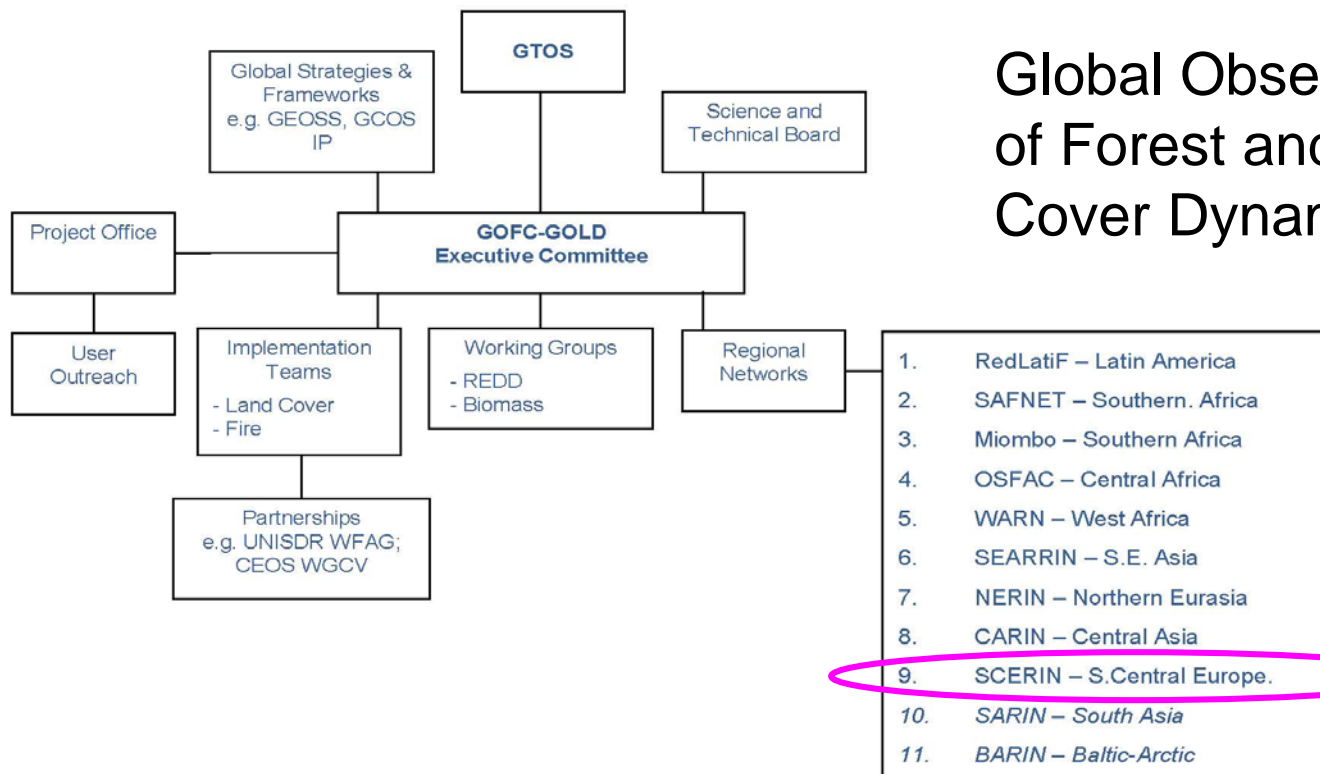
[albrecht@natur.cuni.cz](mailto:albrecht@natur.cuni.cz)

2. Joint Center for Earth Systems Technology, University of Maryland Baltimore County,  
and NASA Goddard Space Flight Center, Greenbelt, Maryland, USA



# GOFC- GOLD

## Global Observation of Forest and Land Cover Dynamics



*Brice Mora, 2013*

Regional networks: Global reference validation database for accuracy assessment of land cover

Role in verifying classifications and classifying very high res. images

# SCERIN

## South/Central European Regional Information Network

### Network Coordinator in U.S.:

**Petya Campbell** [petya.campbell@nasa.gov](mailto:petya.campbell@nasa.gov)

Joint Center for Earth Systems Technology (JCET),  
University of Maryland Baltimore County  
NASA Goddard Space Flight Center, Biospheric Sciences  
Branch, Greenbelt, Maryland 20771, USA



### Regional Contacts in Europe, Czech Republic:

**Jana Albrechtova** [albrecht@natur.cuni.cz](mailto:albrecht@natur.cuni.cz)

Department of Experimental Plant Biology, Faculty of  
Science, Charles University Prague



**Lucie Kupkova** [lucie.kupova@gmail.com](mailto:lucie.kupova@gmail.com)

Department of Applied Geoinformatics and Cartography,  
Faculty of Science  
Charles University Prague



# SCERIN

## South/Central European Regional Information Network

### Geographic Domain

Central and South Eastern Europe, the Danube Watershed and Western Black Sea coast



# SCERIN

## South/Central European Regional Information Network

### *Why SCERIN?* REGIONAL SPECIFICS

- **Extreme diversity in land forms and environmental conditions** --- unique richness and diversity of species, both highly sensitive and vulnerable to the global climatic changes



# SCERIN

South/Central European Regional Information Network

*Why SCERIN?* REGIONAL SPECIFICS



# SCERIN

## South/Central European Regional Information Network

### *Why SCERIN?* REGIONAL SPECIFICS

- Most of the region has been under extensive land use for a very long period --- industrial, mining activities, urbanization
- Many of the natural processes of adaptation are dysfunctional

# SCERIN

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*Why SCERIN?* REGIONAL SPECIFICS





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*Why SCERIN?* REGIONAL SPECIFICS

*LCLUC, RS research*

❖ *tradition of 20 years in Central EU*

❖ *Tradition of 10 years in South and Central Europe*

# SCERIN

## South/Central European Regional Information Network

### REGIONAL SPECIFICS

- SCERIN region is densely populated, and has an important role in food production and industry
- The economical and social restructuring following the political transition has not reached a stabile phase yet
- Mainstream research and the regional mitigation policy view the effects of land use and land cover changes in the SCERIN region as lower priority of marginal importance (as compared to socio-economical changes)

# SCERIN

## South/Central European Regional Information Network

### REGIONAL SPECIFICS

- SCERIN region is undergoing **active land use change**, presenting a **major source of uncertainty in global-scale estimates of land-cover, carbon storage and flux dynamics**
  - Climatic predictions for SCERIN region show **higher uncertainties**, and processes and trends that differ and/or oppose the forecasts for western or north European climatic conditions
  - The decline of vitality/stability of the natural ecosystems in SCERIN region triggers **extreme events** (e.g., flooding, wild fires, droughts) which result in ecological degradation and a release of the carbon stored in the ecosystems, and/or urban destructions and devastation of settlements
  - **UNIQUE**: Possibility/responsibility of applying planned, large-scale measures to support natural processes by human interference
- .... ***all the above considerably complicates the socioeconomic consequences of land cover change***

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## South/Central European Regional Information Network

### IMPORTANCE OF the research in the SCERIN region

- **Model areas for research of impacts of human activities**
- **UNIQUE:** Possibility/responsibility of applying planned, large-scale measures to support natural processes by human interference



# SCERIN

## South/Central European Regional Information Network

### Goals :

1. To promote and coordinate the production and provision of Earth System observations, *adapted and/or designed* for the user communities in South, Central and Eastern Europe
2. To **focus on regional and local issues** related to satellite data products, methodologies, and end users
3. SCERIN contribution to GOFC-GOLD, linkages with regional networks, e.g. IGU LUC workgroup

<http://www.fao.org/gtos/gofc-gold/net-SEERIN.html>



# SCERIN

## South/Central European Regional Information Network Participants and Structure

- Informal network of scientists and other professionals based in the region or with scientific interests in the region.
  
- SCERIN's participants work together with the regional forest and land management agencies to ensure continuous, high quality observations and information products for operational and management applications, to facilitate feasible and sustainable natural resources management practices.



# SCERIN

## South/Central European Regional Information Network

### Participants and Structure

FG1: Forest biomass production; decline, disturbance and driving forces

FG2: Land Cover Changes: climate change, agricultural land abandonment, urban expansion

*New* FG3: Validation/verification network for support of current and future satellite missions [e.g. NASA's LDCM and Sustainable Land Imaging (SLI), and ESA's GMES program]



# SCERIN: Examples of Regional Projects

## **SOUTH EUROPE:**

1. Romania: Issues in Remote Sensing Techniques for Forest Cover Change Monitoring (*V. Gancz, Forest Research & Management Institute, Romania*)
2. Bulgaria: Meteorological Satellites in Support to Land Surface Analyses (*J. Stoyanova & C. Georgiev, NIMH-BA, and L. Pessanha, Institute of Meteorology, Portugal*)
3. Use of Remote Sensing for Agricultural Applications in North West of Turkey (*L. Genc, COMU, Turkey*)
4. Use of Remote Sensing Data for LULC monitoring in Turkey (*D. Maktav, Istanbul Technical University*)

## **CENTRAL EUROPE:**

1. Poland: Land Use & Land Cover Change Studies in the Northern Carpathians (*J. Kozak, K. Ostapowicz, Jagiellonian University, Krakow*)
2. Application of Hyperspectral Data and Artificial Neural Networks for Land Cover Mapping of Mountains Areas (*B. Zagajewski, University of Warsaw, Poland*)
3. Slovakia: Land Cover Research, Applications and Development Needs (*A. Halabuk, Slovak Academy of Science, Slovakia*)
4. LULCC Research in the Czech Republic (*P. Stych, Prague, Czech Republic*)
5. Monitoring of Forest Condition & Function (*J. Albrechtova & L. Kupkova, Prague, Czech Republic*)

## **EASTERN EUROPE:**

Ukraine: Monitoring of New Wetlands Formation in Water Reservoirs and Deltas' Degradation in the Black Sea Basin (*V. Starodubtsev, National University of Life and Environmental Sciences, Ukraine*)



# SCERIN: Examples of Regional Projects: SOUTH

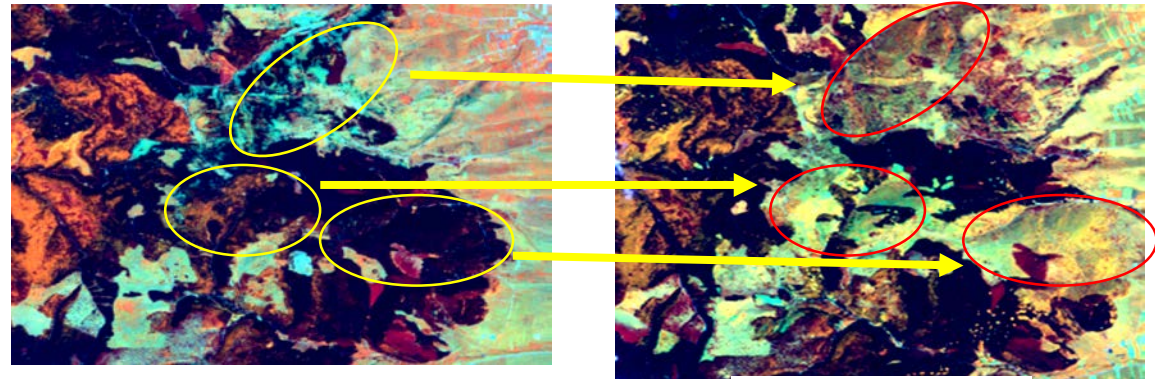
*Vladimir Gancz, Romania*

## Forest Cover Change Monitoring in Romania

### Aims:

- to provide a tool for systematic automatic forest cover change detection
- to publish the results on Internet geoportal on a regular basis (annually / 6 months)

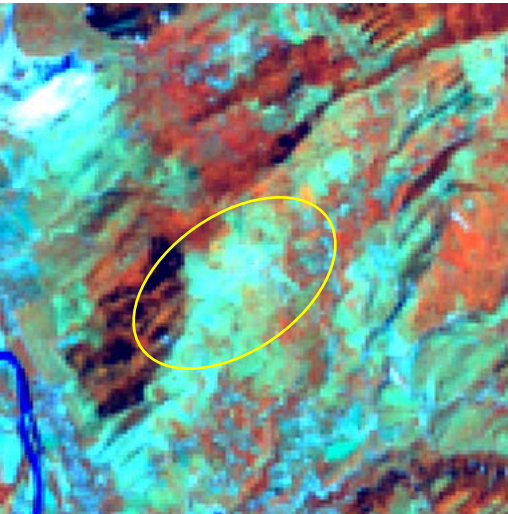
Based on medium resolution EO data (i.e. Landsat)



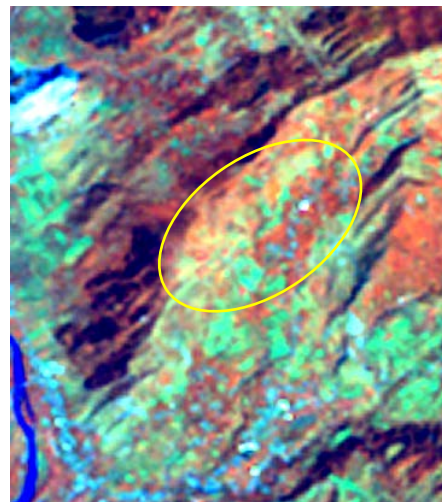
2000

2010

### Illegal clear cutting



2000



2010

Natural spreading of forest vegetation on abandoned agriculture (orchards/vineyards)

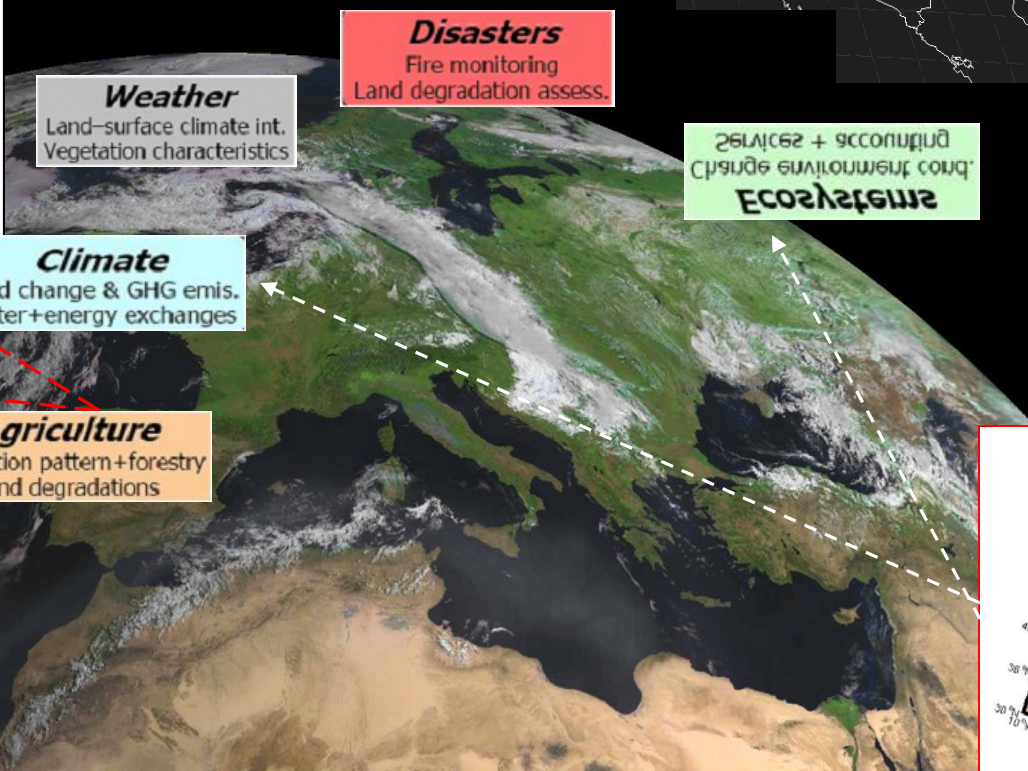
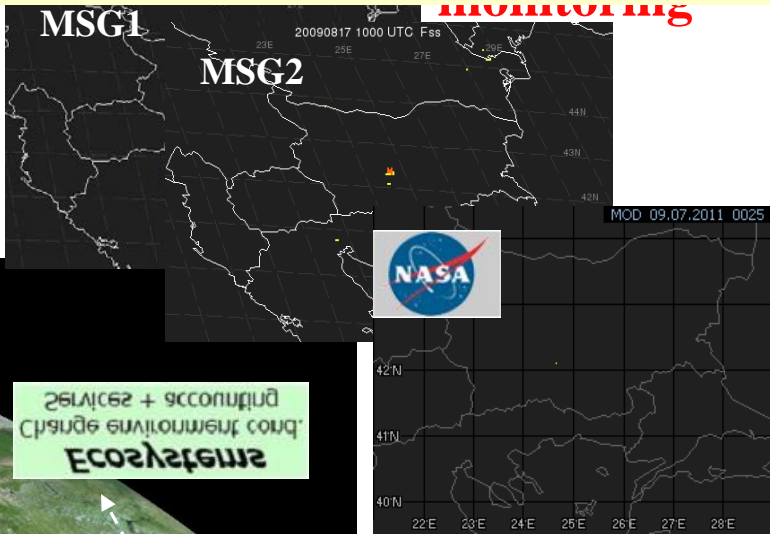
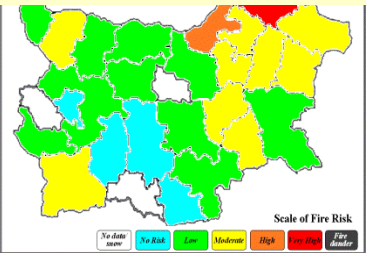
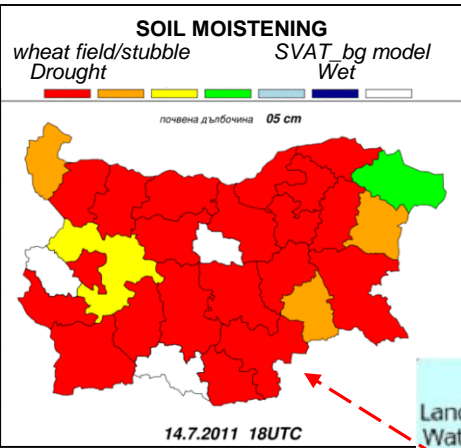
*Dr.ing. Vladimir Gancz*

# SCERIN: Examples of Regional Projects: SOUTH

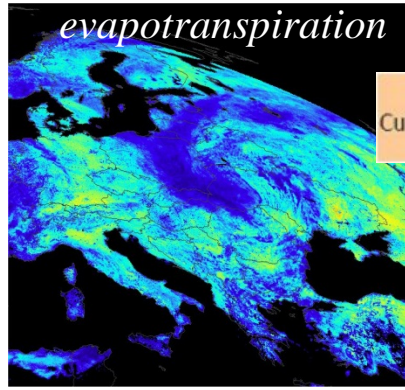
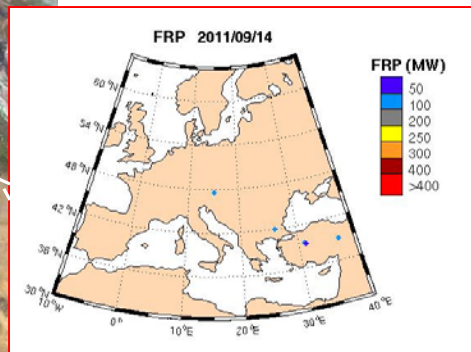
Julia Stoyanova & Christo Georgiev, Bulgaria

- Application of this integrated interdisciplinary approach is a basis for multifunctional risk assessment at NIMH of Bulgaria

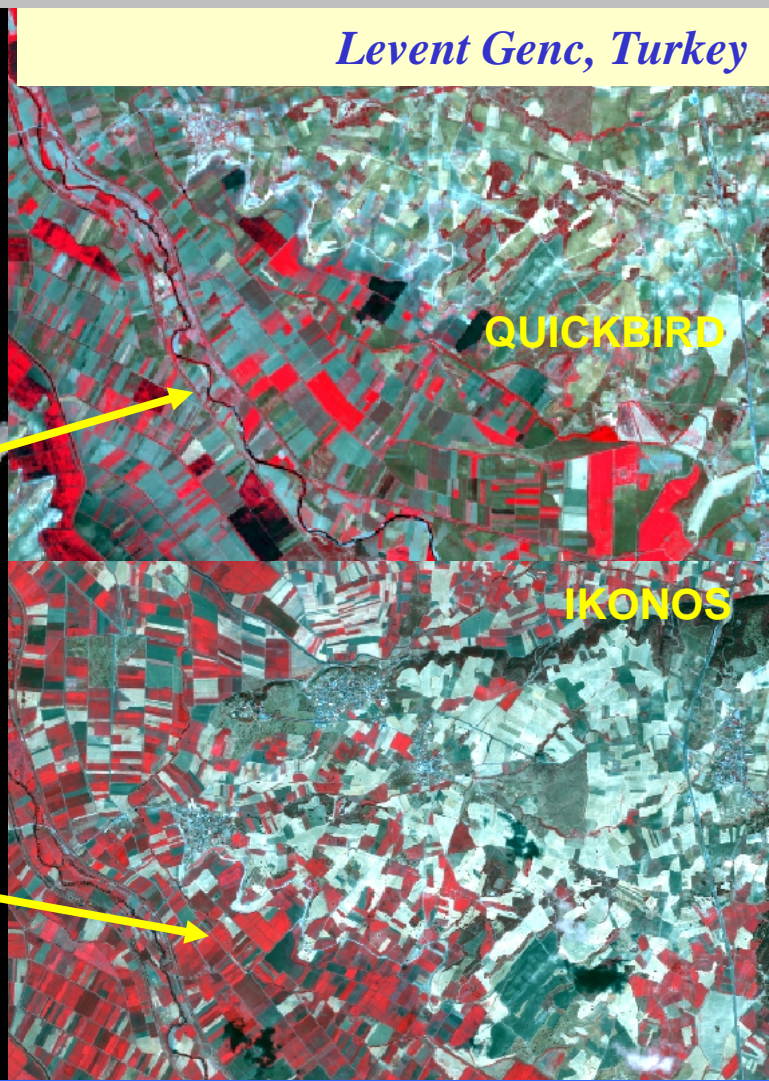
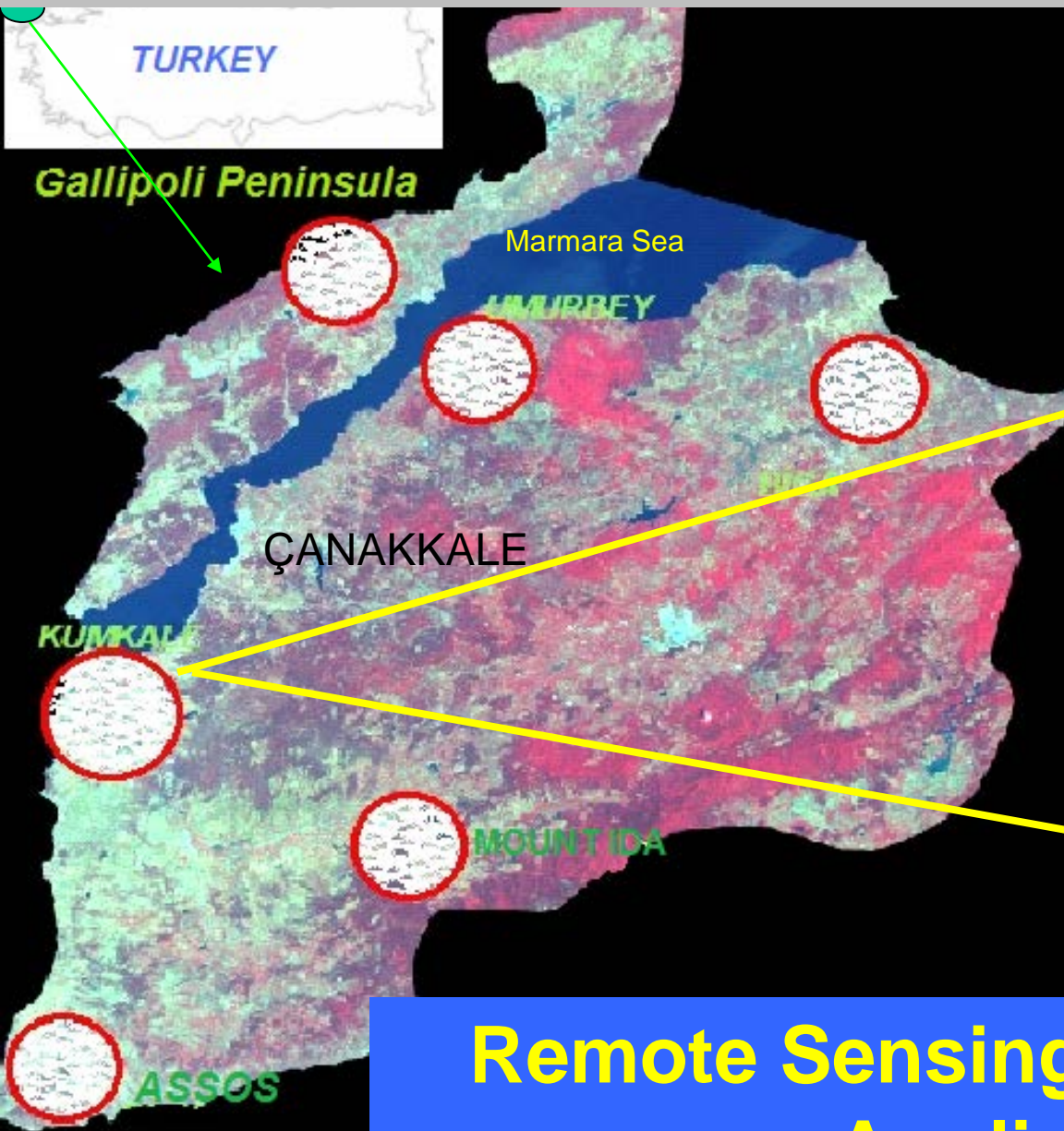
**Drought**  
at wheat field **Risk of wild fire**



**Fire carbon emissions**



# SCERIN: Examples of Regional Projects: SOUTH



*Levent Genc, Turkey*

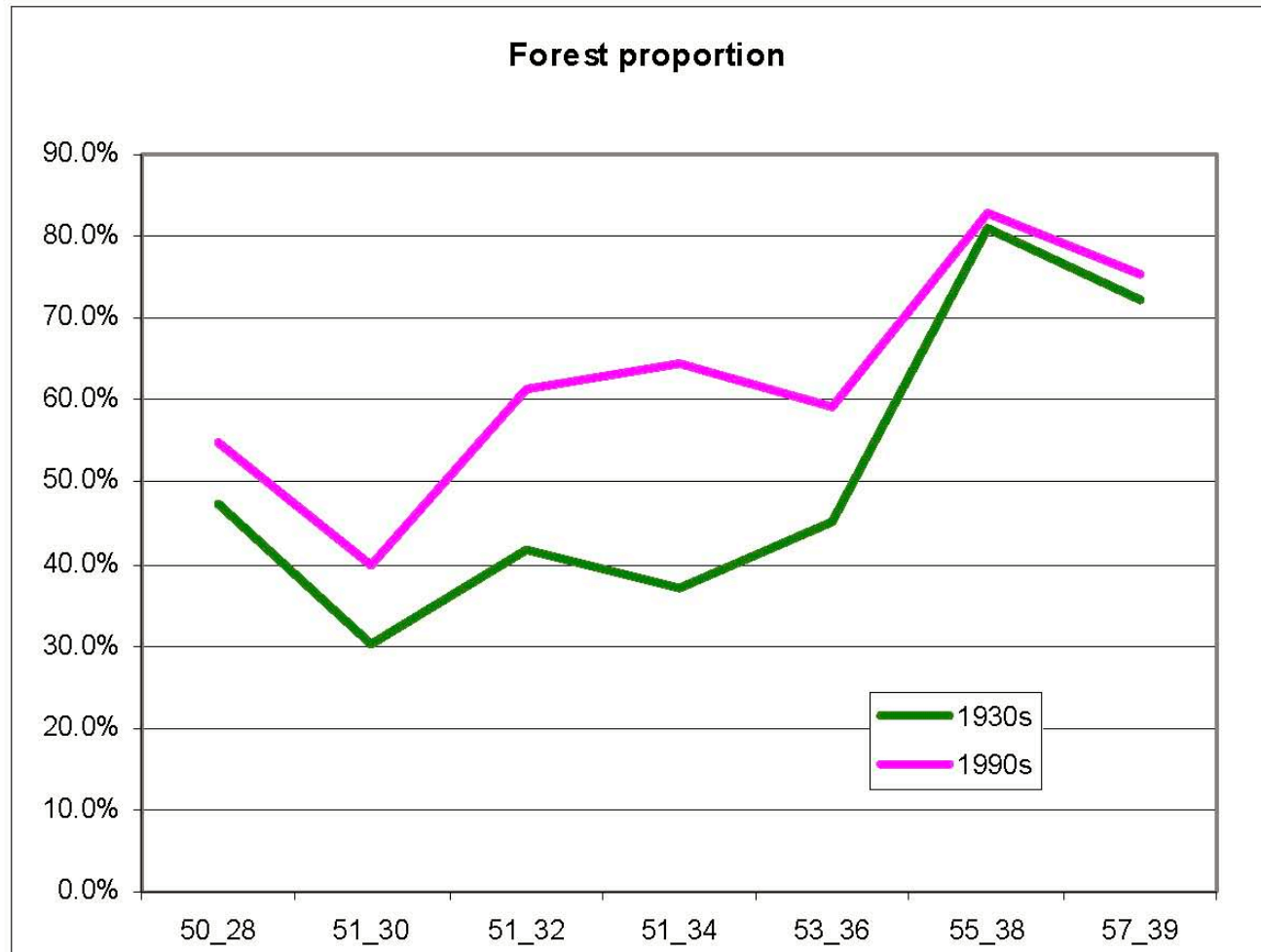
**Remote Sensing for Agricultural Applications**



# SCERIN: Examples of Regional Projects: **CENTRAL**

*Jacek Kozak, Katarzyna Ostapowicz, Poland*




**Forest cover change, west – east gradients, 1930 – 2000; Kozak et al. 2007**



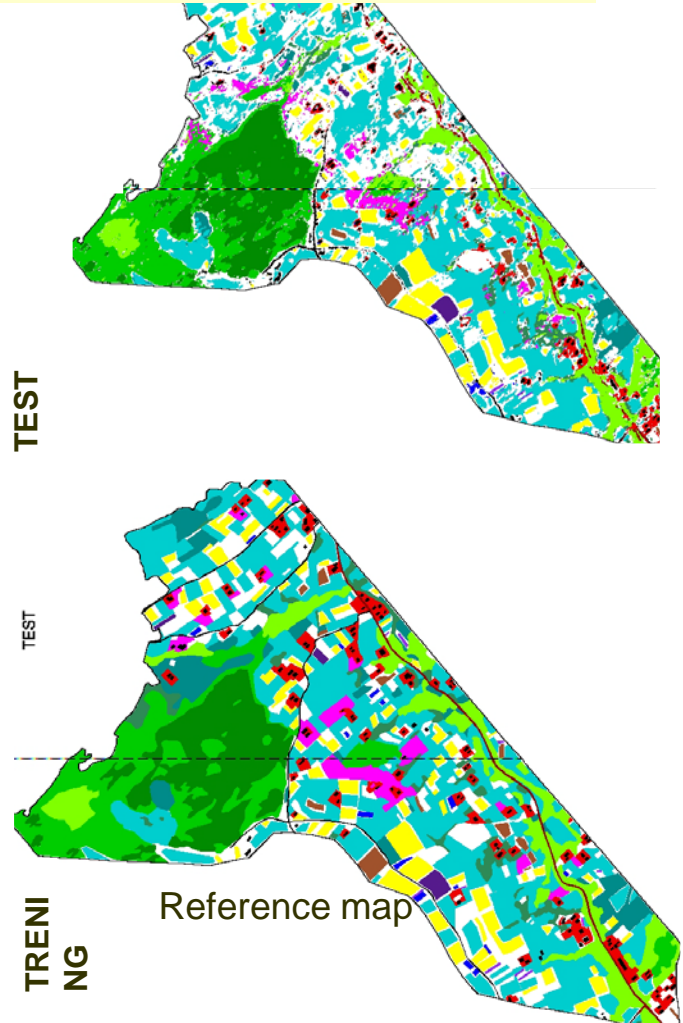
**Forest cover change, 1930 – 1990s; Kozak, Estreguil, Troll 2007**  
**1930s – topographic maps; 1990s – satellite data (Landsat)**

*Bogdan ZAGAJEWSKI, Poland*

## Land cover mapping of mountains areas

-  grasslands
-  wastelands
-  coniferous forest
-  mixed forest
-  deciduous forest
-  tree clumps
-  orchards
-  beet crops
-  potato crops
-  oat crops
-  stubbles
-  arable areas
-  asphalt roads
-  side roads
-  built-up areas
-  buildings

13 bands MNF 3x3

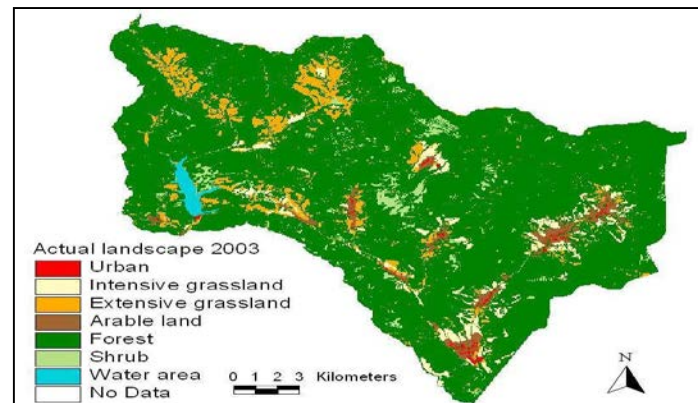


*Andrej Halabuk, SAS, Slovakia*

## Predictive land cover change modelling

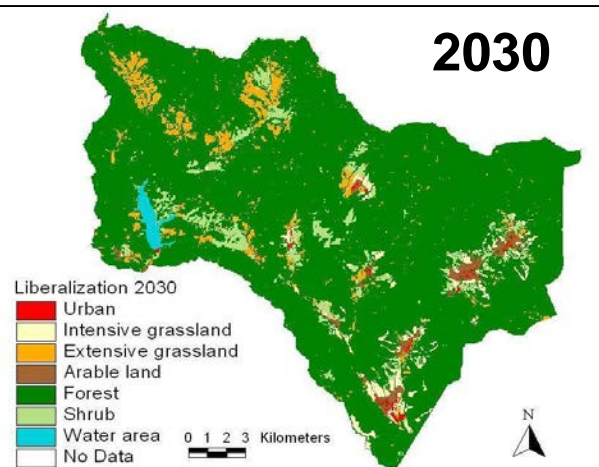


2003

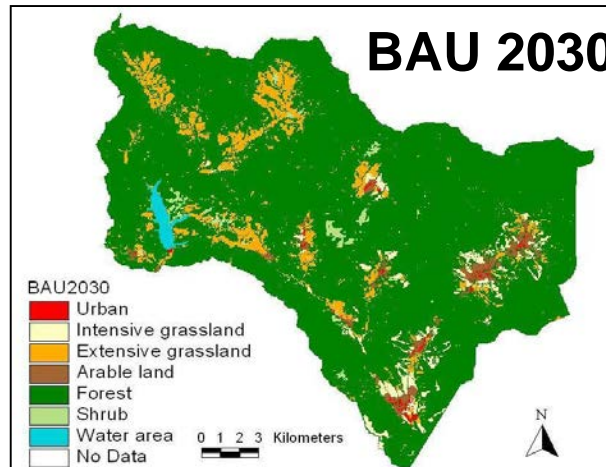


**Liberalization**

2030

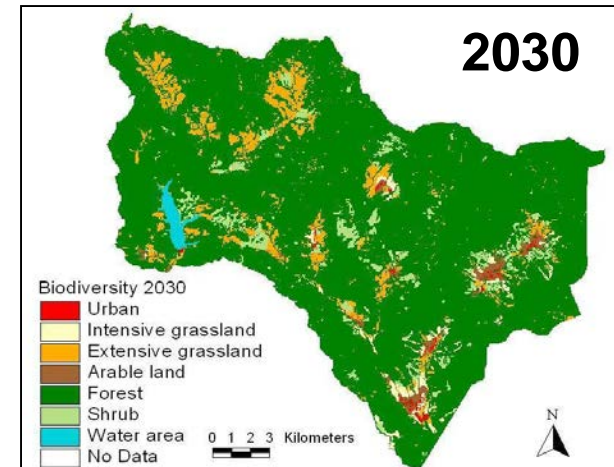


**BAU 2030**



**Biodiversity**

2030



# SCERIN: Examples of Regional Projects: **CENTRAL**

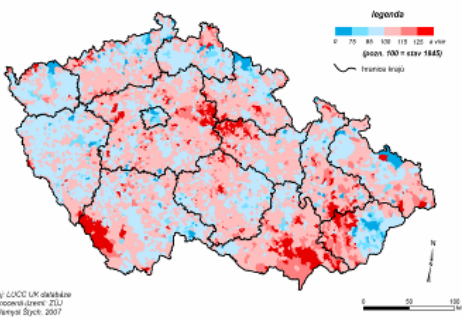
*Přemysl Štych, Czech Republic*

- **Project: Driving forces of land use differentiation changes in the Czech Republic and neighbor countries. Perspectives after EU accession**
- **Unique long-term data sources** – cadastral records - LUCC database for years 1845, 1896, 1948, 1990, 2000, 2010 – 10 LUCC categories (about 9,000 units) – free available <http://lucc.ic.cz/>
- **Well worked-out methodology for long-term changes evaluation** (index of change, typology of changes, coefficient of anthropogenic pressure, etc.)

➤ **Complex approach** – driving forces evaluation

**Changes of arable land 1845-1948**

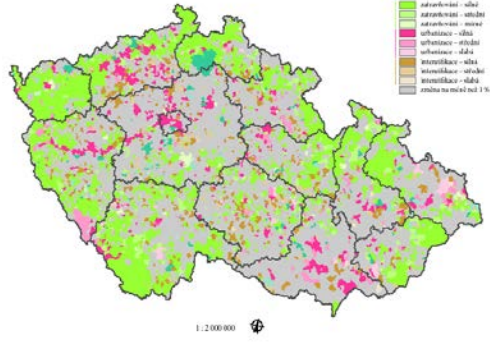
Vývoj rozlohy orné půdy v Česku v období 1845 - 1948 (v %)



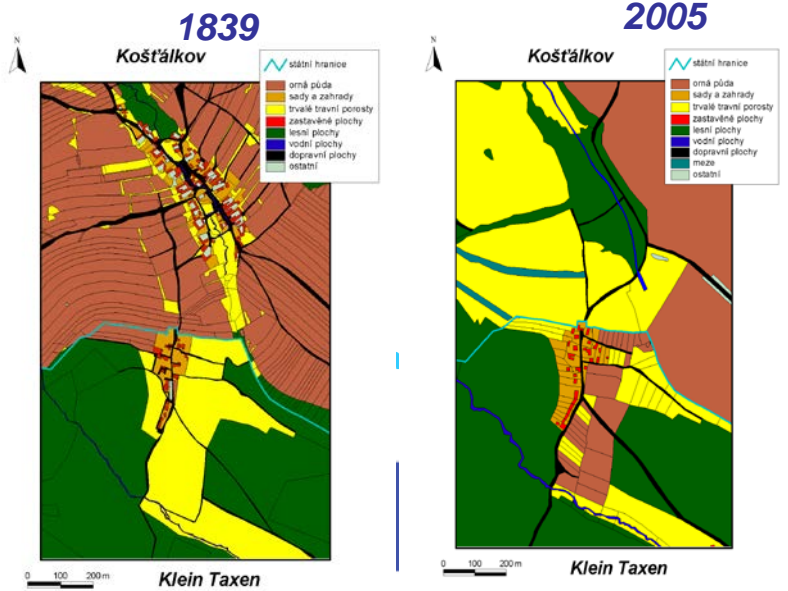
zdroj: LUCD UK databáze  
hodnotení čísel 211  
© Přemysl Štych, 2007

**Main processes 1990 - 2000**

Hlavní procesy přeměny krajiny v období 1990-2000



**Cross-border Case studies**

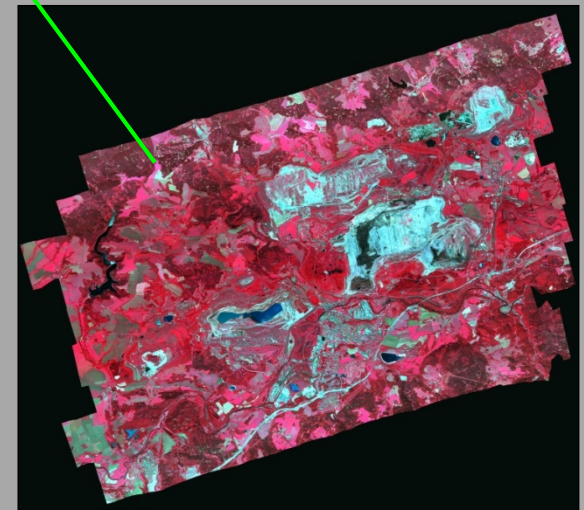




# SCERIN: Examples of Regional Projects: **CENTRAL**

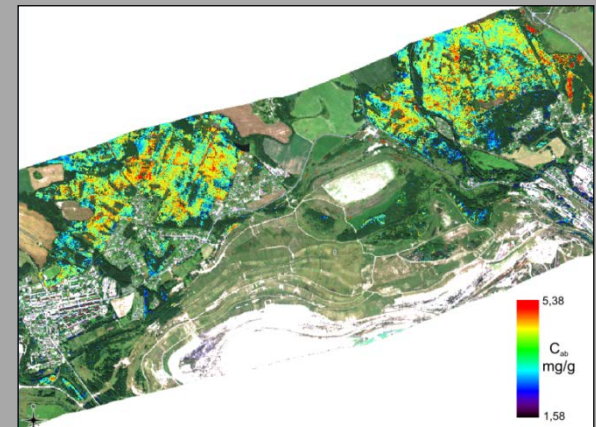
*Jana Albrechtová, Lucie Kupková, Veronika Kopačková Czech Republic*

HypSO - Assessment of Mining Related Impacts Based on Utilization of Airborne Hyperspectral Sensor



- **Project goals**

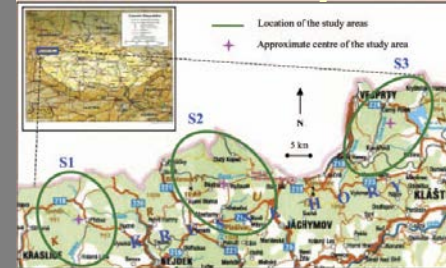
- To assess the current extent of the area affected by mining activities (tailing ponds, acid and heavy metal polluted zones, irritated vegetation, and changes in protection zones of water).
- To find relationships between irritation originator and consequential environmental disturbances of vegetation.



# SCERIN: Examples of Regional Projects: **CENTRAL**

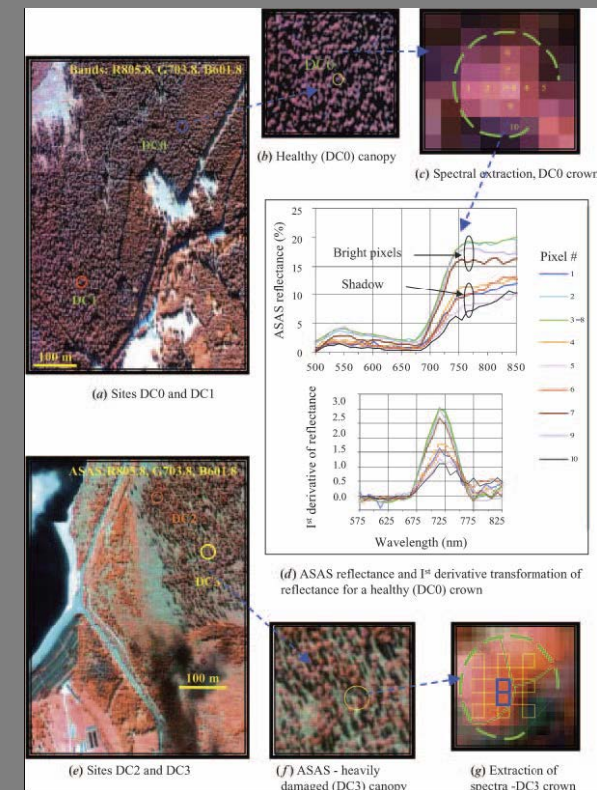
*Jana Albrechtová, Lucie Kupková, Veronika Kopačková Czech Republic*

INMON - Innovation of methods for monitoring of health status of Norway spruce stands in the Krusne hory Mts. with the use of hyperspectral data



## Project goals

- Evaluation of current health status of selected Norway spruce stands in the Krusne hory Mts.
- linking foliage chemical composition and spectral properties with soil chemical properties (basic cations, heavy metals, pH, C/N, DOC, DON, etc.).
- Adjustment of methodology for processing of hyperspectral data to allow comparison of health status of Norway spruce stands in the Krusne hory Mts. in the end of the 1990's
- **Collaboration with Dr. Petya Campbell, NASA Goddard Space Flight Center**

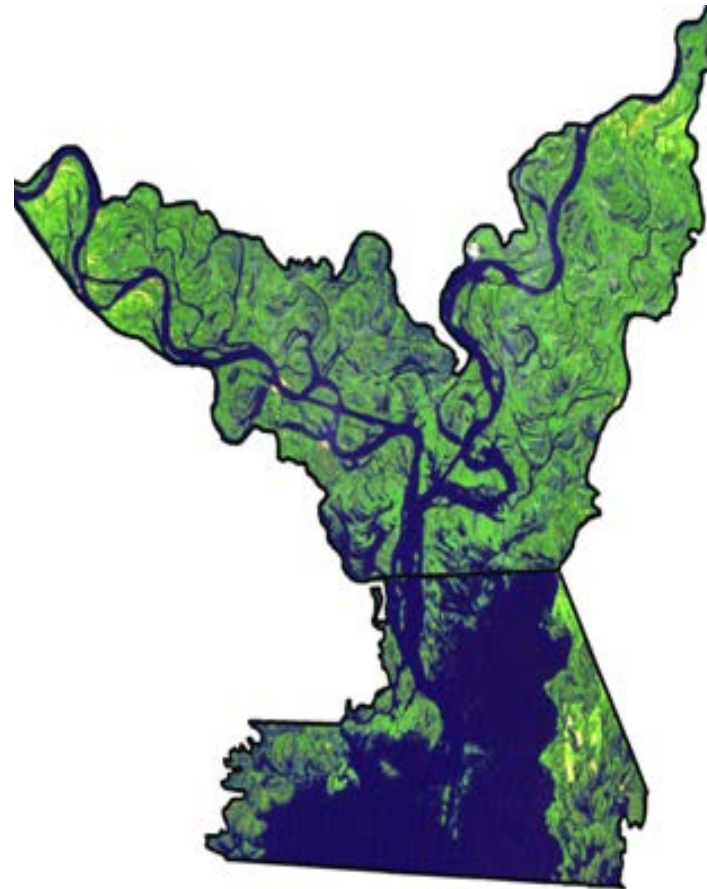
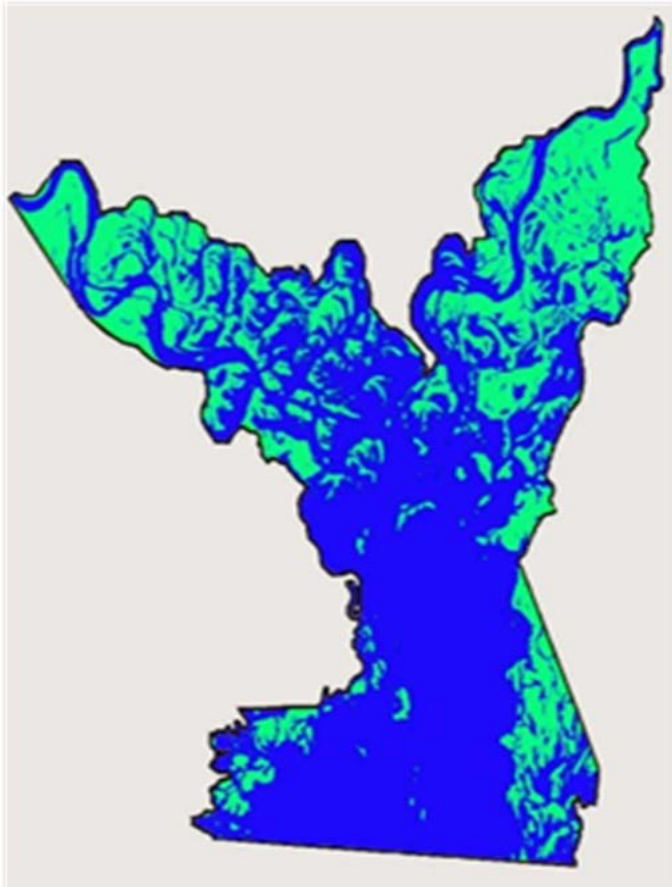


**Campbell et al. 2004**

# SCERIN: Examples of Regional Projects: **Eastern**

*Vladimir M. STARODUBTSEV, Ukraine*

**New wetlands formation in the Kiev reservoir from 1985 till 2009  
(Landsat-5)**





# SCERIN

South/Central European Regional Information Network

## Meetings and Activities:

**2012:**

**SEERIN (now SCERIN) Formulation Workshop,**  
17 April, Sofia, Bulgaria

**2013:**

**SCERIN-1 Meeting, Trip & Trans-Atlantic Training,**  
17-21 June, 2013 Prague, Czech Republic

**2014**

**SCERIN-2 Meeting and Trans-Atlantic Training,**  
9-10 June, 2014 Krakow, Poland

# 2012: SCERIN Formulation Workshop, Sofia, Bulgaria

## Theme: Land Cover Observations in SC Europe, National & Regional Programs

### 1) Achieved a consensus if the regional network is *needed*

- Regional experts discuss the recent research accomplishments in the LCLUC, GOFC-GOLD and GEOSS research areas
- Define the regional/national research and application issues

### 2) Identified common goals, participants & outline a *roadmap*

- Formulated the specific regional/national research & application objectives

### 3) Outlined *next steps* (outlined pilot projects and capacity building initiatives to be conducted by the network)

### 4) Formulated a capacity building workshop

- Under the auspices of the US GOFC-GOLD (Global Observation of Forest and Land Cover Dynamics) and START (global change SysTem for Analysis, Research & Training).
- Meeting presentations and materials - [http://www.fao.org/gtos/gofc-gold/net-SEERIN\\_Meetings\\_Sofia.html](http://www.fao.org/gtos/gofc-gold/net-SEERIN_Meetings_Sofia.html)
- **41 participants** [Bulgaria, Czech Republic, Germany, Poland, Romania, Slovakia, Switzerland (ENVIROGRIDS), The Netherlands (GOFC-GOLD LCPO), TFYR Macedonia, Turkey, USA]

# 2012: SCERIN Formulation Workshop, Sofia, Bulgaria



17 April 2012, Sofia



17-21 June 2013

# SCERIN-1 Meeting, Trip and Trans-Atlantic Training Charles University in Prague, Czech Republic

**1. SCERIN-1 Meeting:** 17-19 June 2013

“Monitoring Land Cover Changes & Forest Condition”

**2. Scientific Field Trip in coordination with IGU LUCG :** 19 June 2013

„LCLUC in Sokolov Region in Northwestern Bohemia affected by mining activities“ (scientific trip)

**3. Trans-Atlantic Training in collaboration with ESA:** 20-21 June 2013 “Classification methods in Land-Use/Land-Cover Change”

**4. IGU LUCG meeting:** 20-22 June, 2013, Prague

„International Geographical Union LUCG workgroup meeting“

## collaboration between the existing networks in the region

**SCERIN**



3rd Symposium,  
Wageningen, April 2013



# SCERIN-1 Meeting, Trip and Trans-Atlantic Training Charles University in Prague, Czech Republic



17-21 June 2013

• SCERIN has linkages with the **IGU LUC** workgroup: joint meeting with SCERIN1 in Prague 2013

IGU LUC  
<http://lucprague.cz/>

- » Basic information about a special LUC week in Prague (17th to 22nd June 2013).
- » The seminar will be held on June 20th - 21st 2013 at the Faculty of Science, Charles University in Prague.
- » On 22nd June you can join us for an excursion focused on the land use changes in Central and Northern Bohemia.
- » This will be the 5th seminar dealing with these topics taking place in Prague and organised by geographers from the Faculty of Science (2001, 2007, 2009, 2010).

WE CORDIALLY INVITE YOU TO THE SEMINAR  
HELD IN PRAGUE ON THE TOPIC OF

## LAND USE LAND COVER CHANGE RESEARCH IN EUROPEAN COUNTRIES



NASA LCLUC Spring Science Team Meeting  
2014, 23-25 April





# Capacity Building Goal Achieved

## Trans-Atlantic Training in collaboration with NASA and ESA:

20-21 June 2013 “Classification methods in Land-Use/Land-Cover Change”



**Premysl Stych** [stych@natur.cuni.cz](mailto:stych@natur.cuni.cz)

Department of Applied Geoinformatics and Cartography,  
Faculty of Science  
Charles University Prague



**Francesco Sarti – ESA**



**Garik Gutman - NASA**

# SCERIN-1 Meeting, Trip and Trans-Atlantic Training Charles University in Prague, Czech Republic



17-21 June 2013



3rd Symposium,  
Wageningen, April 2013





5-10 June 2014

## Theme: Current LCLUC challenges in SCERIN: Assessing Ecosystem Function and Processes

9-10 June 2014, Krakow, Poland

The second meeting of GOFC-GOLD South Central and East European Regional Information Network (SCERIN-2) is planned for **9-10 June 2014**.

It is hosted by Drs. K. Ostapowicz and J. Kozak, Institute of Geography and Spatial Management at the Jagiellonian University, Krakow, Poland (<http://www.gis.geo.uj.edu.pl/ZGIS/eng/aboutus/contact.ht>).

# SCERIN-2 MEETING

Jagiellonian University in Kraków, Poland, Institute of Geography and Spatial Management



5-10 June 2014

## AGENDA

Day	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed
Date	4-Jun-14	5-Jun-14	6-Jun-14	7-Jun-14	8-Jun-14	<b>9-Jun-14</b>	<b>10-Jun-14</b>	11-Jun-14
am	<i>Arrival of TAT participants</i>	TAT Unit 1	TAT Unit 3	TAT Unit 5 TAT Unit 6	<i>Arrival of SCERIN-2 Participants</i>	SCERIN-2 Sessions 1&2	SCERIN-2 Sessions 3&4	<i>Departure of SCERIN-2 Participants</i>
pm		TAT Unit 2	TAT Unit 4			Discussions of SCERIN FGs 1&2	SCERIN-2 Sessions 5&6	

***Session 1: Plenary lectures, LCLUC and GOF-C-GOLD priorities***

***Session 2: SCERIN Focus Groups Discussions***

FG1: Land cover products/applications, ecosystem/landscape assessments using hyperspectral and LiDAR data

FG2: Land Cover Changes: agricultural land abandonment, urban expansion

FG3: Validation/verification network for support of current and future satellite NASA (HypIRI, Landsat) and ESA missions (GMES program) *New*

***Session 3: Land Cover Observations in SCE – panel of experts***

# SCERIN

## South/Central European Regional Information Network

### Current SCERIN remote sensing issues, needs, goals

- ✓ **Main processes in present:** forest deterioration, changes in forest ecosystem functions, suburbanization, afforestation,
- ✓ **Driving forces:** transitional processes, EU accession and open market, changes in land preservation and restitutions, private land ownership, nature preservation, changes in pollution
- ✓ **GOALS:**
  - Network of field validation sites (including land management data) at regional SCERIN scales
  - Developing archives of long-term RS, LCLUC data , meteorology and field observations
  - Developing techniques for up-scaling between sites, networks of sites for detecting and interpreting key indicators of land use and land cover change
  - Designing a system for a cost effective monitoring that enable frequent, repeated, regionally coordinated assessment of landscape and ecosystems: distribution, status and trends of change
  - **Needs:** LCLUC regional modeling predictions, **International cooperation for sharing of data and experience, and for comparative studies**





# SCERIN

## South/Central European Regional Information Network

### SUPPORT US: GO TO KRAKOW June 9-10 2014

<http://csebr.cz/scerin2014/>

### SCERIN-2 MEETING

Jagiellonian University in Kraków, Poland, Institute of Geography and Spatial Management



5-10 June 2014



NASA LCLUC Spring Science Team Meeting  
2014, 23-25 April