Supported by: Croatian scientific foundation

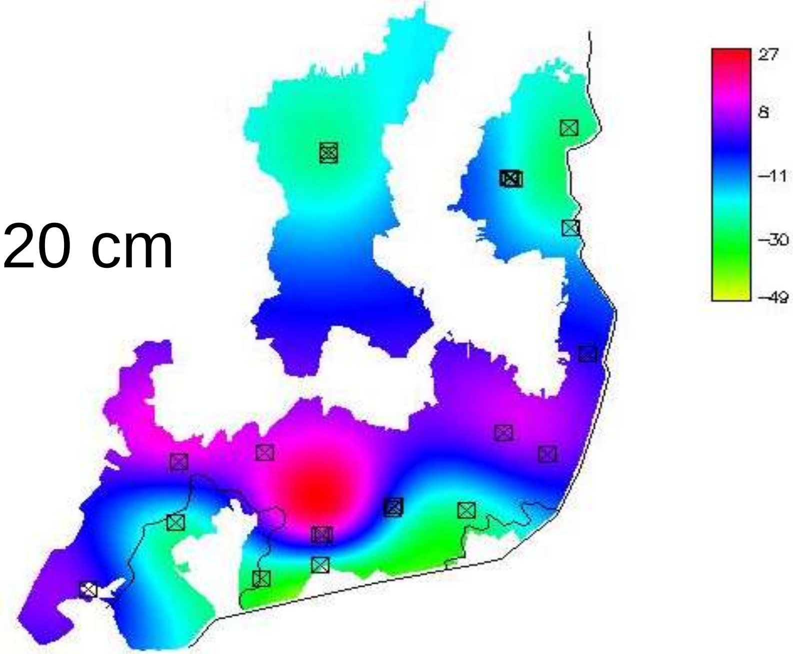
The use of satellite imagery in the assessment of the restoration of the floodplain Česma forest in the North-Western Croatia

Luka Rumora(1), Mario Miler(1), Damir Medak(1),
Ivan Medved(2), Ivan Pilaš(2)
(1) University of Zagreb, Faculty of Geodesy
(2) Croatian Forest Research Institute, Jastrebarsko

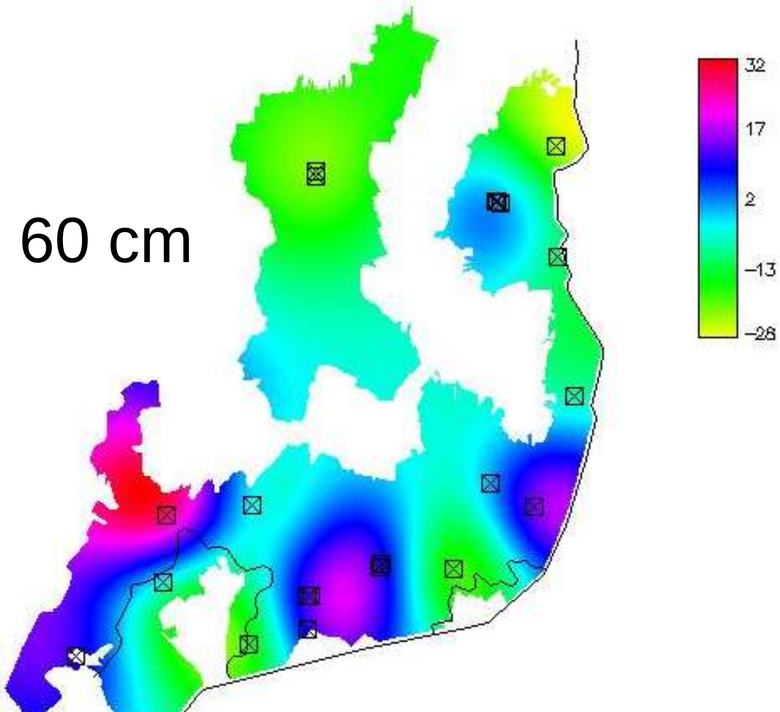
SCERIN-4 Capacity Building Workshop (CBW)
Zvolen, Slovakia 19-22 July, 2016

Poster 4: Rumora, SCERIN 4, Zvolen, 2016

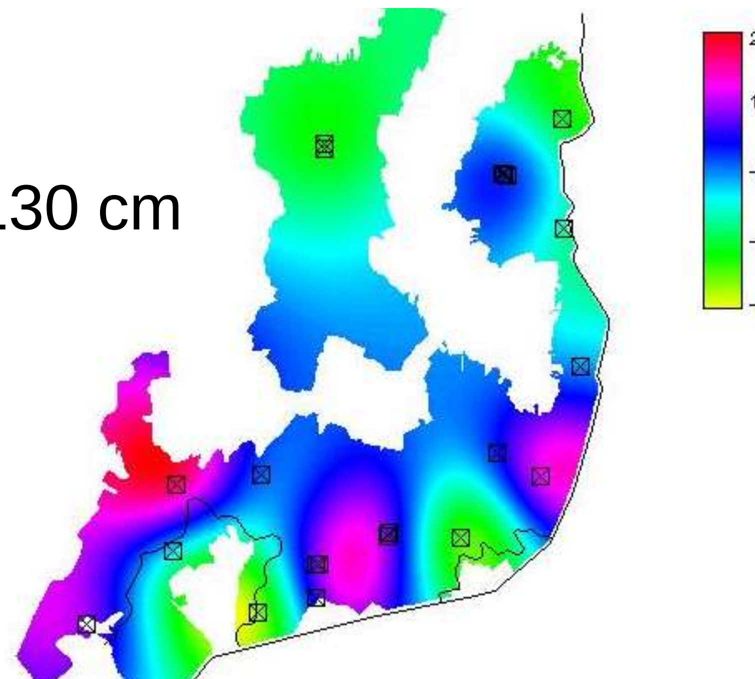
20 cm



60 cm



130 cm



Difference between EVI_2007_2010 and EVI_2002_2007

Difference between EVI_2010_2015 and EVI_2007_2010

Long-term disturbance patterns in Romanian forests

Mihai Daniel Niță[1], Cătălina Munteanu[2]

[1] Department of Forest Engineering, Faculty of Silviculture and Forest Engineering, Transilvania University of Brașov
[2] SILVIS Lab, Department of Forest and Wildlife Ecology, University of Wisconsin-Madison

Long-term disturbance patterns in Romanian forests

Mihai Daniel Niţă[1], Cătălina Munteanu[2]

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Introduction

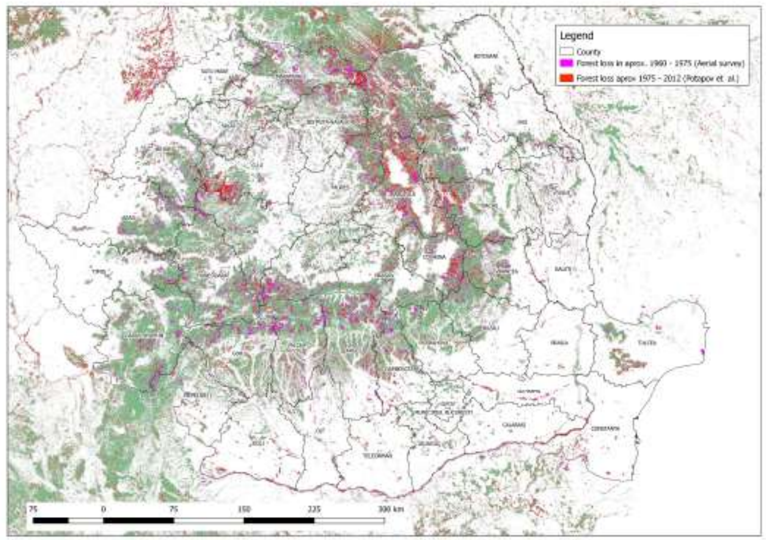
Forest disturbance and recovery are critical ecosystem processes and an improved monitoring of changes in forest structure is needed to quantify natural and human impact on forest systems. The influence of size, fragmentation of disturbances to the ecosystem is directly proportional to the covered area. Long-term changes, in particular, have major consequences for ecosystem functioning, carbon storage, climate regulation and biodiversity.

Our goal was to create a spatial database with the location, fragmentation and shape of forest disturbances in the last 60 years

Results

Following WWII, and especially after 1975, Soviet policies increased forest cover by establishing forest plantations outside the historical range of forests. We observed a peak in harvest around 1965, partly due to war reparations paid to Russia in oil and timber.

Disturbance peaked again in 1982–1985 when Romania was paying off loans to the International Monetary Fund. Following the collapse of the Soviet Union, disturbance rates were also high in Romania especially following major privatization laws in 1991, 2000, and 2005.



Spatial distribution of disturbances in Romanian forests

Methods

In this study, we created a spatial database by combining geographic data on forest disturbances maps extracted from different products and studies.

For the period 1960 – 1975, we digitized the forest disturbances using the second edition of Military Topographic map of Romania which was based on the first aerial survey which covered the entire teritory of Romania.

For the period 1975 – 2012, the forest disturbances were extracted from a previous study (Potapov et al, 2014) which is based on several Landsat historical and recent scenes collected from USGS archive.

Conclusions

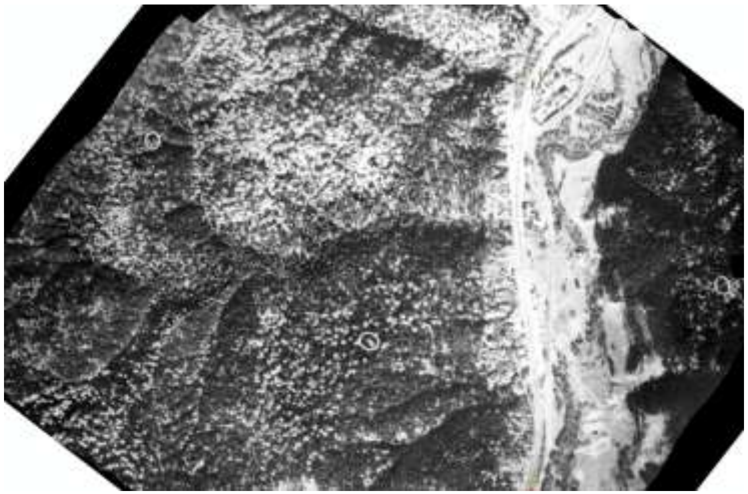
The results revealed that fusing cartographic data and Landsat's temporal and spatial coverage, provides an unique opportunity for characterizing vegetation changes. On macro level, this kind of method offers a large view on forest disturbances which occur during a management cycle.

This database is an important starting point in identifying the valuable ecosystems and old-growth forests, by identifying islands of undisturbed forests in the context of forest ownership in Romania

An important finding of this study is highlights that rates of forest harvesting after 1990 were lower than pre-1990, a fact that is missed by most post-socialist studies.

Methodology

1960 – 1975
Topographical Map from Aerial Survey



1975 – 2012
(Potapov et. al, 2014)

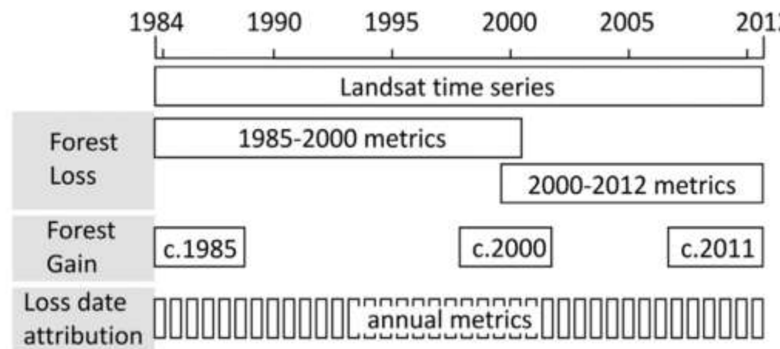
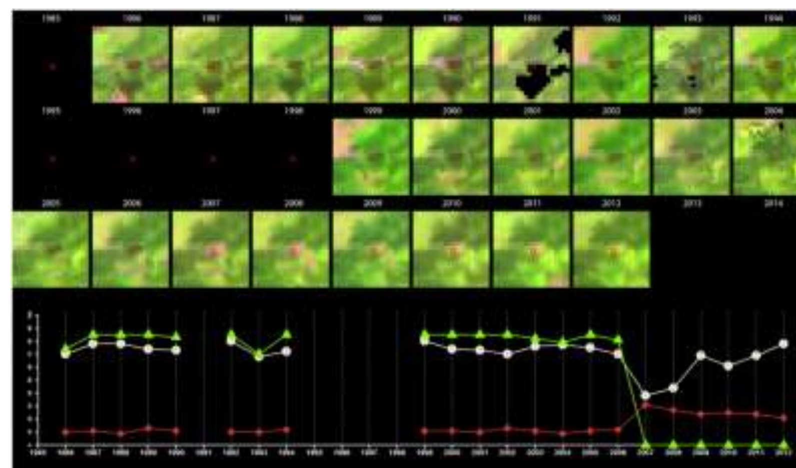
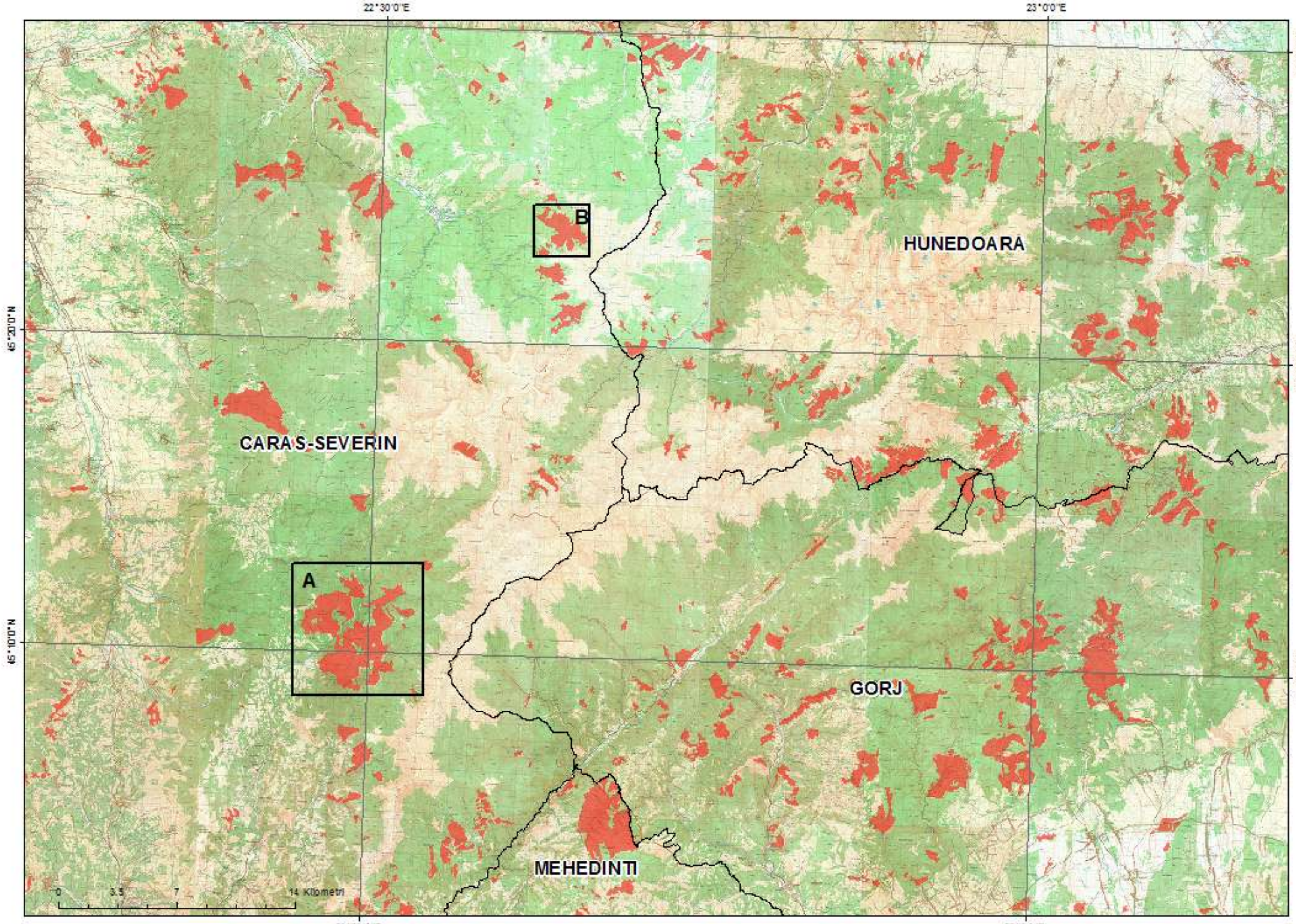


Fig. 1. Landsat time series and multi-temporal metric sets.

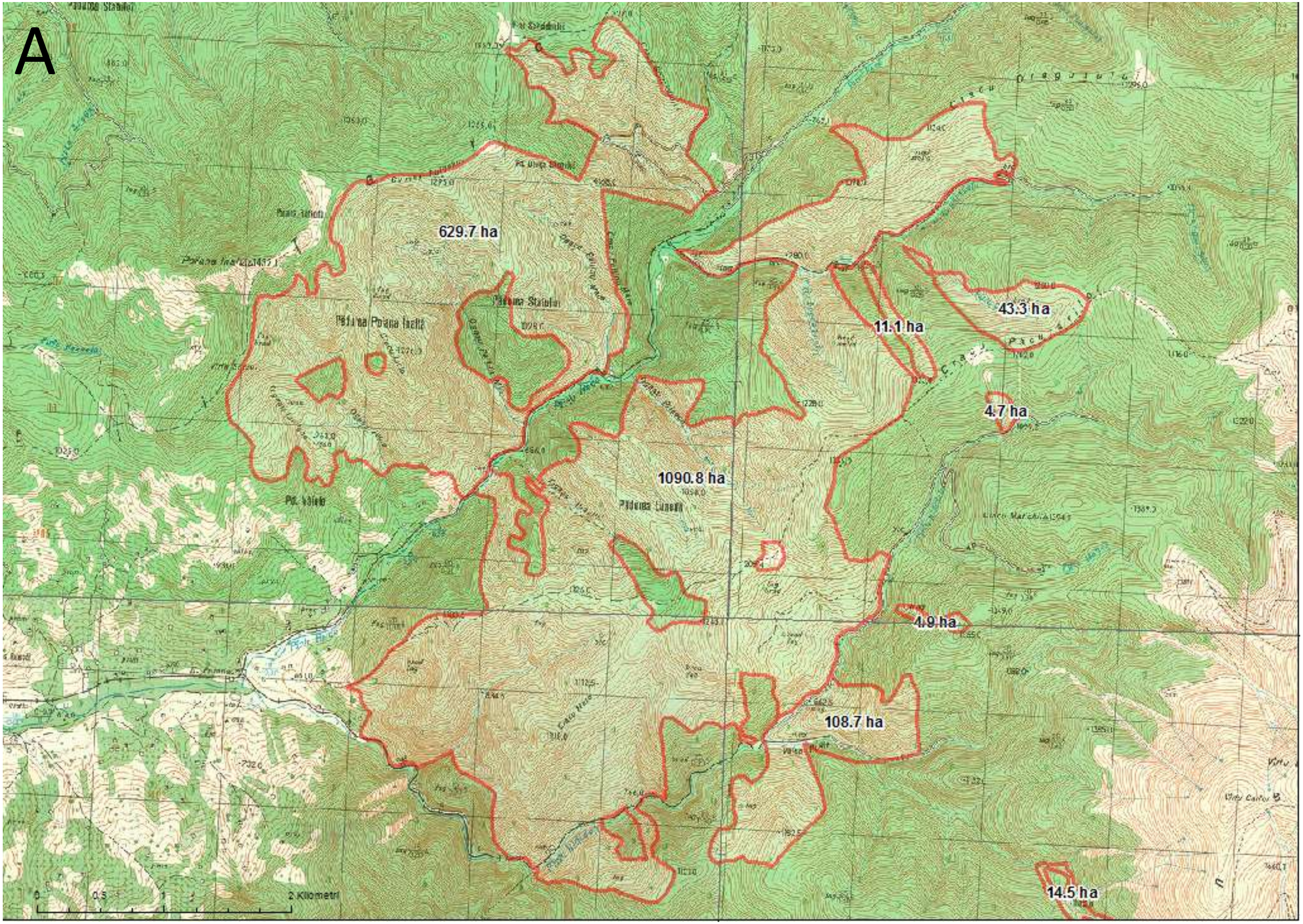


Methodology – disturbance digitization

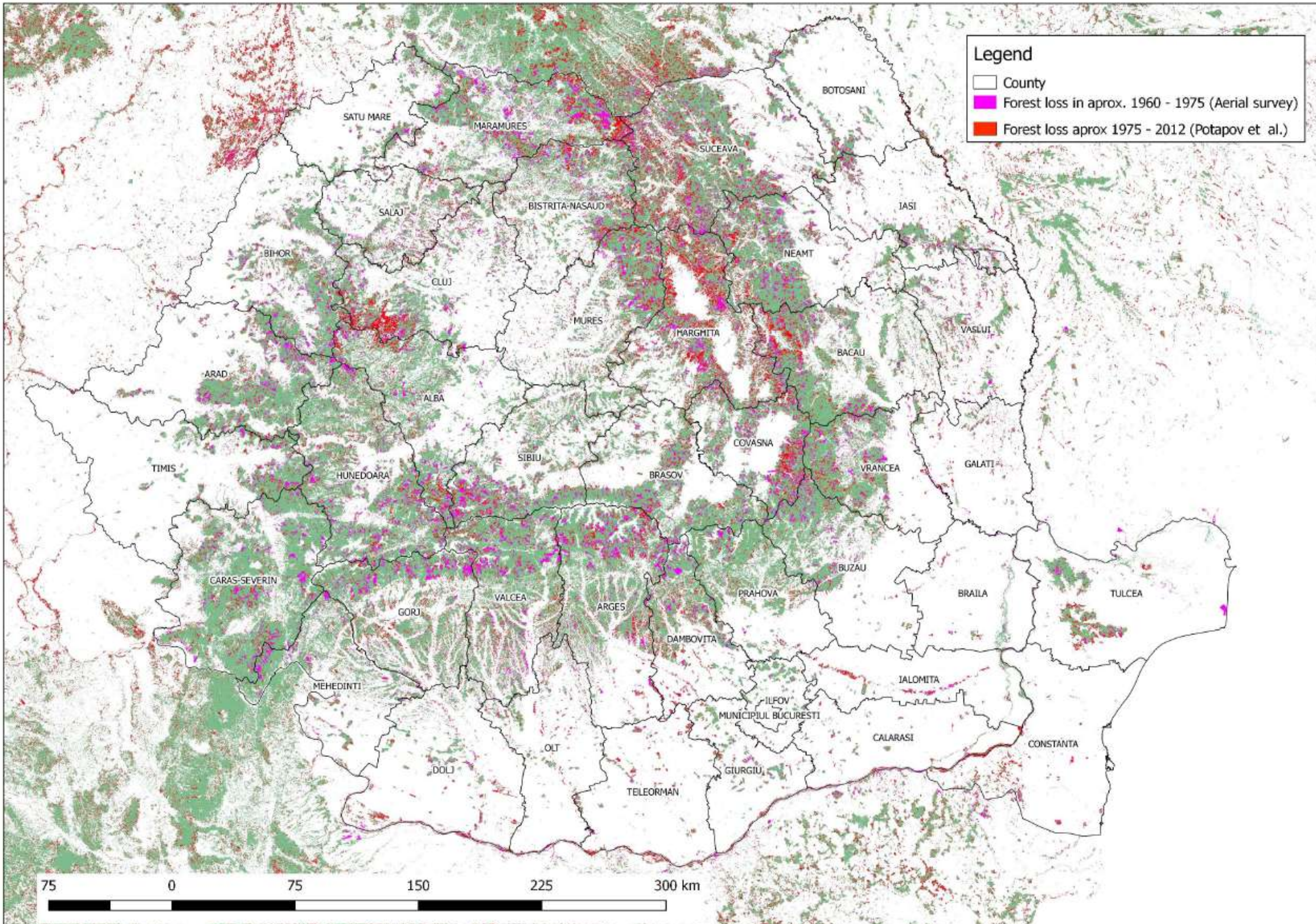



A
0
0.5
1
2 Kilometri

A


629.7 ha
1090.8 ha
43.3 ha
11.1 ha
4.7 ha
4.9 ha
108.7 ha
14.5 ha
0 0.5 1 2 Kilometri

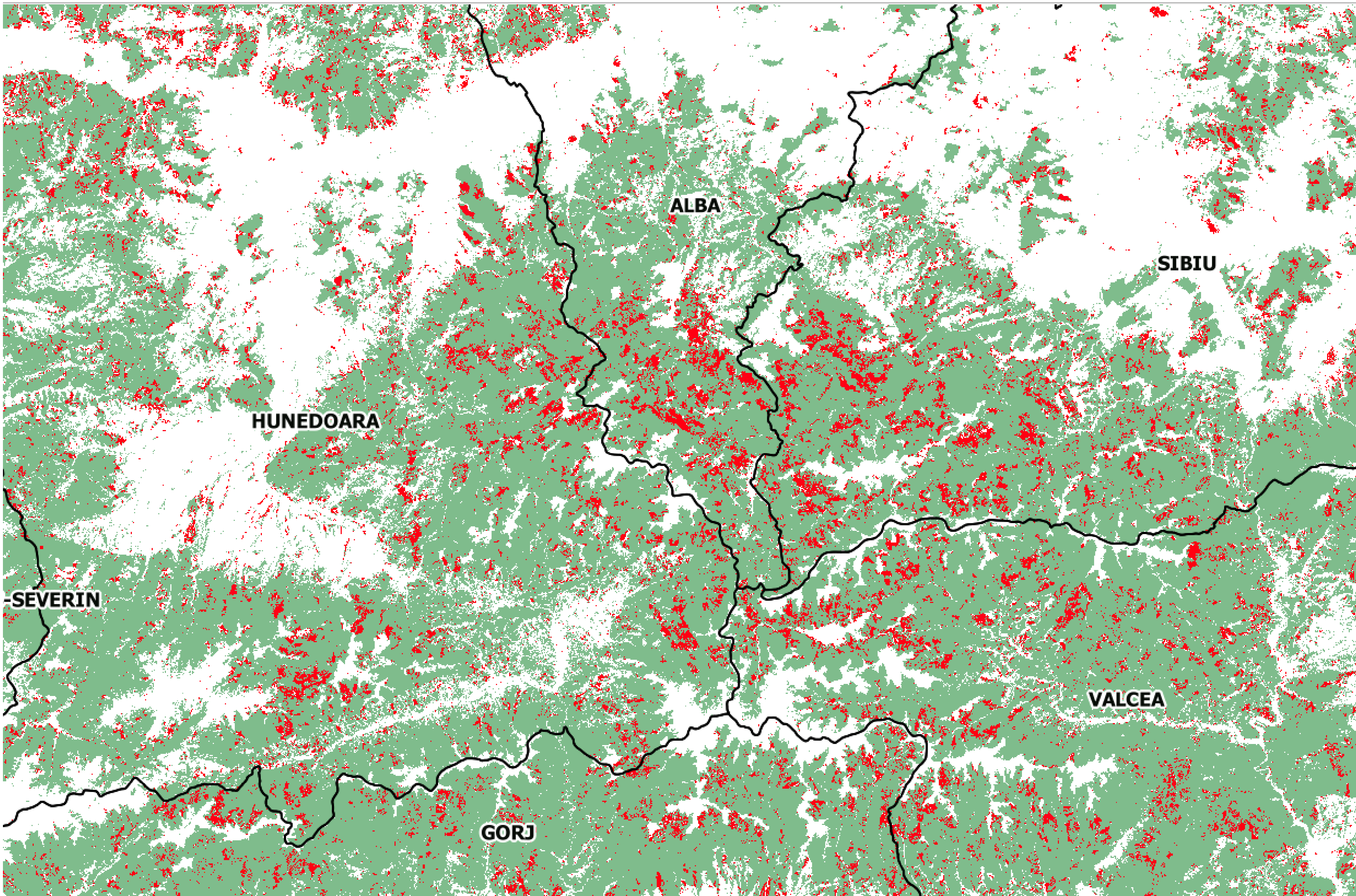
Results



Legend
County
Forest loss in aprox. 1960 - 1975 (Aerial survey)
Forest loss aprox 1975 - 2012 (Potapov et al.)
SATU MARE
MARAMURES
BOTOSANI
SUCEAVA
SALAJ
BISTRITA-NASAUD
IASI
BIHOR
NEAMT
CLUJ
MURES
HARGHITA
VASLUI
BACAU
ARAD
ALBA
COVASNA
TIMIS
SIBIU
GALATI
HUNEDOARA
BRASOV
VRANCEA
BUZAU
CARAS-SEVERIN
VALCEA
PRAHOVA
BRAILA
TULCEA
GORJ
ARGES
DAMBOVITA
MEHEDINTI
IALOMITA
ILFOV
MUNICIPIUL BUCURESTI
CALARASI
CONSTANTA
OLT
DOLJ
GIURGIU
TELEORMAN
75
0
75
150
225
300 km

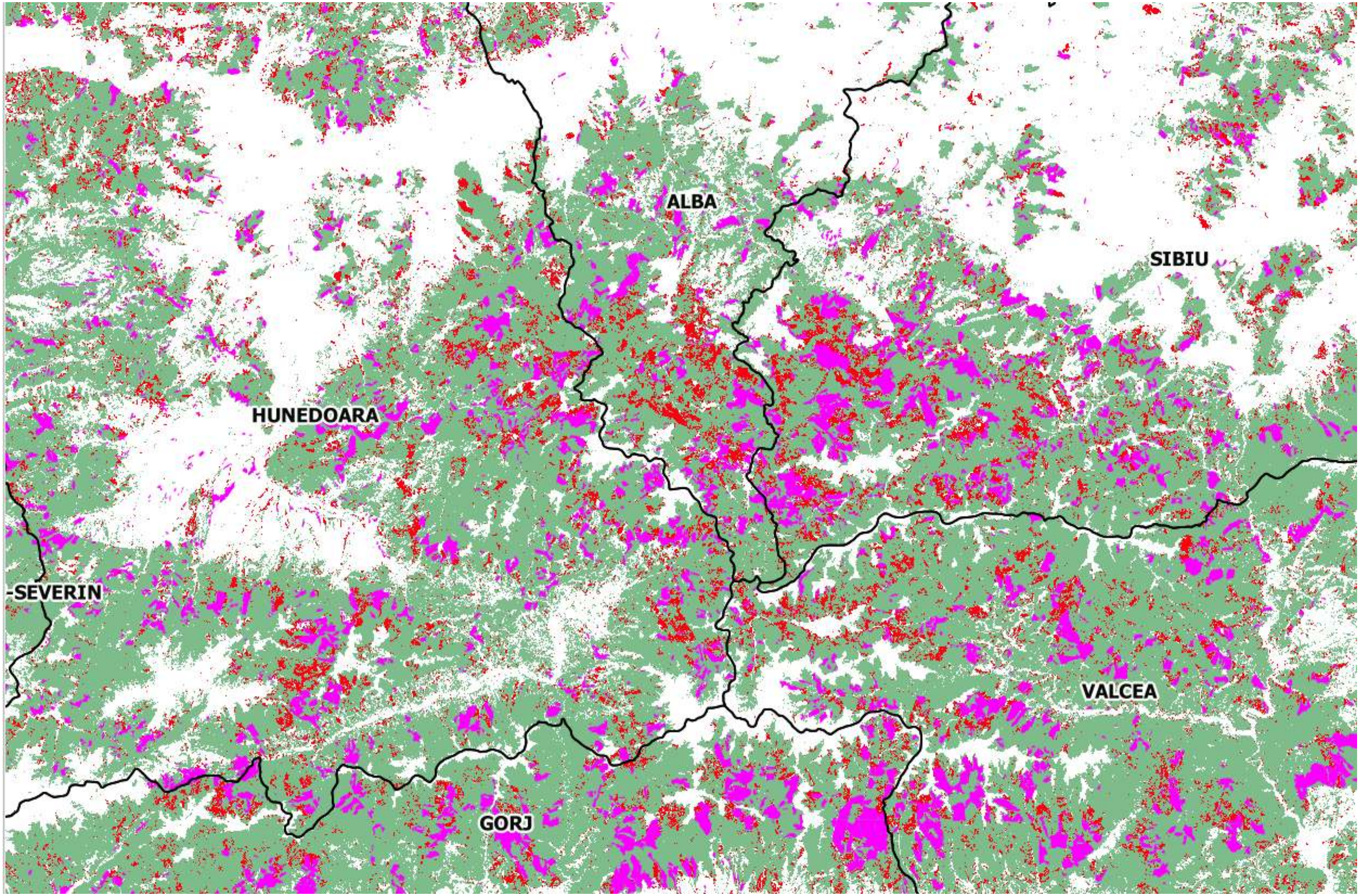
Results

1980 - 2012



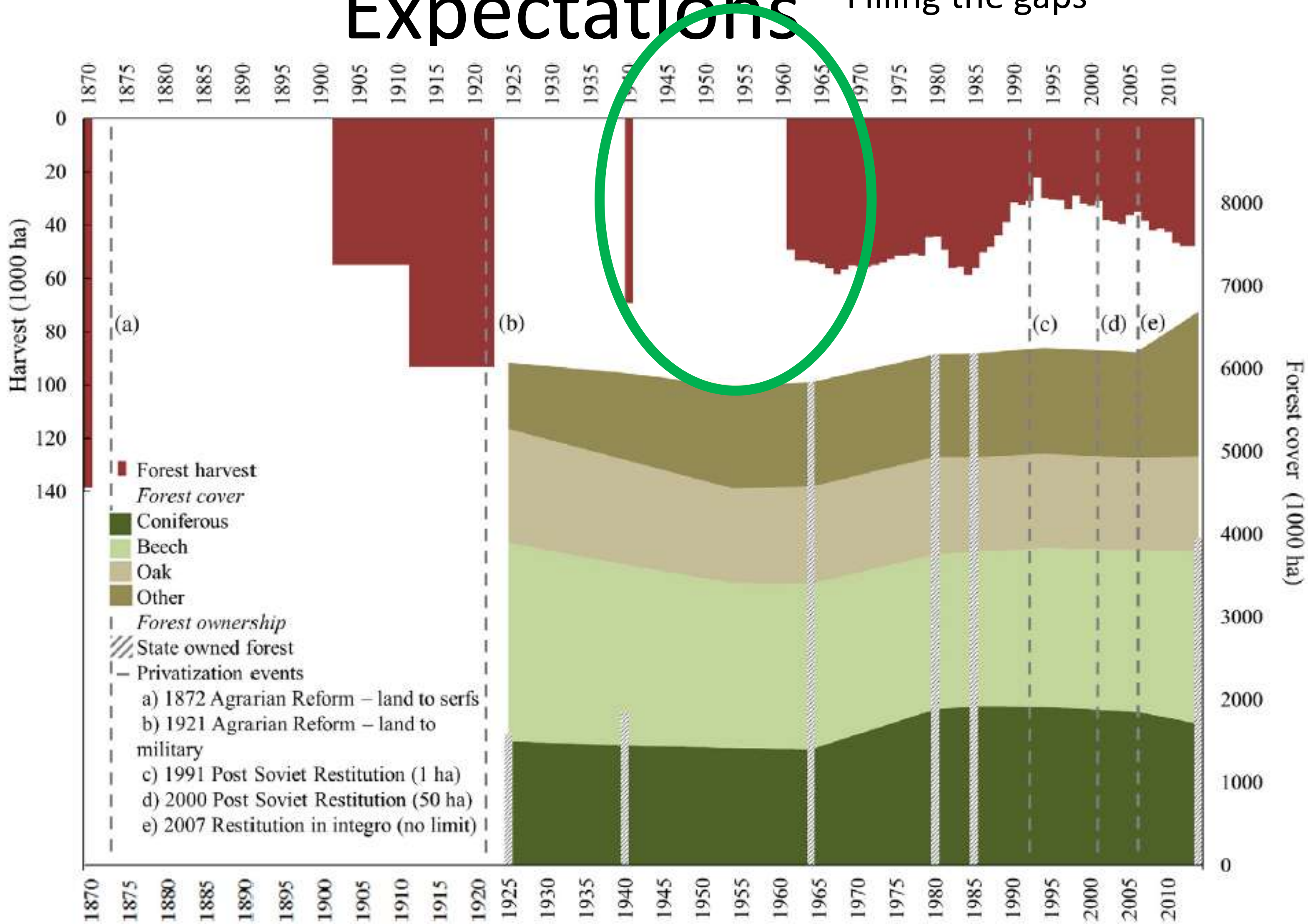
Results

1960 - 2012



Expectations

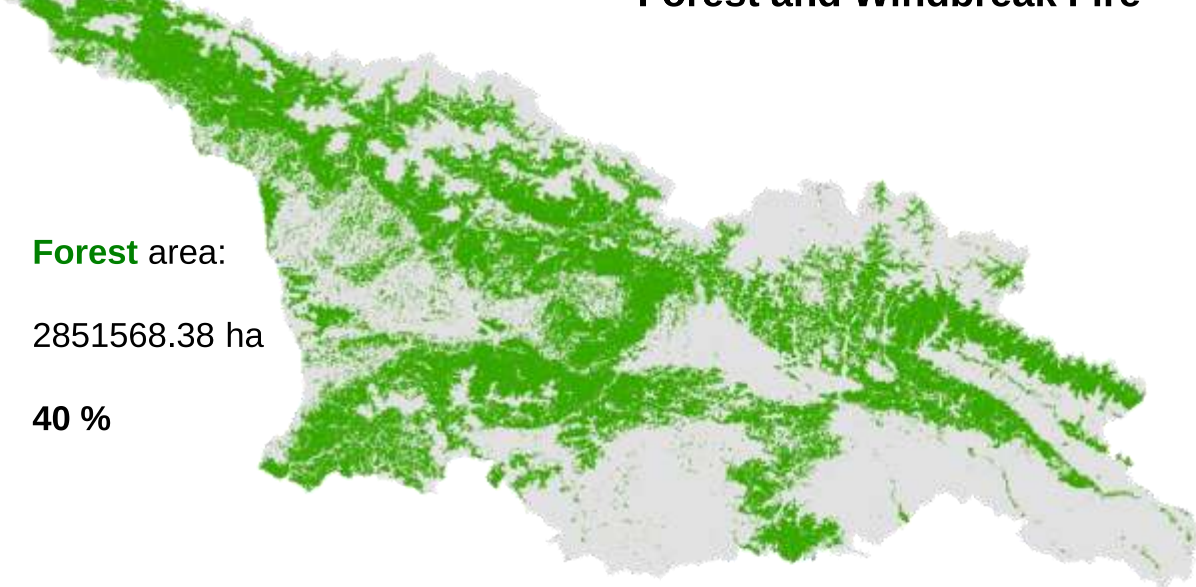
Filling the gaps



Overview of the evolution of forest cover, species composition, disturbance and ownership patterns in Romania between 1870s and 2010, in the context of major land tenure changes (Munteanu et al, 2016)

GEORGIA

Forest and Windbreak Fire

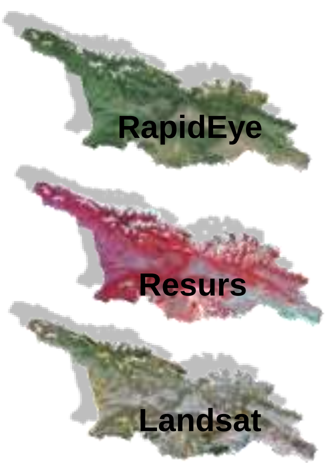


Forest area:

2851568.38 ha

40 %

SATELLITE IMAGES

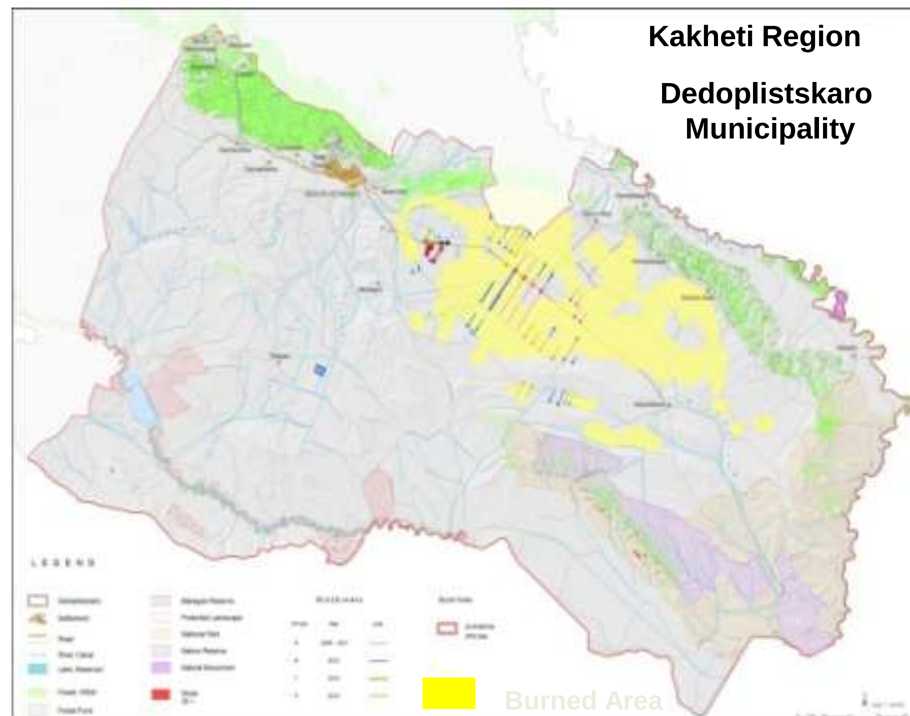


The MODIS burned area product

was downloaded, free of charge,

as Shapefiles from the server:

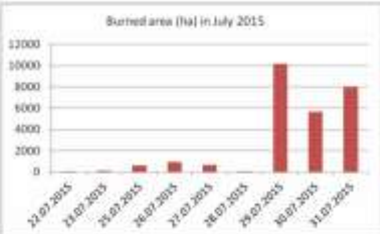
http://modis-fire.umd.edu/index.php



Map Made for GIZ

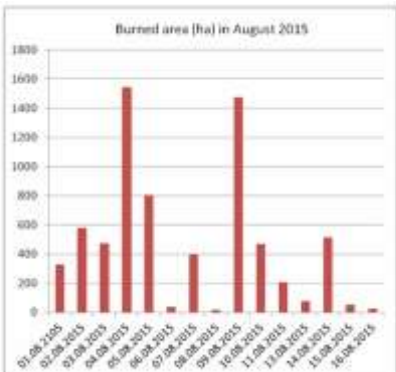
The MODIS burned area product
Fire and Burned area

Burned area July 2015



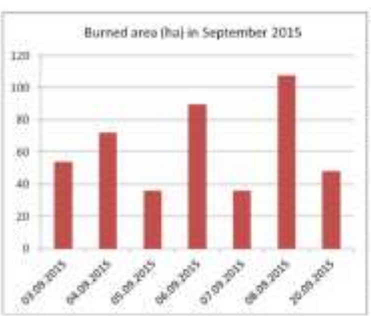
Date of burning	Burned area (ha)
22.07.2015	53.87
23.07.2015	107.74
25.07.2015	608.49
26.07.2015	938.78
27.07.2015	683.26
28.07.2015	71.9
29.07.2015	10186.12
30.07.2015	5659.92
31.07.2015	8080.63
Sum	26302.74

Burned area August 2015



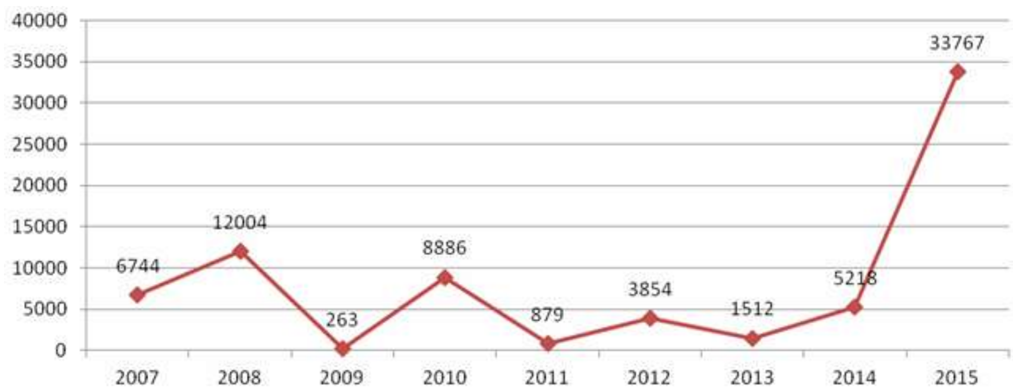
Date	Burned area (ha)
01.08.2105	326.68
02.08.2015	576.83
03.08.2015	474.78
04.08.2015	1541.74
05.08.2015	804.22
06.08.2015	36.82
07.08.2015	402.47
08.08.2015	17.98
09.08.2015	1473.95
10.08.2015	468.44
11.08.2015	208.2
13.08.2015	77.02
14.08.2015	513.21
15.08.2015	53.94
16.08.2015	26.84
Sum	7021.09

Burned area September 2015



Date	Burned area (ha)
03.09.2015	53.98
04.09.2015	71.97
05.09.2015	35.93
06.09.2015	89.83
07.09.2015	35.94
08.09.2015	107.82
20.09.2015	48.01
Sum	443.48

Map Made for GIZ



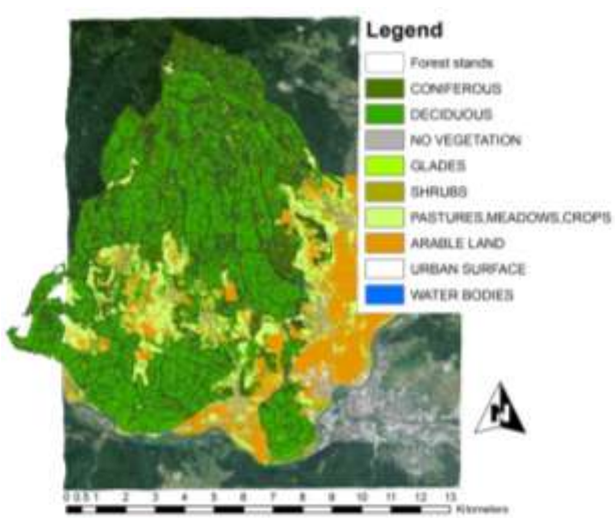
Annually burned area in hectare

HUMAN IMPACT ON THE LAND COVER CHANGE IN UNIVERSITY FOREST ENTERPRISE IN ZVOLEN

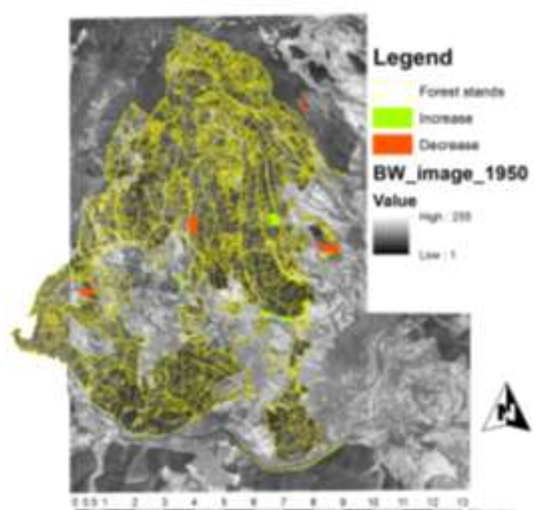
Sitko R. – Merganičová M. – Merganič J. – *Sitková Z. – Mistrík M.
Technical University in Zvolen, *National Forest Center, Zvolen, SLOVAKIA

Goal:
Assessment of land cover change in the selected region (11 000 ha) surrounded by famous mining towns of the past

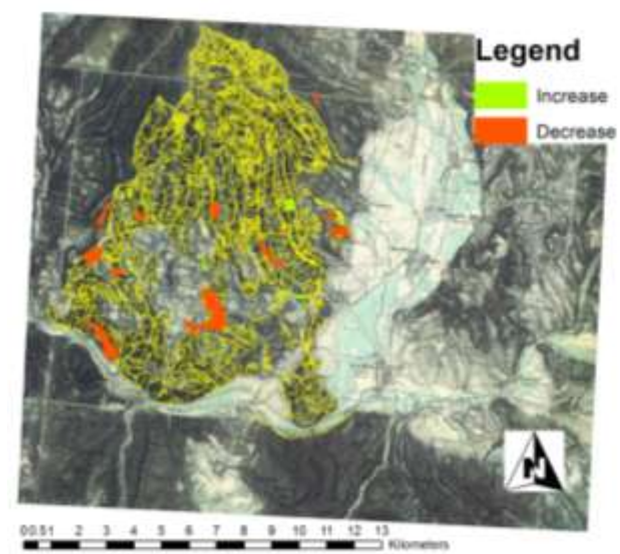
Methods:
Retrospective analysis of historical orthoimages and historical maps (supervised classification, method of image regresion and visual interpretation)



2012 - LC classification (World View-2)



2012/1978 and 1978/1950 change detection

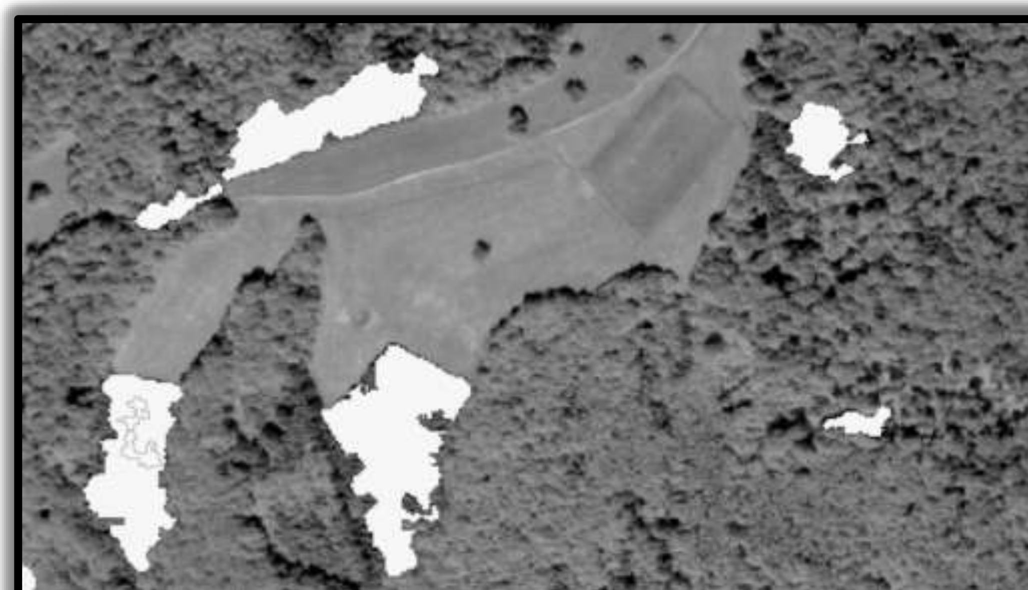


1950/1846 change identification

Preliminary results:

- At the end of 18th century, the deforested areas occurred mainly around villages (demand on wood for mining)

- Forest expansion in second half of 20th century (abandonment of farmlands)



SCERIN-4 Capacity Building Workshop
Zvolen, Slovakia, July 19-22, 2016

INLAND EXCESS WATER MAPPING USING RAPID EYE IMAGES

Mészáros Minucsér,

Department of Geography, Tourism and Hotel Management

Faculty of Sciences,

University of Novi Sad

Inland excess water occurs due to:

- lack of runoff in flat terrains
- insufficient evaporation
- low infiltration capacity of the soil
- upwelling of ground water

Typical problem in flat, lowlands causing:

- crop losses, damages, diseases
- soil and evironmental pollution
- damage to buildings and infrastructure

The scale and wider social implications of these problems are not fully recognized by the public or decision makers!

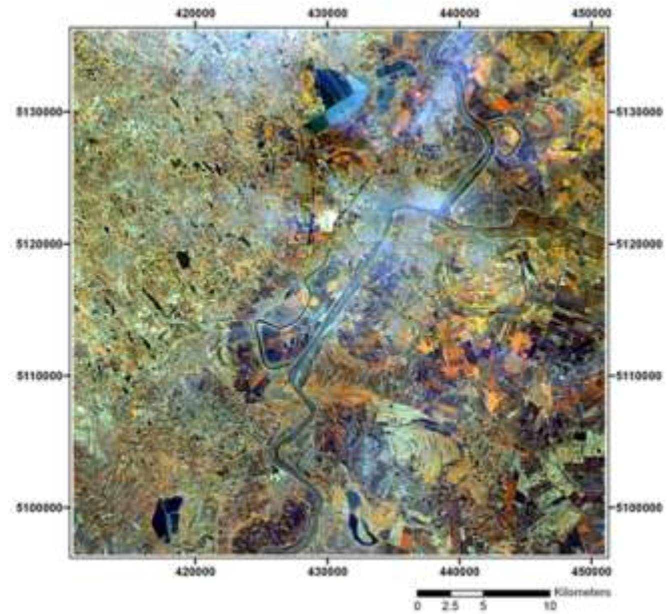
The solution requires:

- intensive monitoring (remote sensing)
- interdisciplinary research of spatio-temporal patterns
- integrated, cross border water management
- land use management

Monitoring of inland excess water:

- inundated areas are inaccessible
- very limited ground measurement
- inundated areas change rapidly
- need for a quick and efficient assesment

Research area (northern Serbia, southern Hungary)

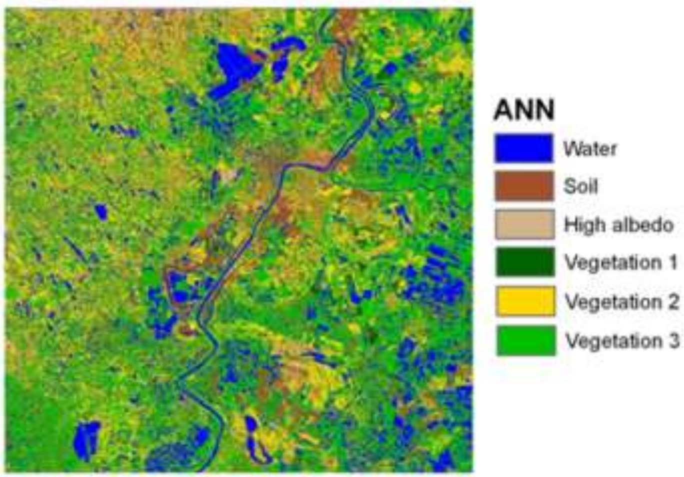


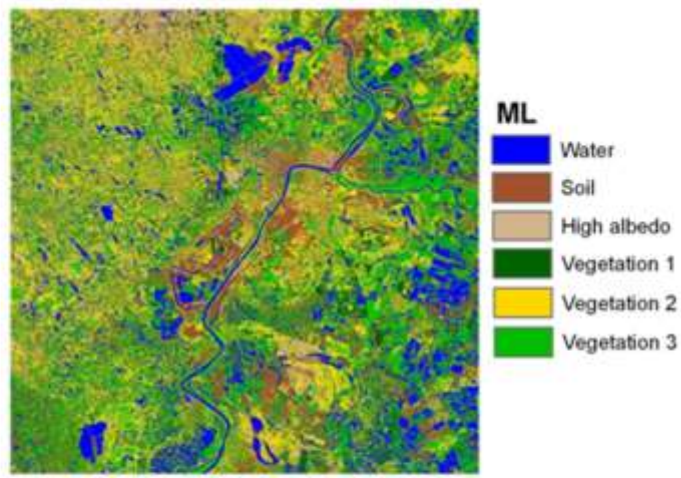
MEasurement, monitoring, management and **RI**sk assessment of inland **EX**cess **WA**ter in South-East Hungary and North Serbia (Using remotely sensed data and spatial data infrastructure)

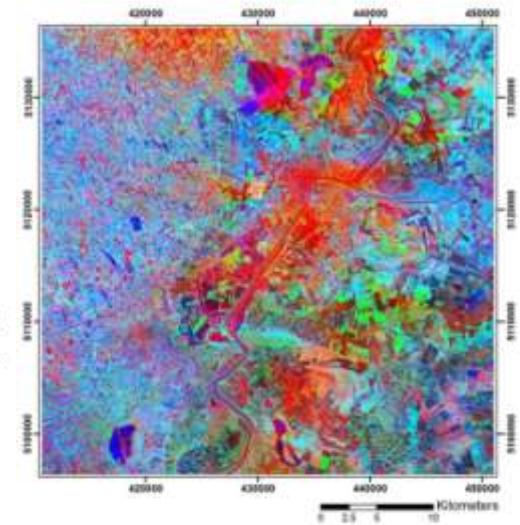
MERIEXWA
Hungary-Serbia
IPA Cross-border Co-operation Programme
The project is co-financed by the European Union

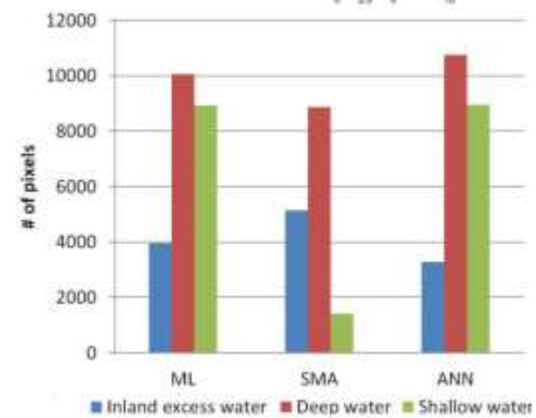
Methods of pixel classification used:

- maximum likelihood (ML)
- spectral mixture analysis (SMA)
- artificial neural network (ANN)









All three methods can be applied to classify inland excess water successfully and provide high quality maps of the inundations based on satellite data from a large area.

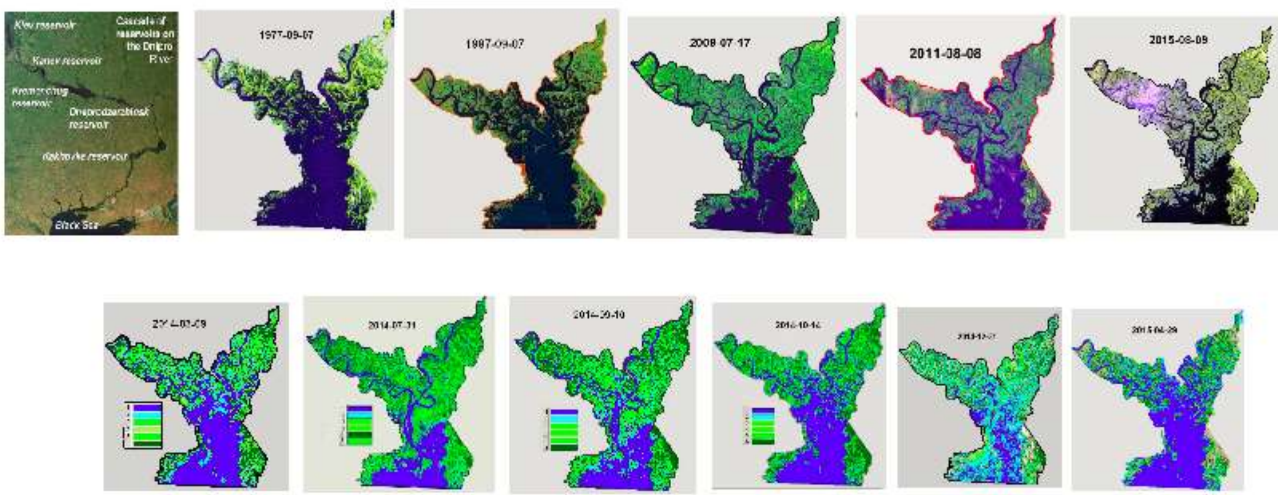
van Leeuwen et al. (2013) Inland excess water mapping using rapid eye images, Journal of Environmental Geography 6 (1–2), 1–8.

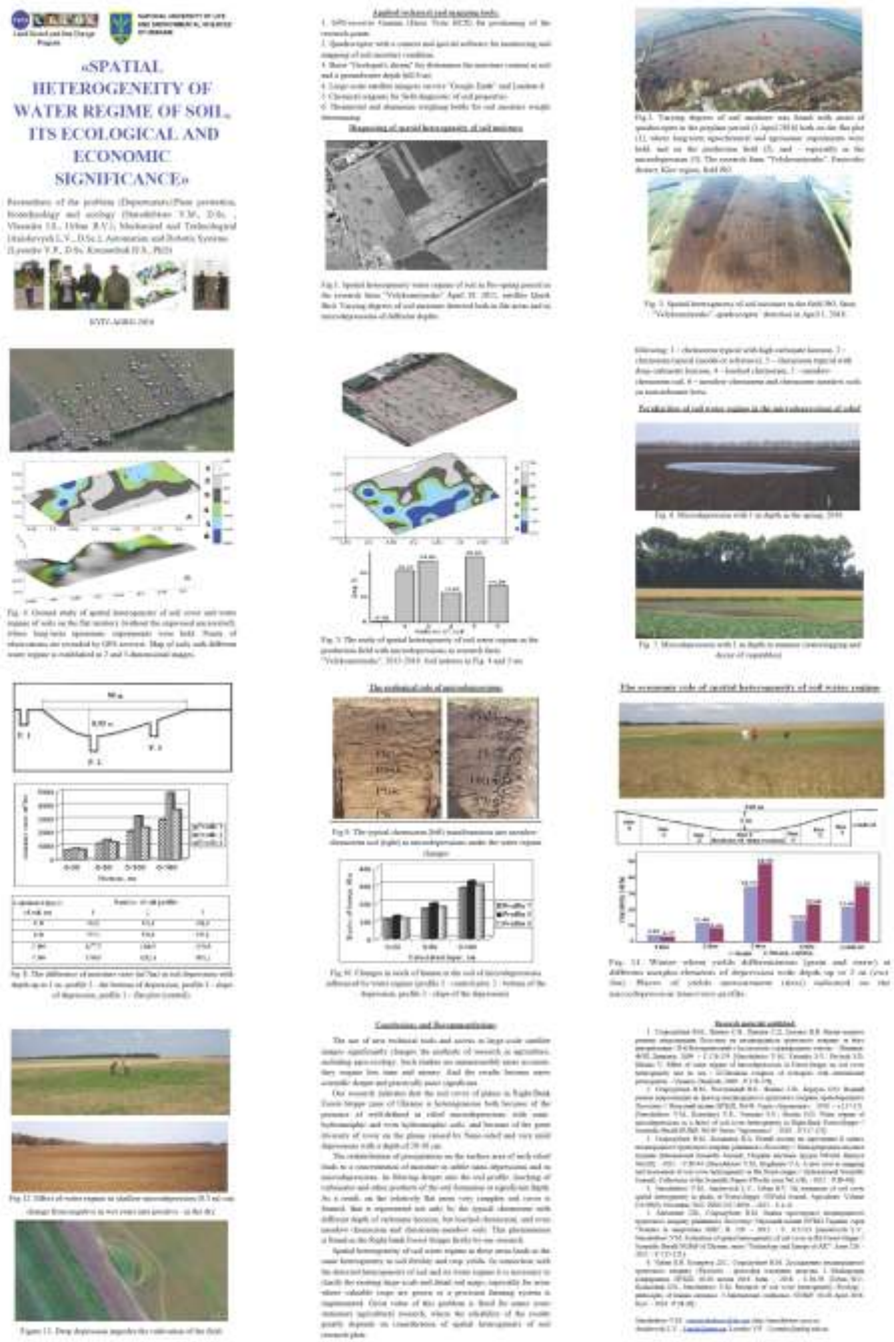
NEW LANDSCAPES FORMATION IN WATER RESERVOIRS: GLOBAL ASPECT

Starodubtsev V.M.

National University of Life and Environmental Sciences of Ukraine

1. Kiev reservoir in the Dnieper river basin: Perennial and seasonal dynamics of new landscapes



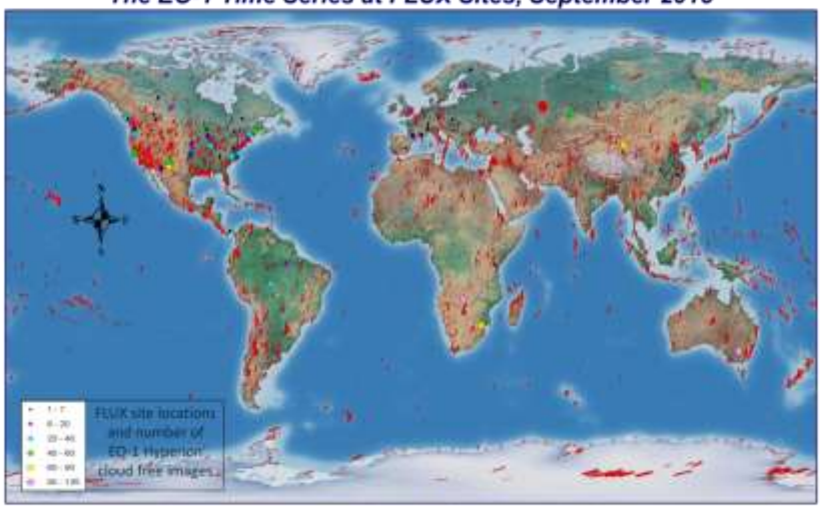

«SPATIAL HETEROGENEITY OF WATER REGIME OF SOIL, ITS ECOLOGICAL AND ECONOMIC SIGNIFICANCE»

‘Flexible’ spectral time series for product validation and assessment of ecosystem productivity and bio-diversity

Summary of two posters, Campbell et al.

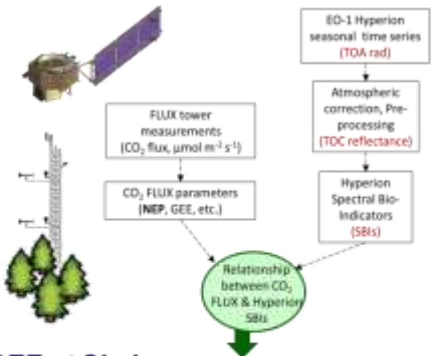
We use high spectral resolution images capturing the corresponding changes in multiple vegetation parameters or <u>*traits.*</u>

The EO-1 Time Series at FLUX Sites, September 2015



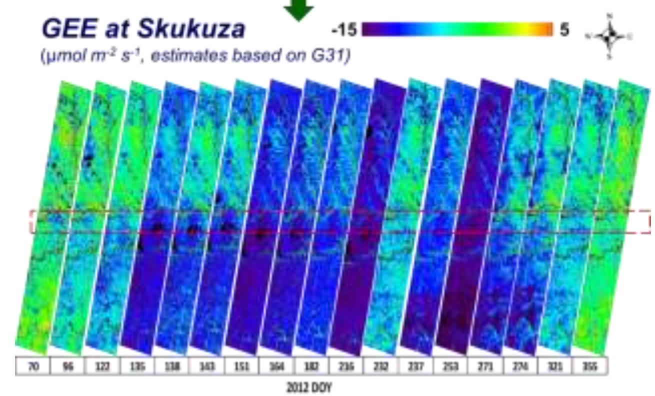
The Earth Observing One (EO-1) was launched in November 2000. As of September 2015 more than 85,000 Hyperion images have been collected. Hyperion has demonstrated the utility of satellite imaging spectroscopy for vegetation monitoring in applications relating to forestry, agriculture, land-use change, biodiversity, natural and anthropogenic hazards and disaster assessments. Numerous time series have been collected for select FLUX sites, which are freely available for download from USGS (http://earthexplorer.usgs.gov/).

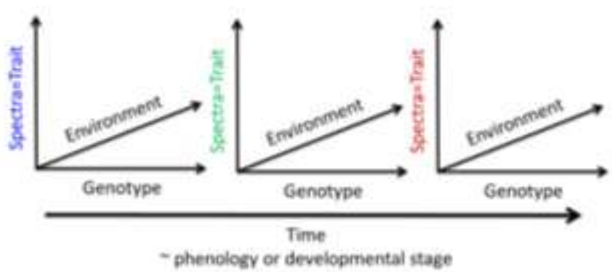
Data Collection and Processing



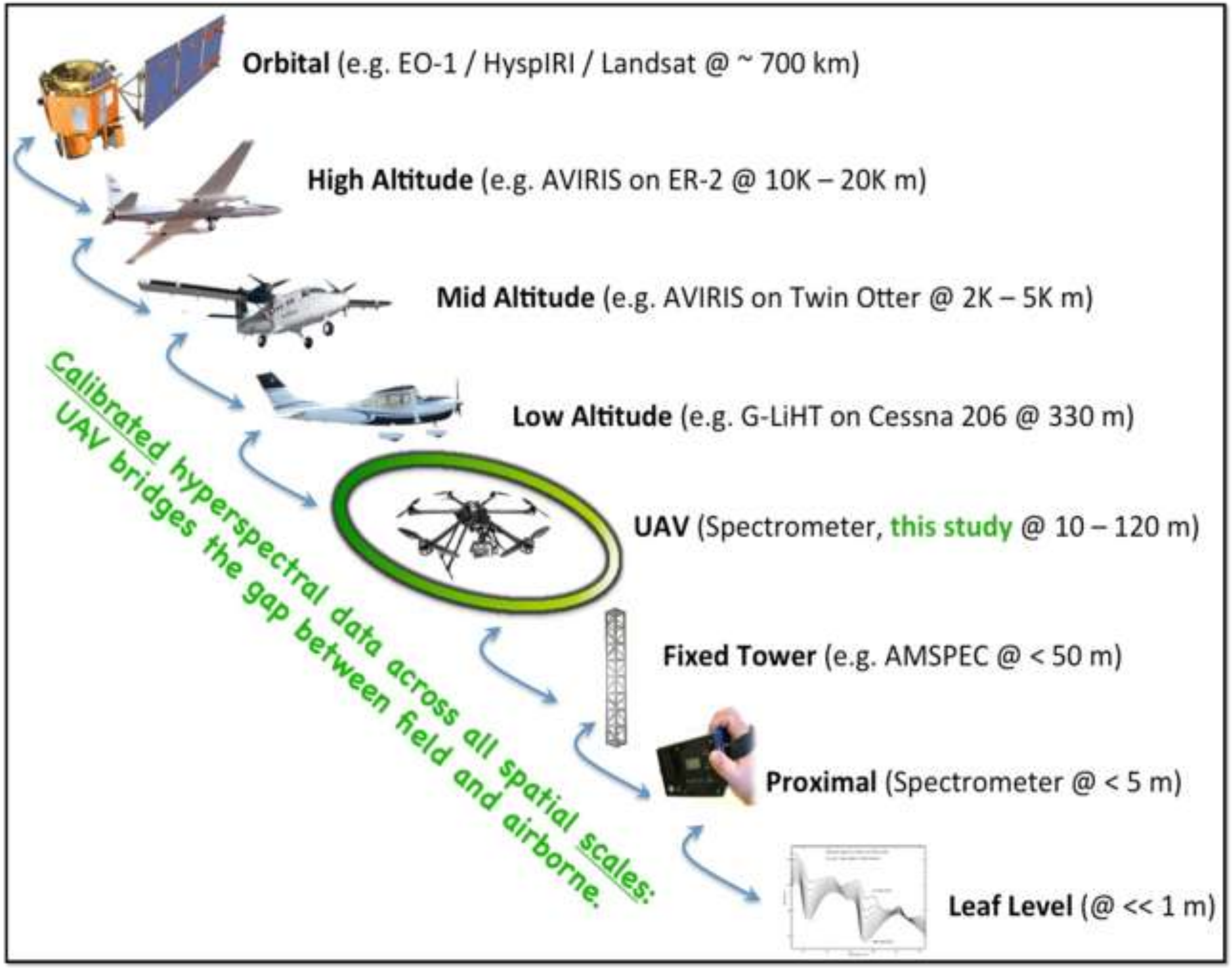
GEE at Skukuza

(μmol m^{-2} s^{-1}, estimates based on G31)





- Traits/spectra vary over the course of a day and/or a growing season



Seasonal dynamics in vegetation traits

Seasonal and diurnal dynamics in vegetation traits

Diurnal dynamics in vegetation traits

Spectral observations are required at all spatial scales, to bridge the gap and connect in situ with airborne and space observations and improve the monitoring of vegetation dynamics.

Additional Posters

- Ganna