

GMES contribution
to the improvement
of the environmental status assessment
in Bulgaria

Ivanka Todorova
Executive Environment Agency



25-26 March 2010, Sofia

Main policy areas

- Soil thematic strategy/Sustainable Land Management
- Water Frame Directive
- Management of Natura 2000 sites
- Integrated Coastal zones management
- Forest Management
- UN ECE Long Range Transboundary Air Pollution
- UN Framework Convention on Climate change and Kyoto Protocol
- UN convention for Combat Desertification
- Common Agricultural policy/Rural development and agri-environmental measure
- etc



25-26 March 2010, Sofia

Consolidated user requirements

- Land cover- land use
- Land use changes
- Soil sealing
- Soil erosion
- Coastal zones
- High nature value farming land
- Natura 2000 sites
- River flood
- Forest- aforestation/ deforestation; Forest fire
- Critical loads
- Geology
- Manning waste facilities



25-26 March 2010, Sofia

Main area of implementation- MoEW- ExEA experience

- Corine Land Cover projects
- River floods projects
- Terrafirma project



25-26 March 2010, Sofia

Land cover/ land use

Parameter	CLC1990	CLC2000	CLC2006
Satellite data	Landsat 4/5 TM single date	Landsat-7 ETM single date	SPOT 4 and 5, IRS - dual date
Time consistency	1986-1998	2000 +/- 1 year	2006 +/- 1 year
Geom. accuracy satellite images	≤ 50 m	≤ 25 m	≤ 25 m
Min. mapping unit	25 ha	25 ha	25 ha
CLC data geom. accuracy	100 m	better than 100 m	better than 100 m
Thematic accuracy	≥ 85% (not achieved)	≥ 85% (achieved)	≥ 85%
Change mapping	–	change area ≥ 5 ha; isolated changes ≥ 25 ha	all changes ≥ 5 ha mapped
Production time	10 years	4 years	1,5 years (planned)
Documentation	incomplete metadata	standard metadata	standard metadata
Access to the data	unclear dissemination policy	dissemination policy agreed from the start	free access for all users (CLC vector data)

CLC class	Number of polygons	Area (ha)	Percentage
Artificial surfaces	5 734	558 410	4.97%
Arable land	23 024	5 760 750	51.24%
Forest and seminatural	22 276	4 795 873	42.66%
Wetlands	82	11 399	0.10%
Water bodies	425	116 189	1.03%
TOTAL:	51 541	11 242 652	100,00%



25-26 March 2010, Sofia

78 Images

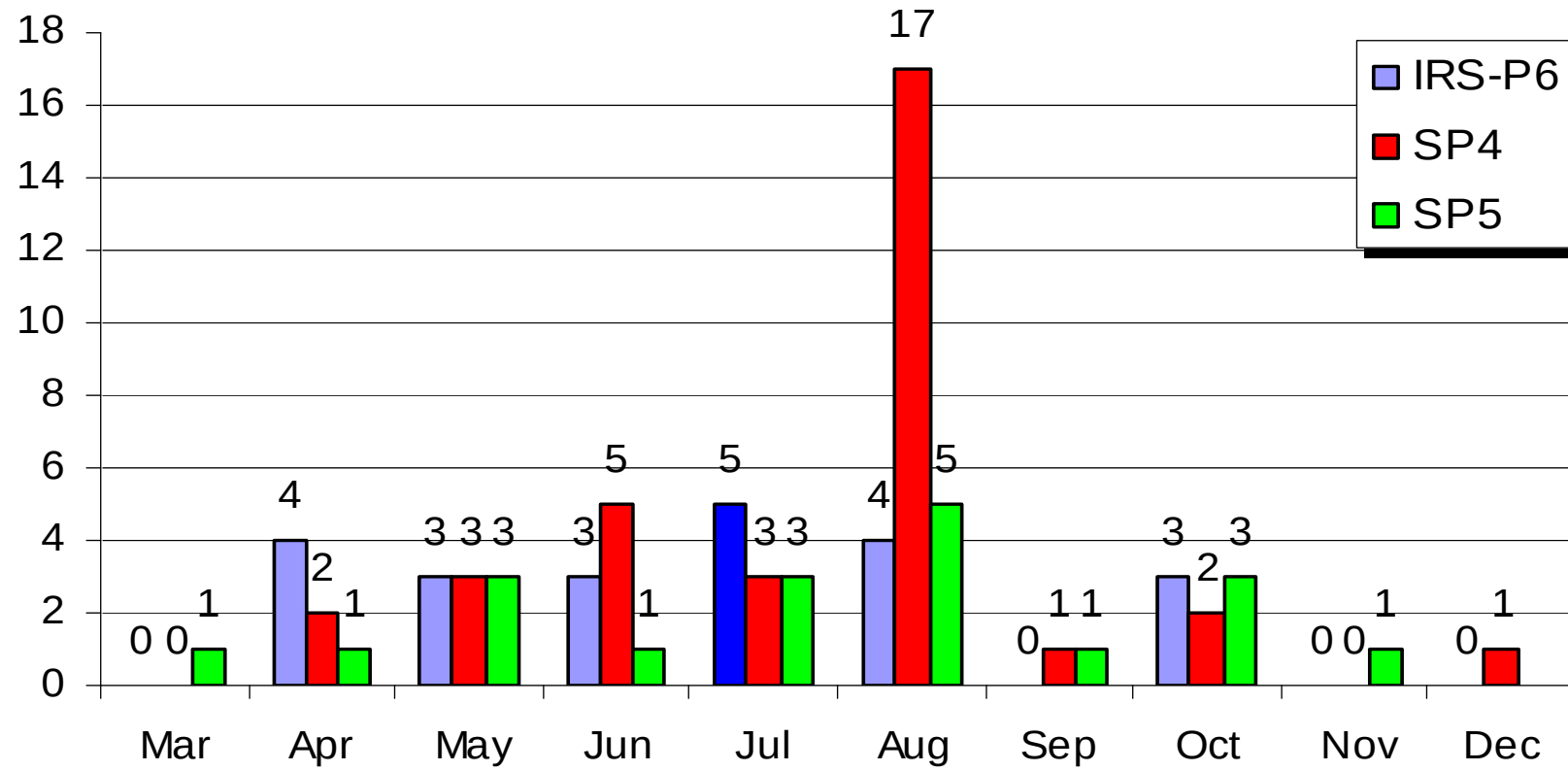
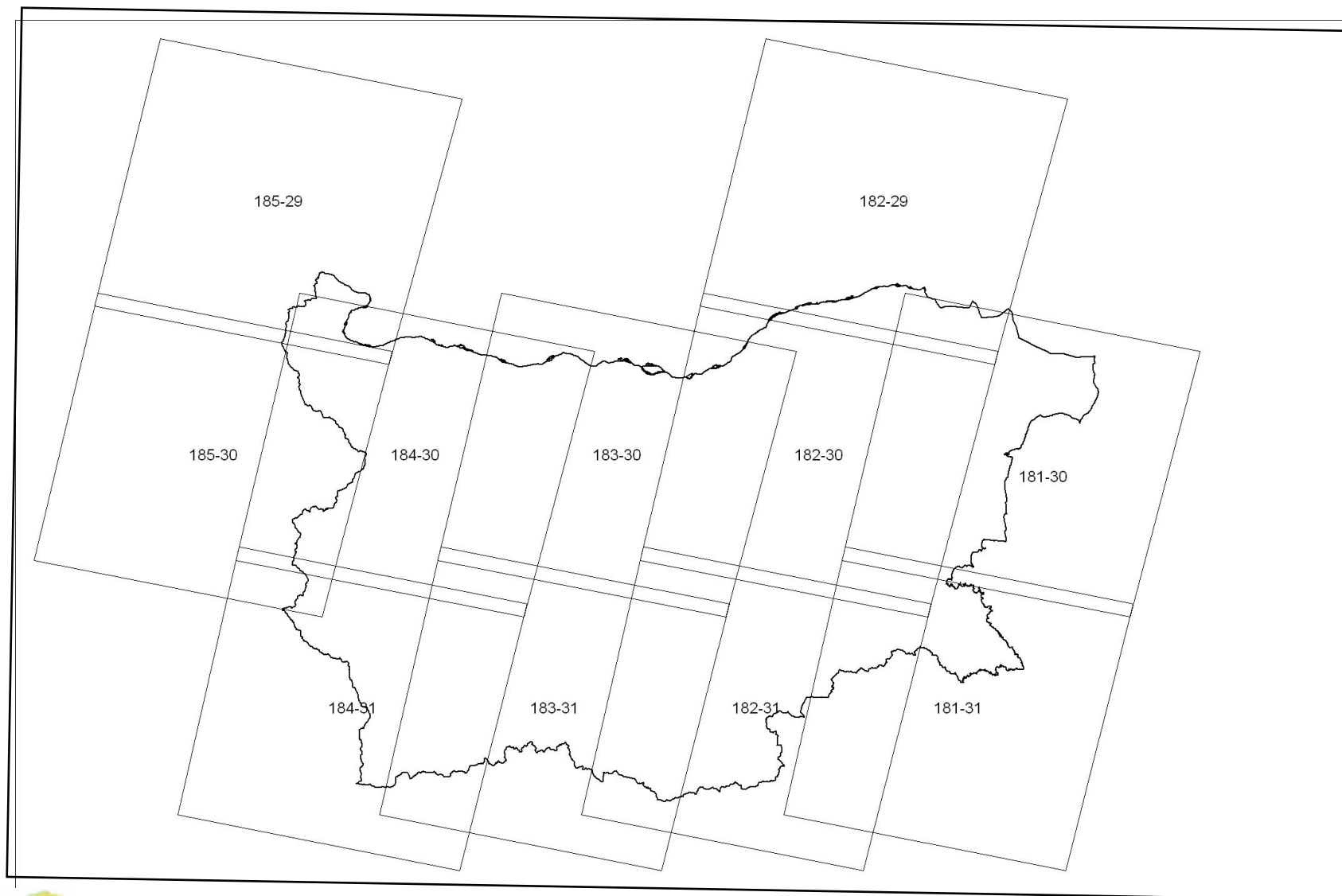


Fig. ... IRS-P6, SPOT4 и SPOT5 сцени - разпределение по месеци



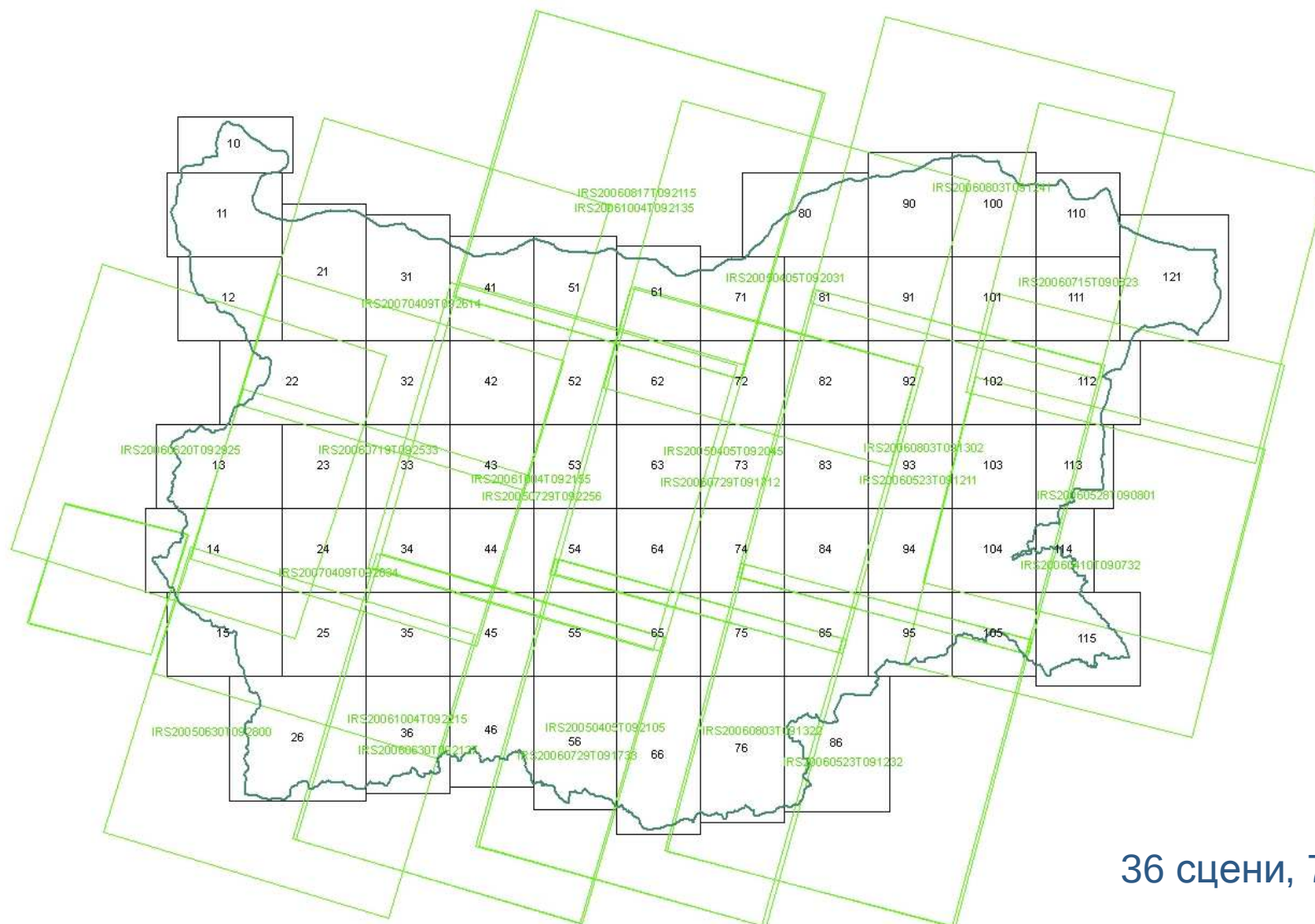
25-26 March 2010, Sofia

Landsat 7 ETM+



25-26 March 2010, Sofia

IRS P6-III cover

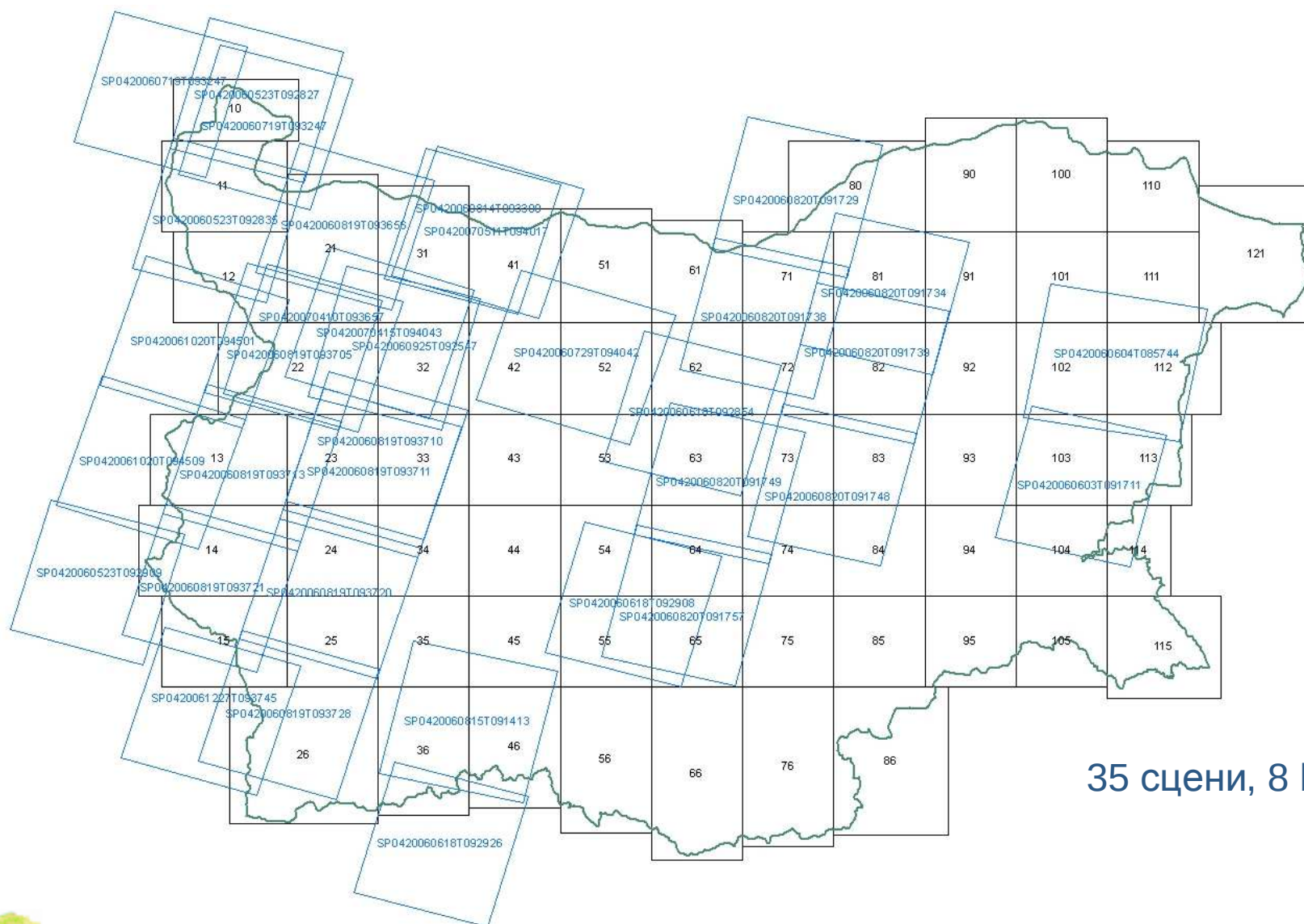


36 сцени, 7 bit



25-26 March 2010, Sofia

SPOT 4 cover

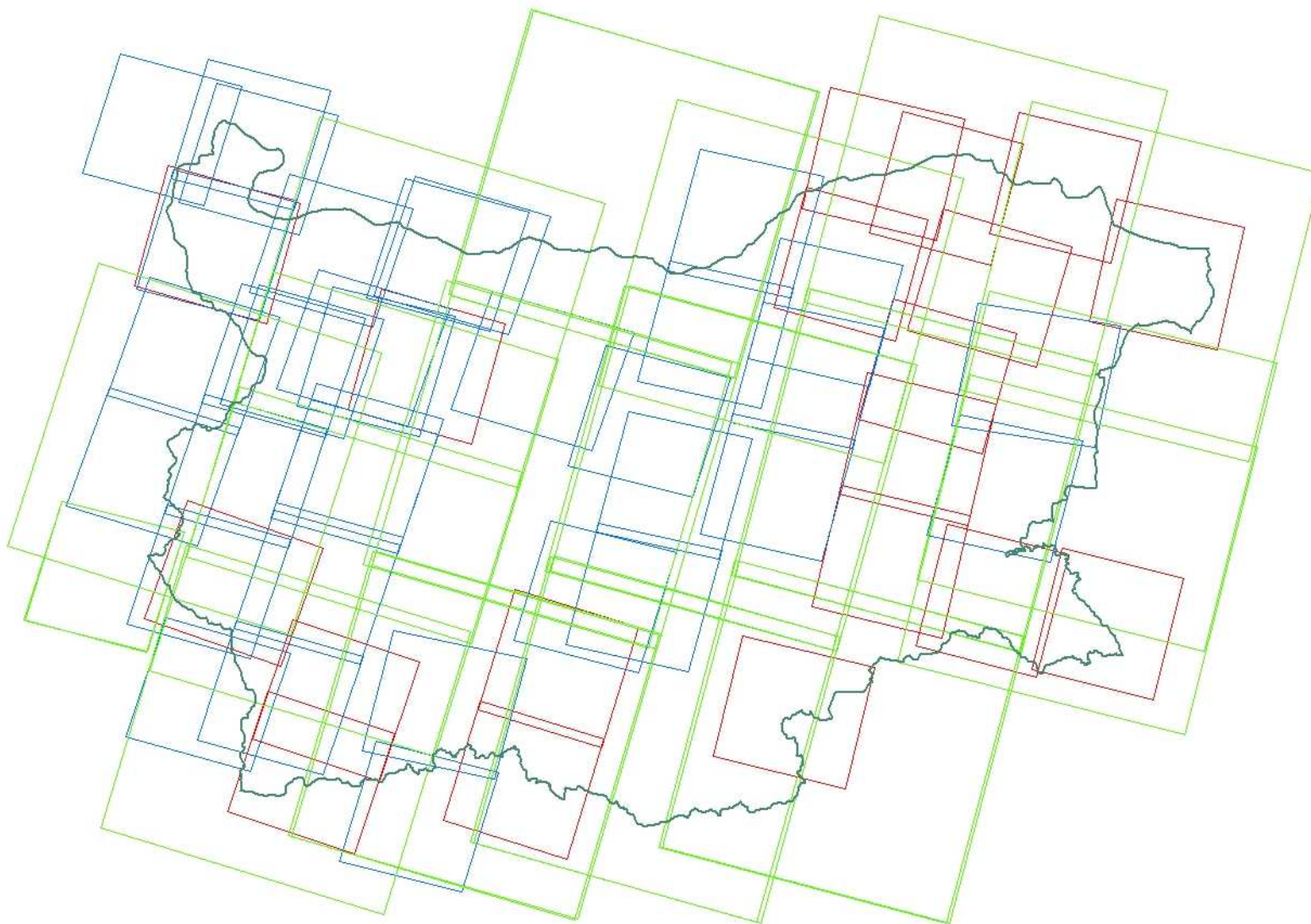


35 сцени, 8 bit



25-26 March 2010, Sofia

IMAGE 2006 Bulgaria



IRS P6-III 24 images, SPOT 4 – 35 images, SPOT 5 – 19 images

25-26 March 2010, Sofia



Additional data

Topographic Maps:

- scale 1:100 000;
- scale 1:50 000;
- scale 1:25 000

Thematically Maps

Air- images

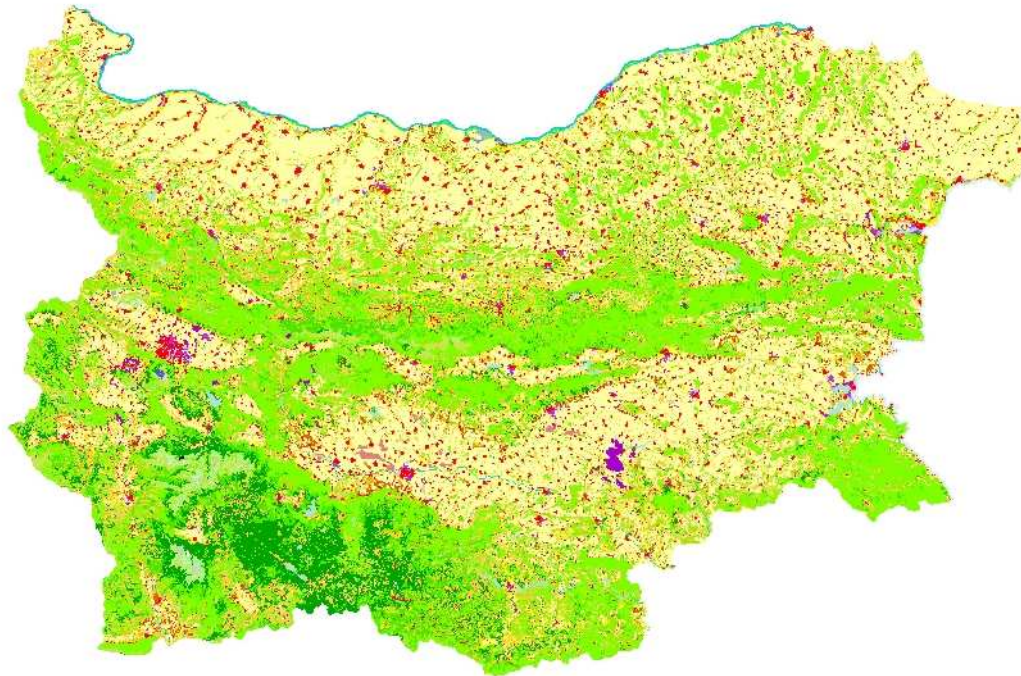
HR satellite images :

- GoogleEarth;
- QwickBird;
- IKONOS;
- EROS-B;
- SPOT 4 and 5;
- KFA1000

Statistical data

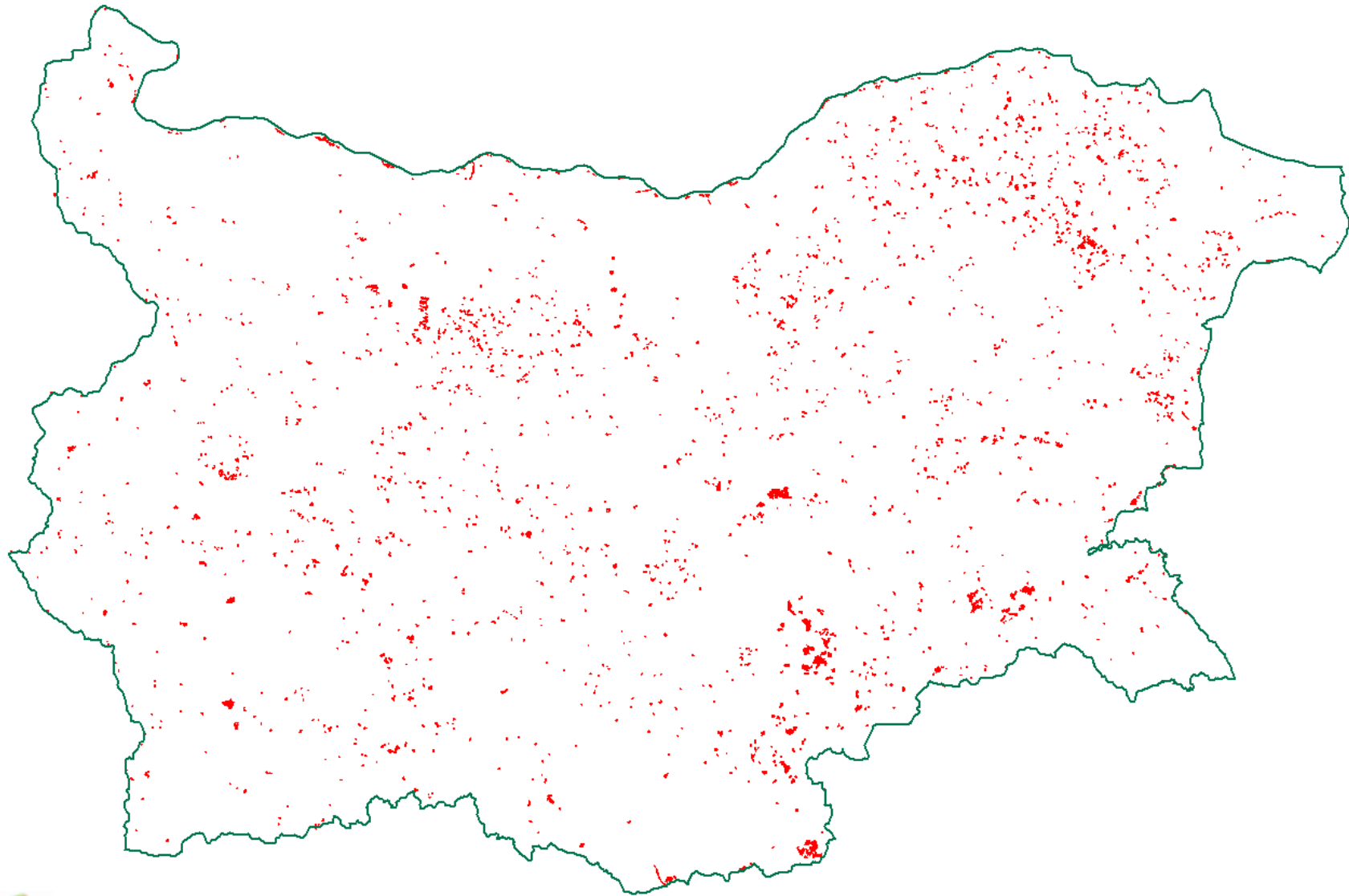


CLC 2006 Bulgaria



25-26 March 2010, Sofia

CLC Changes 2000-2006 Bulgaria

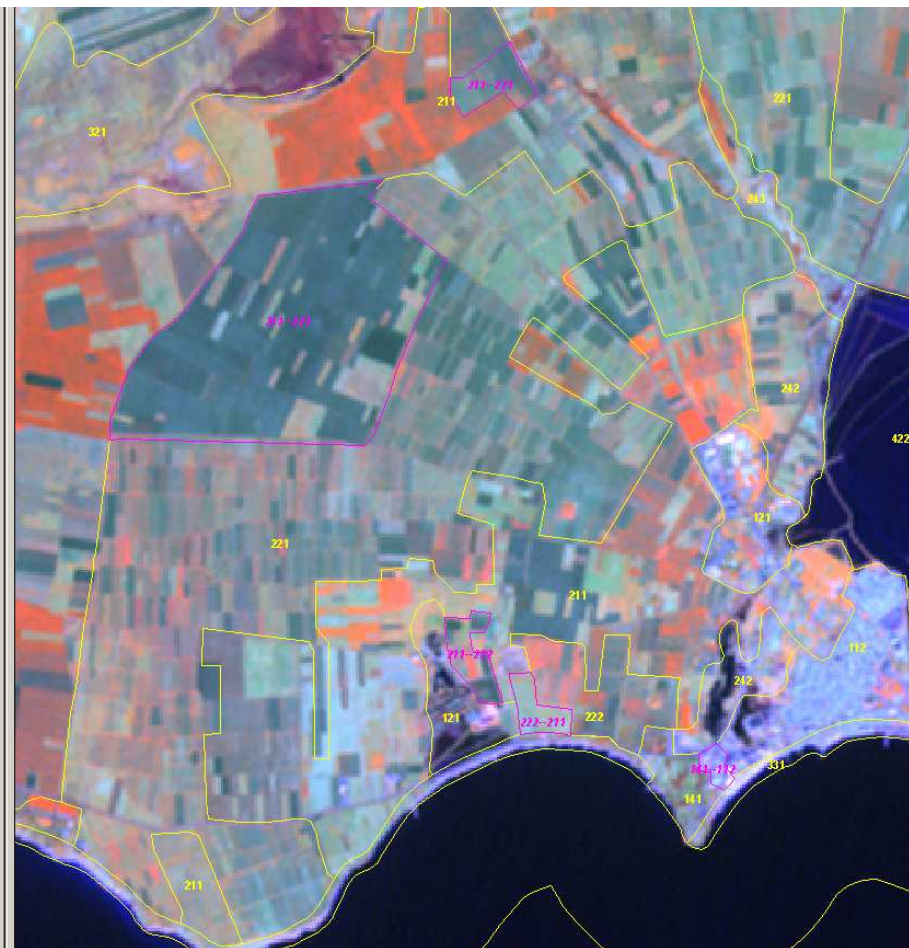


25-26 March 2010, Sofia

2700 polygons

Agricultural lands

Change from cropland to vineyards (211-221)



2000 г./ Pomorie

25-26 March 2010, Sofia

2006/ Pomorie

Agricultural lands

Change from cropland to vineyards (211-221)

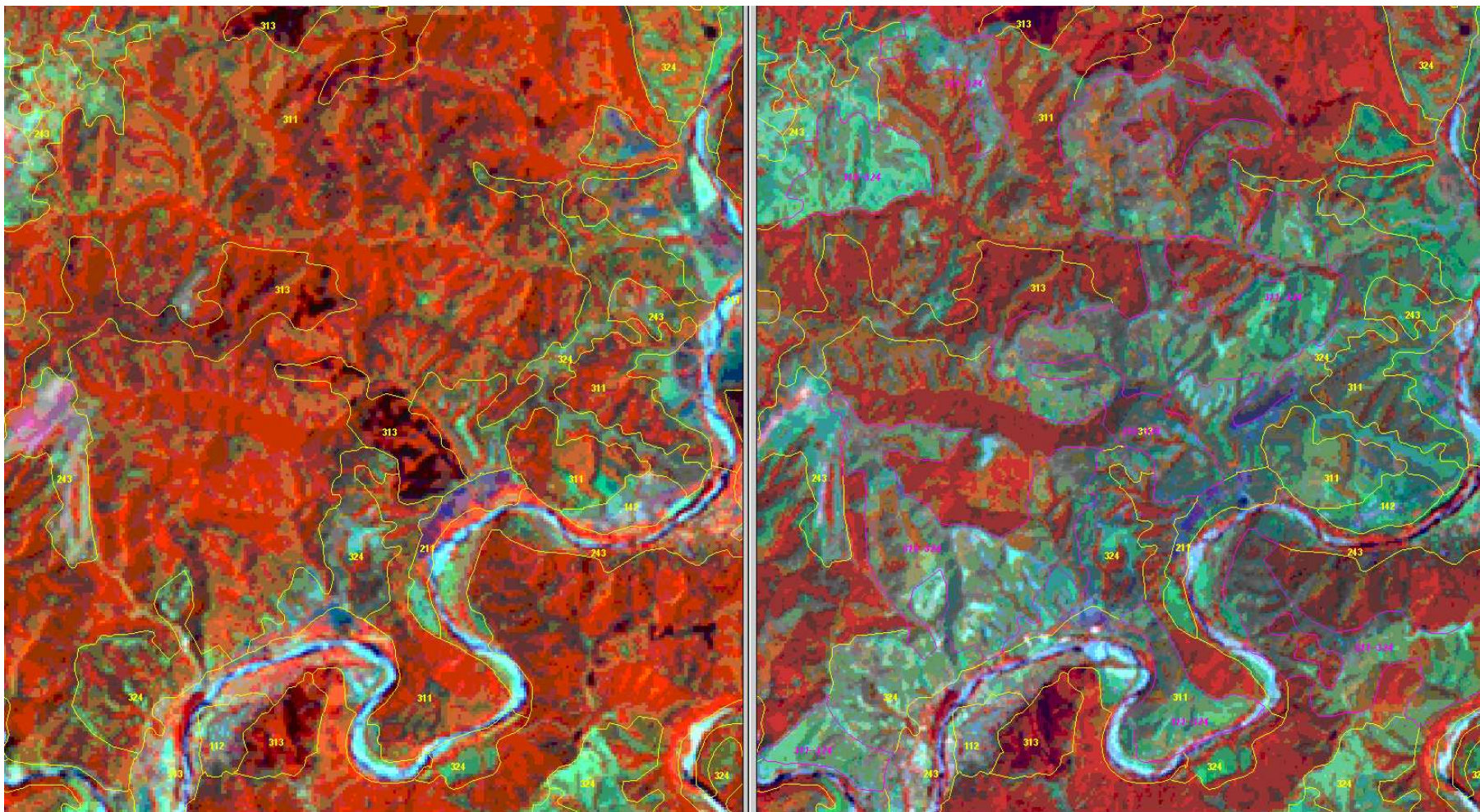


2000 r./ Pomorie

25-26 March 2010, Sofia

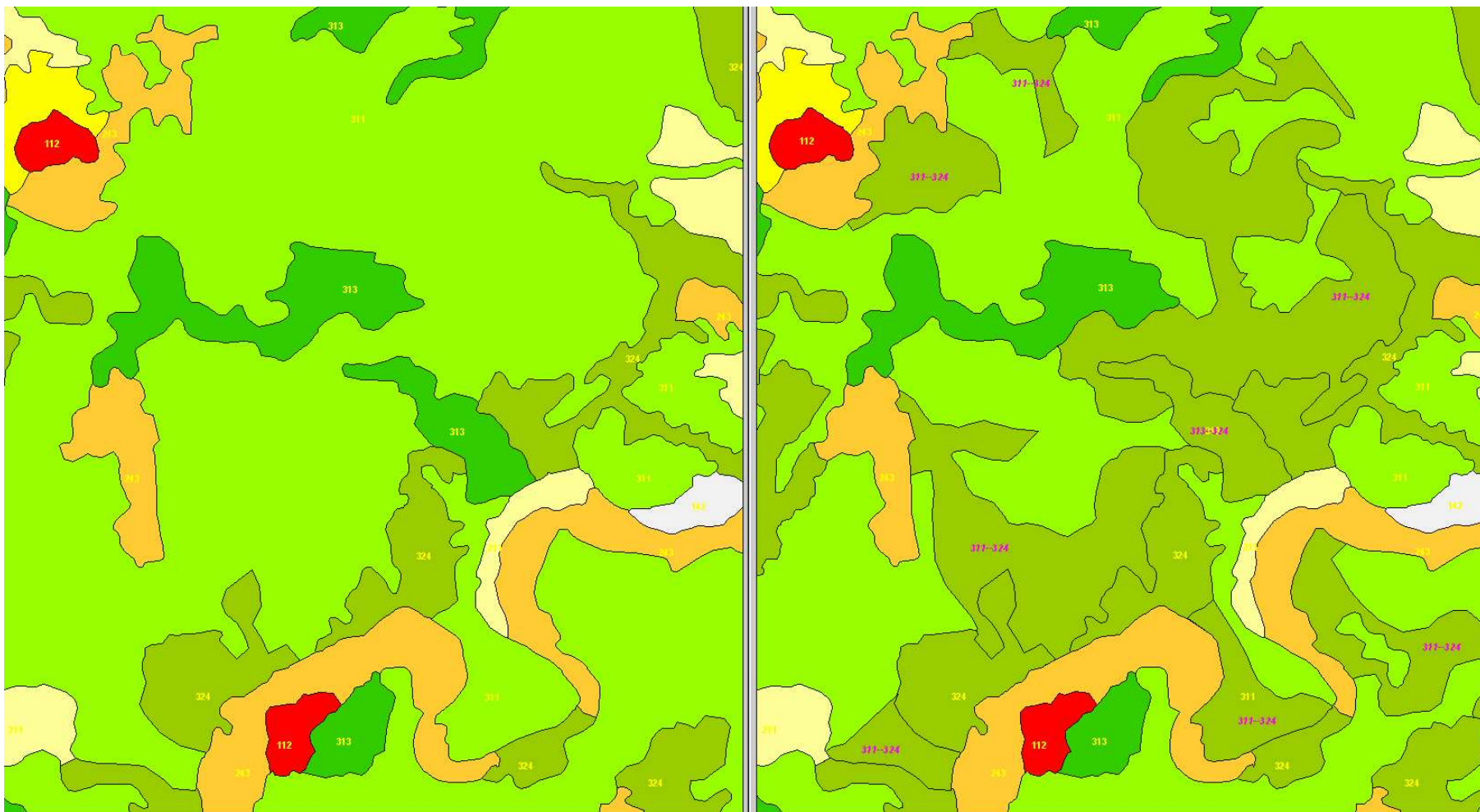
2006/ Pomorie

Deforestation – 1 443 ha (Ivailograd)



Landsat ETM+ /14.06.2006/ March 2010, Sofia **IRS /03.08.2006/**

Deforestation – 1 443 ha (Ivailograd))



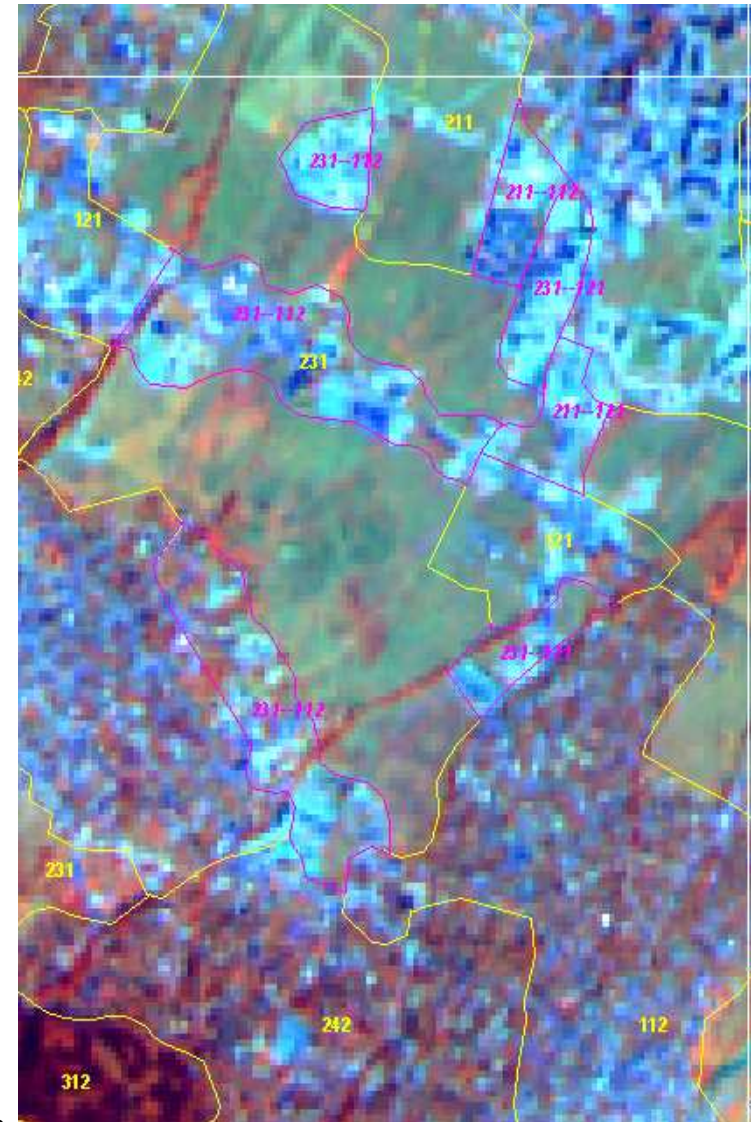
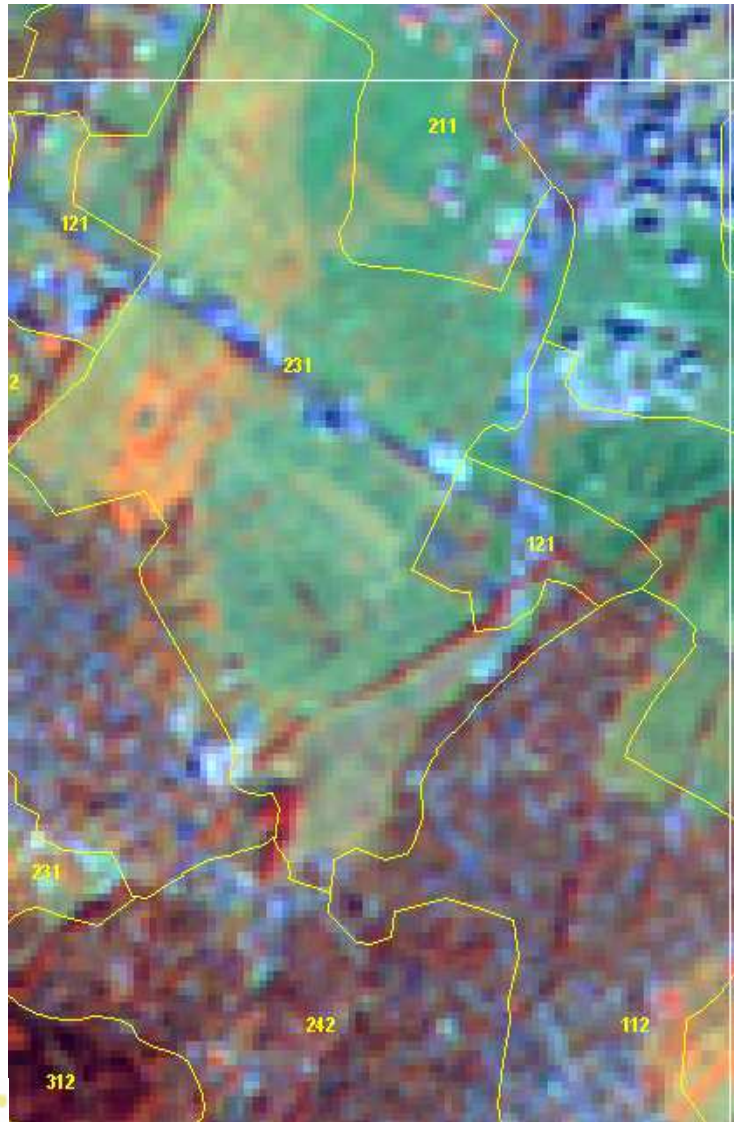
2000 г.

25-26 March 2010, Sofia

2006 г.

Agricultural lands

Change from cropland to artificial surface 231 – 112 и 121

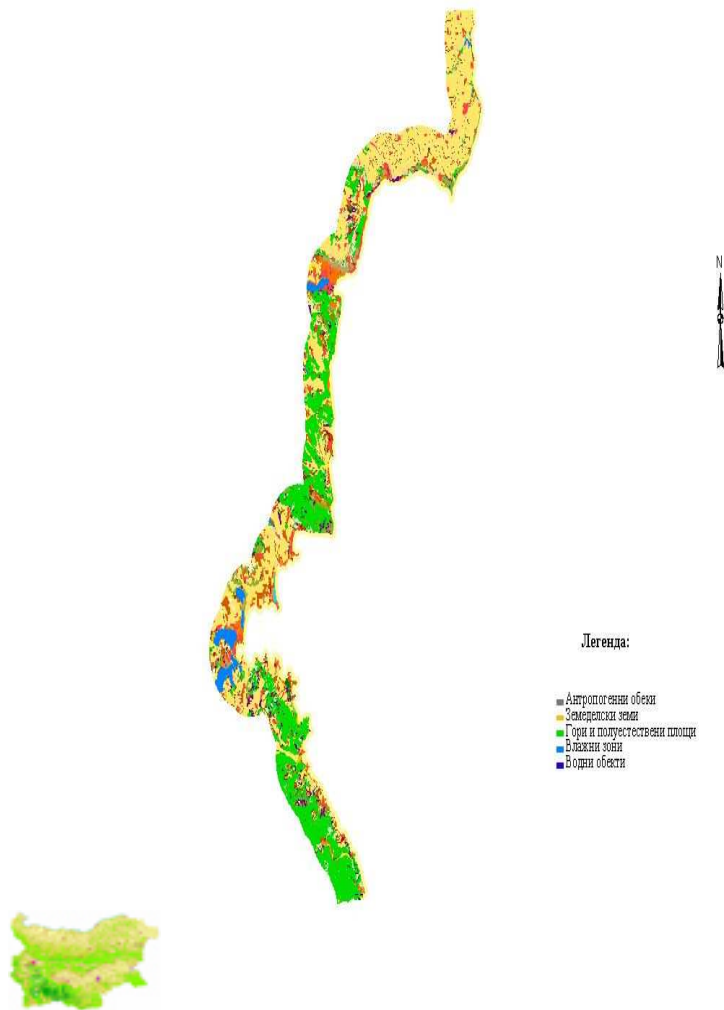


2000 r./ Sofia ring road 25-26 March 2010, Sofia 2006 r./ Sofia



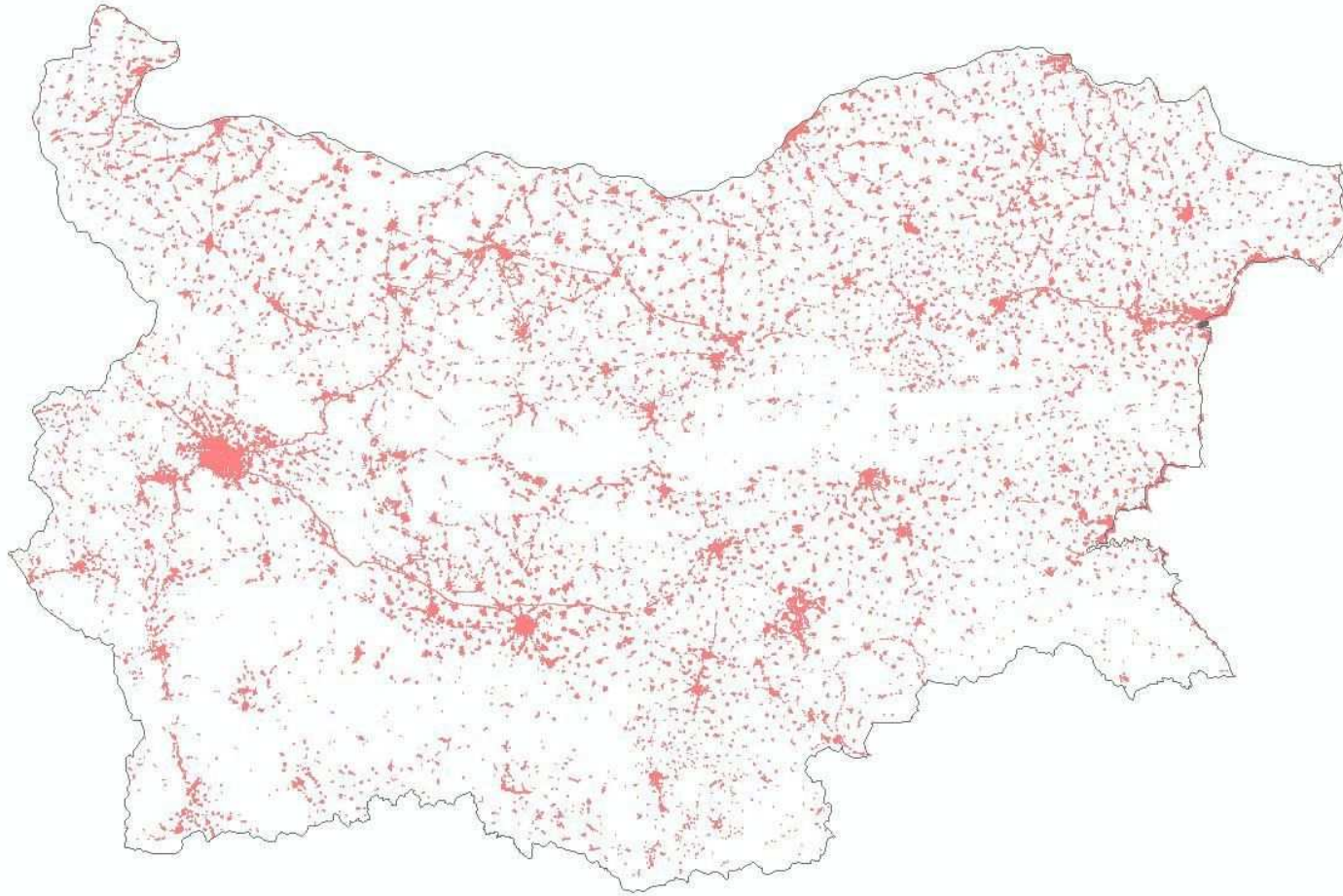
Coastal zones

- National classification development
- 5-th level nomenclature



25-26 March 2010, Sofia

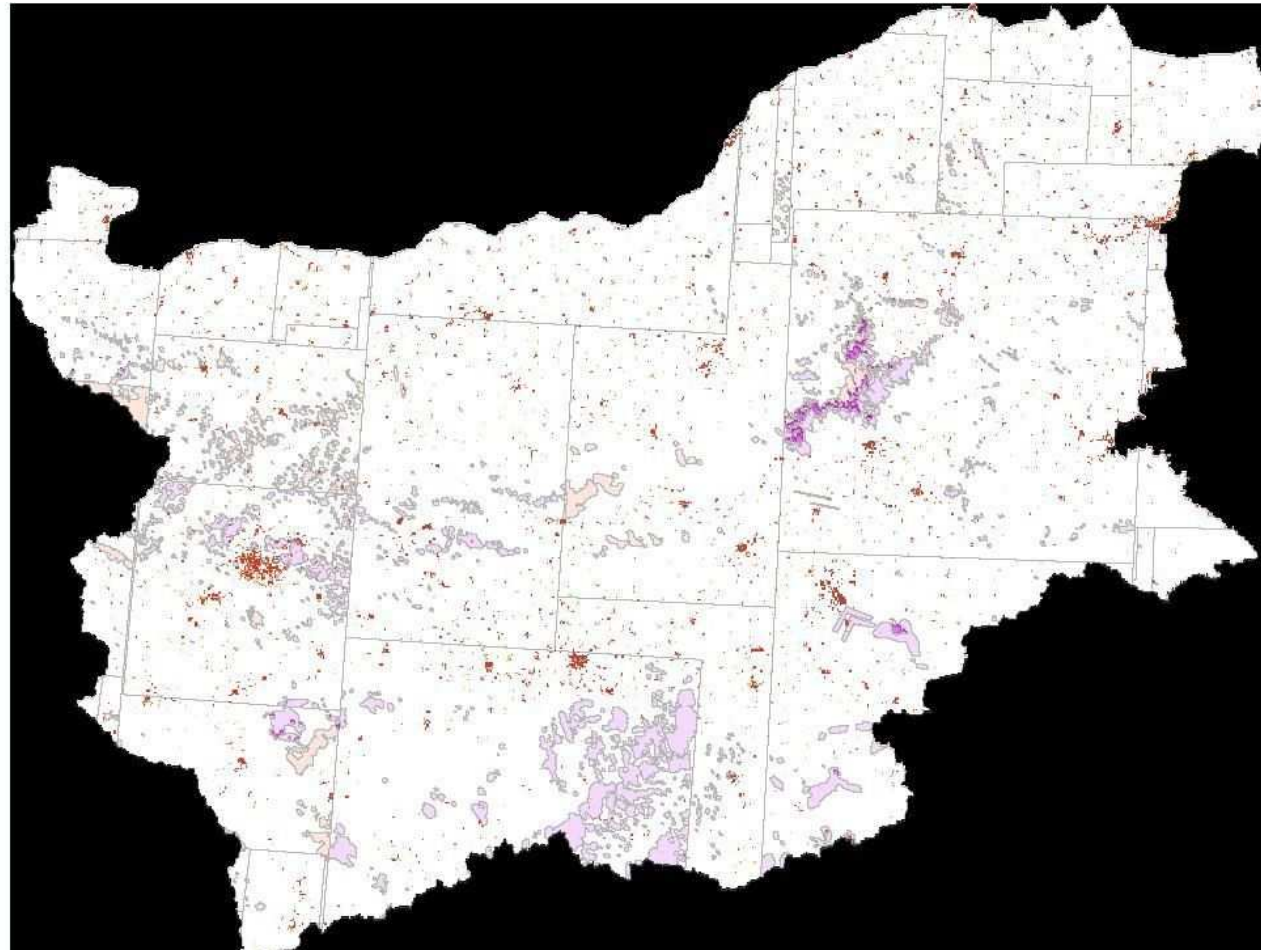
Soil sealing



25-26 March 2010, Sofia

Soil sealing-Bulgaria

EEA-FTSP-Sealing_image
[] <all other values>
Cloud_Cov
[] 1
[] 2
[] 3
[] 4
EEA-FTSP-Sealing_Count
[]
EEA-FTSP-Sealing_Legend
Value
[] Non Built-Up
[] Built-Up 1 - 29 %
[] Built-Up 30 - 49 %
[] Built-Up 50 - 79 %
[] Built-Up 80 - 99 %
[] Built-Up 100%
[] 254 Unclassifiable
[] 255 No Data
EEA-FTSP-Sealing_BG_F1



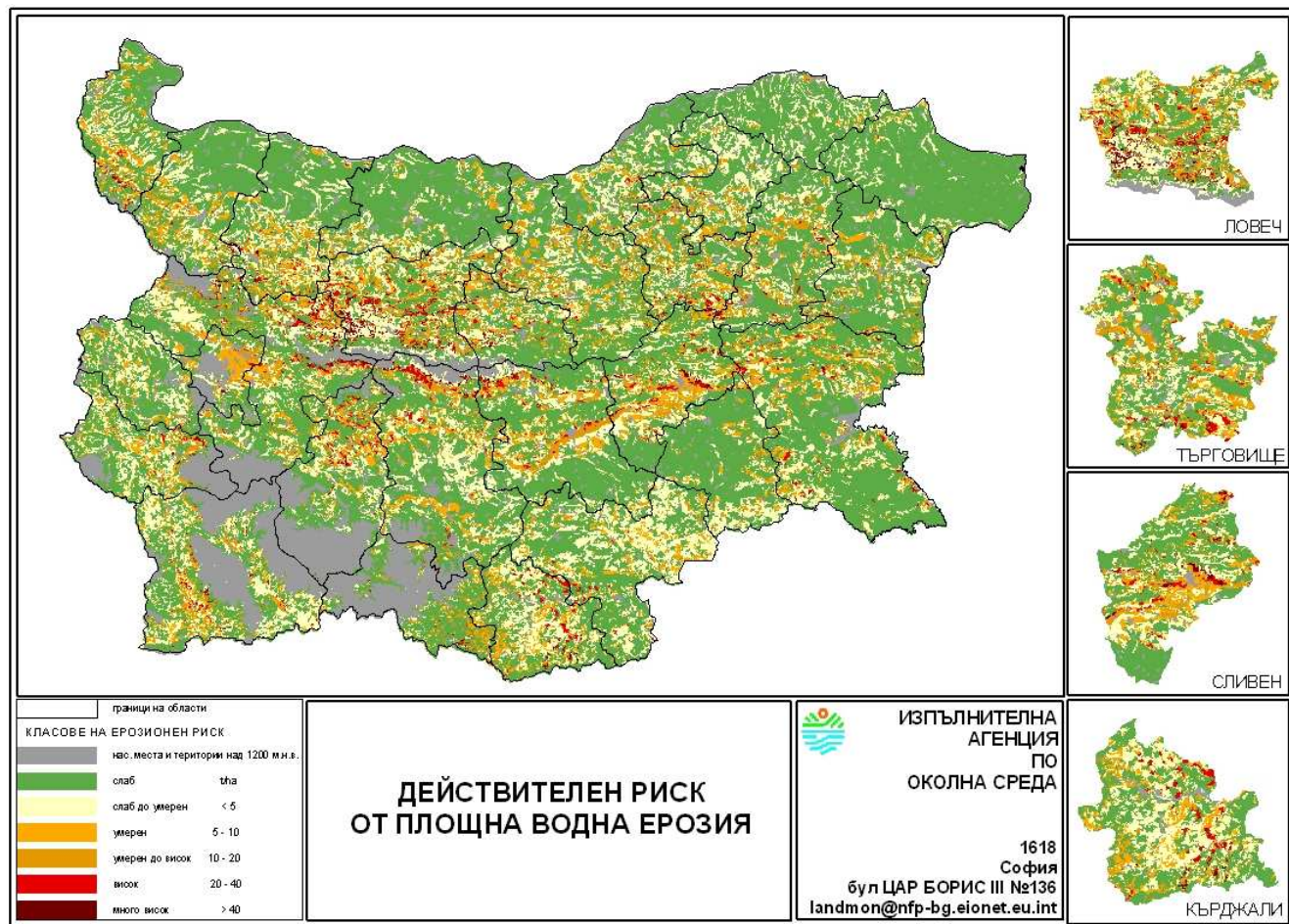
25-26 March 2010, Sofia

Sofia



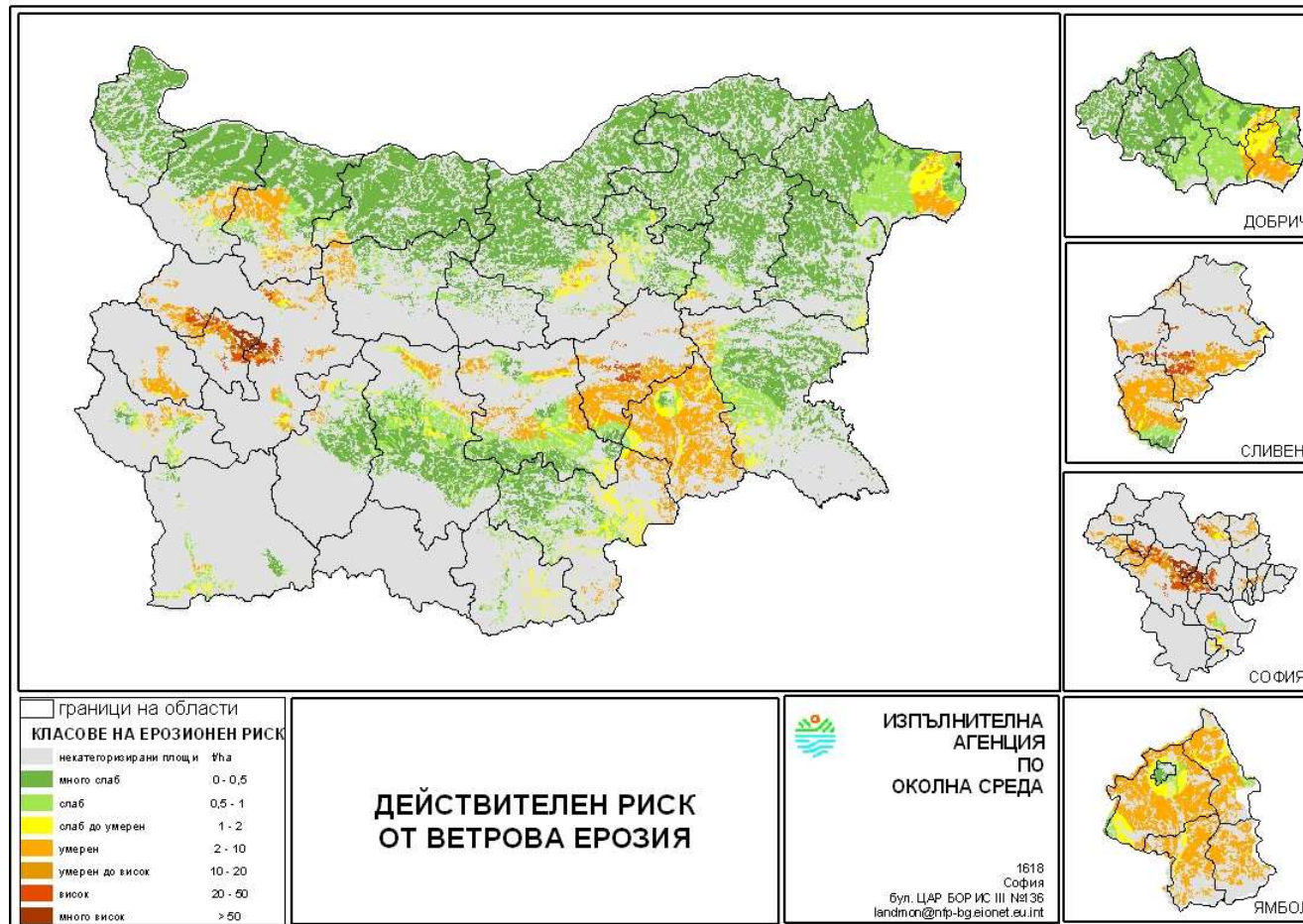
25-26 March 2010, Sofia

Soil erosion- water erosion



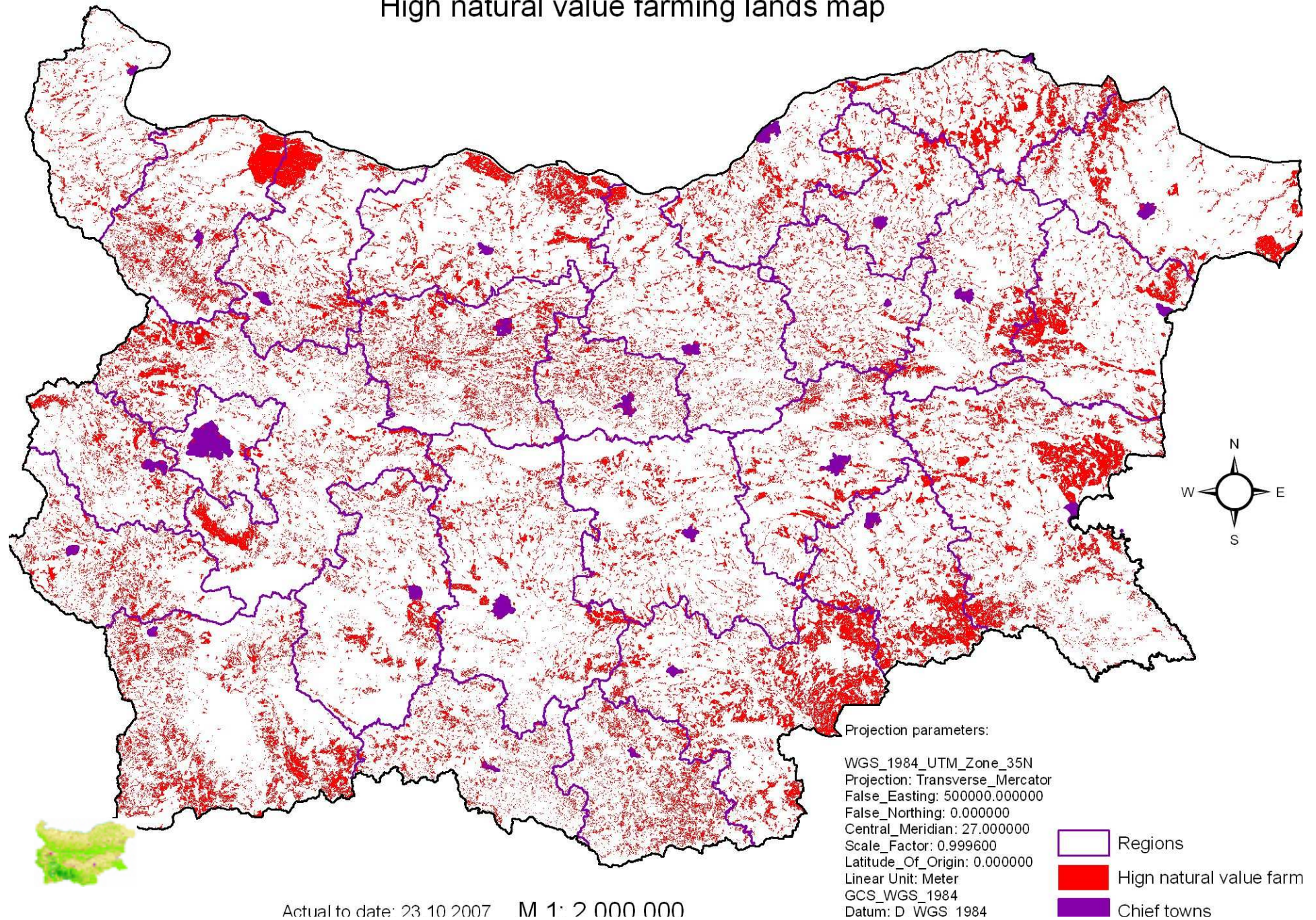
25-26 March 2010, Sofia

Soil erosion- wind erosion

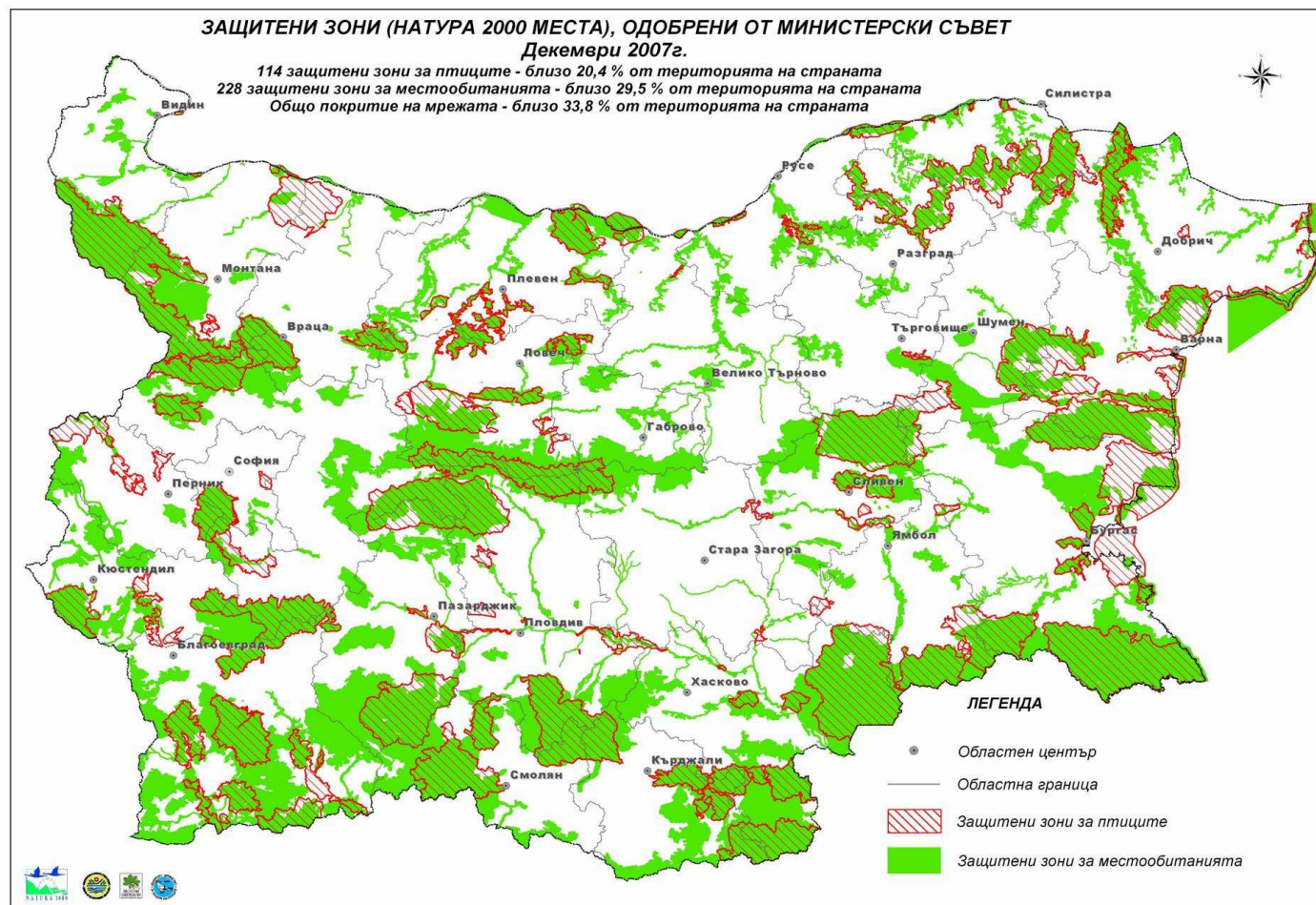


25-26 March 2010, Sofia

High natural value farming lands map

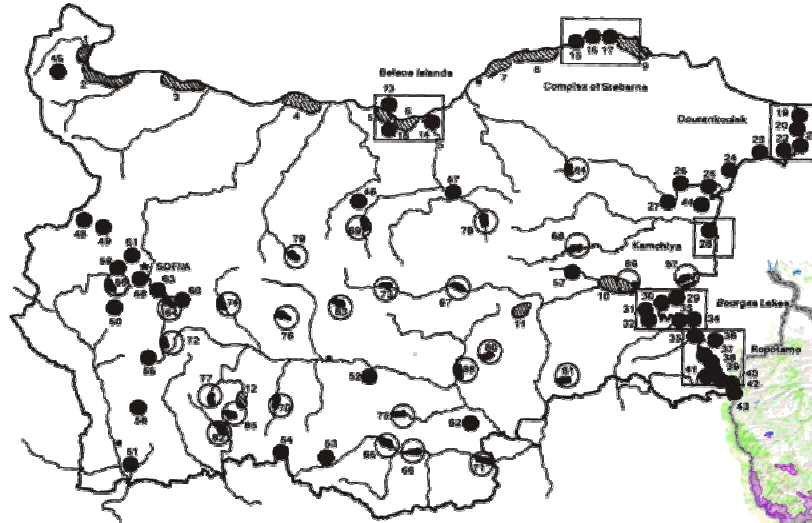


Natura 2000 sites

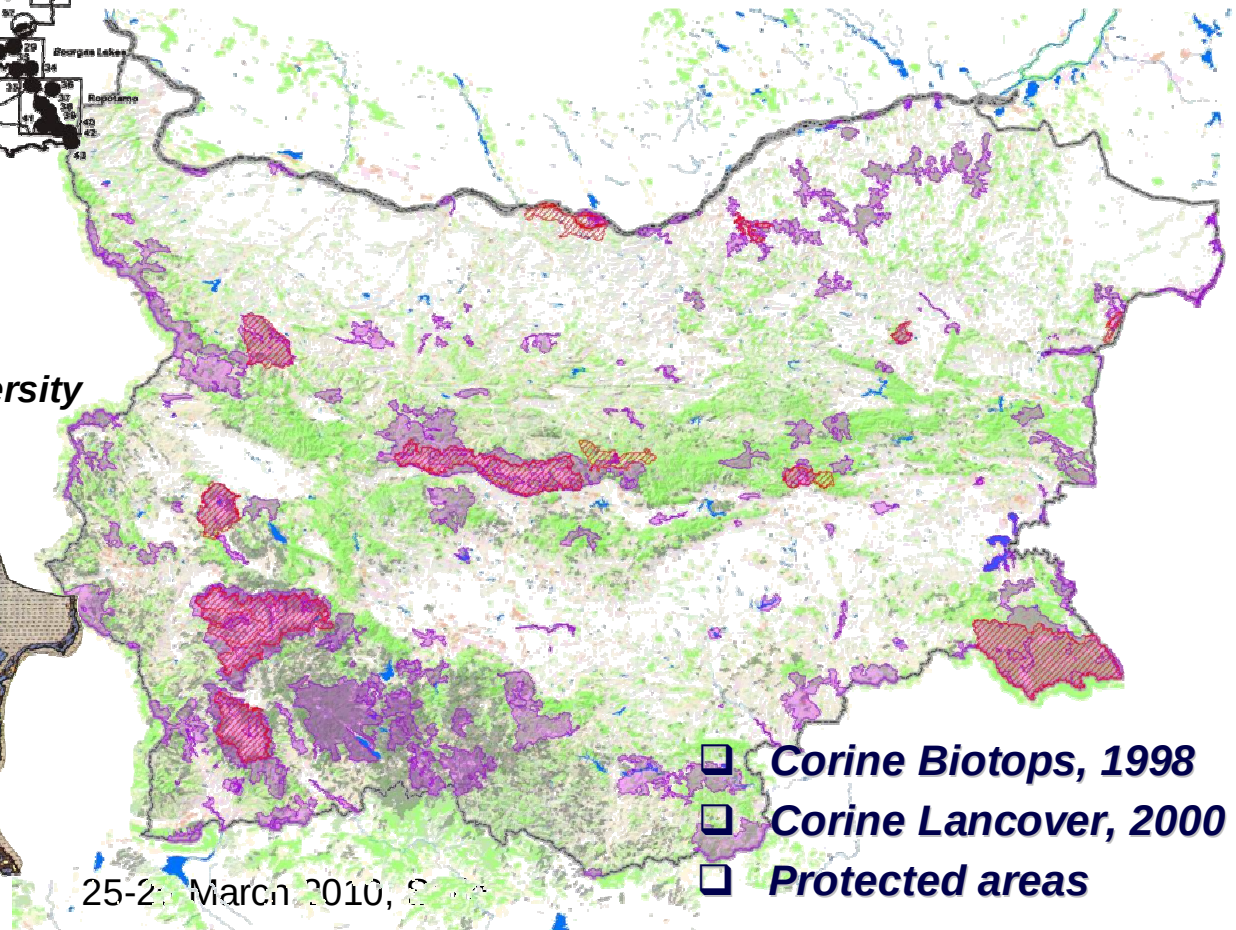
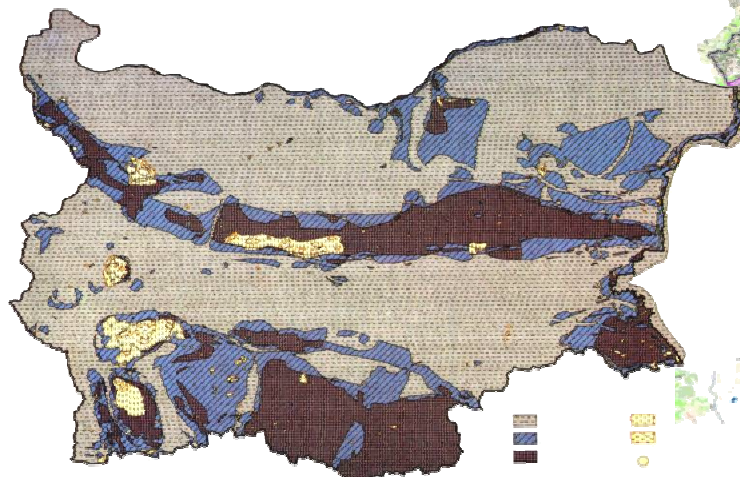


25-26 March 2010, Sofia

National actual plan for wetlands, 1995



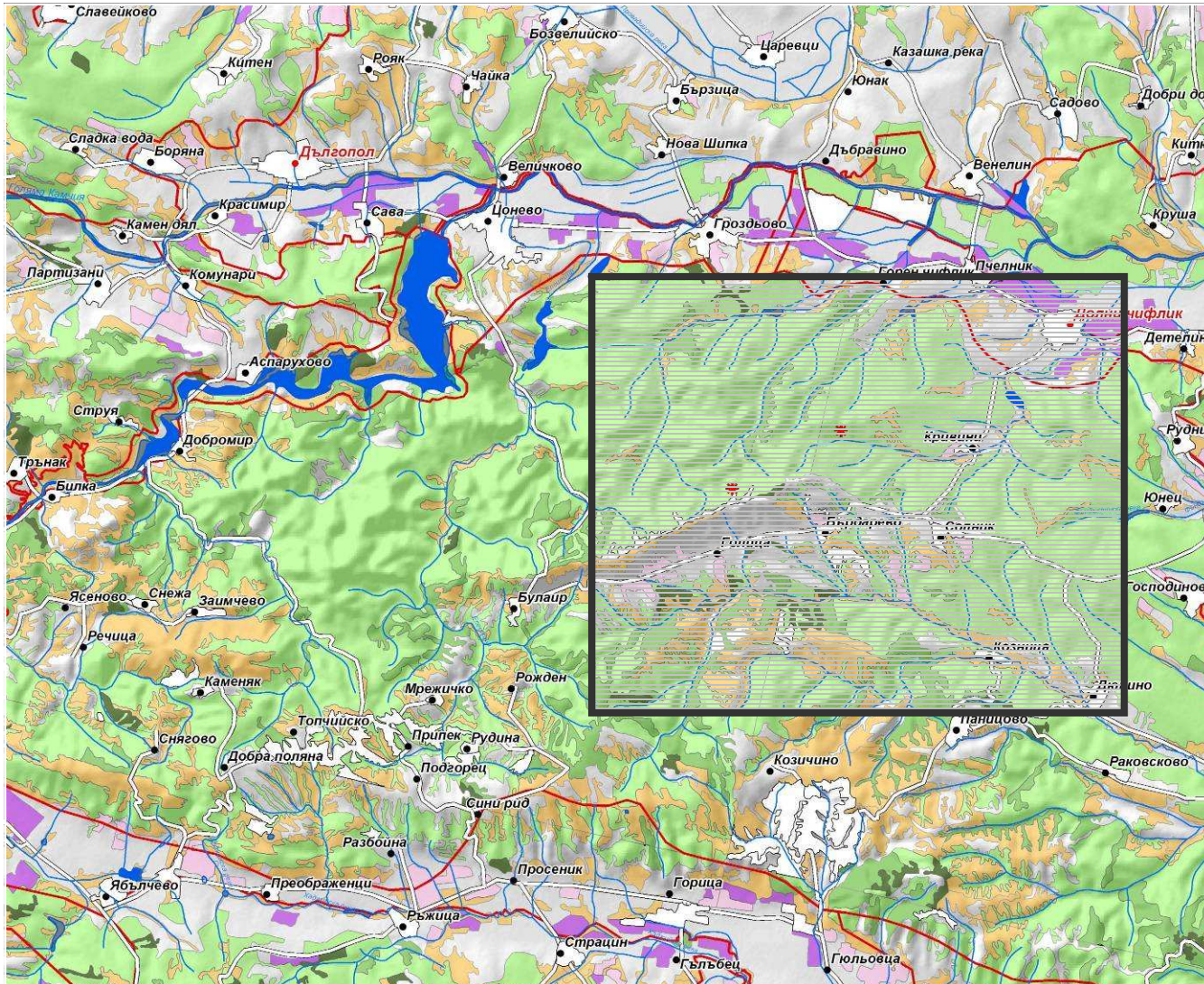
National Strategy for biodiversity protection, 1995



-  Corine Biotops, 1998
-  Corine Landcover, 2000
-  Protected areas

25-26 March 2010, Sofia

Preliminary investigation



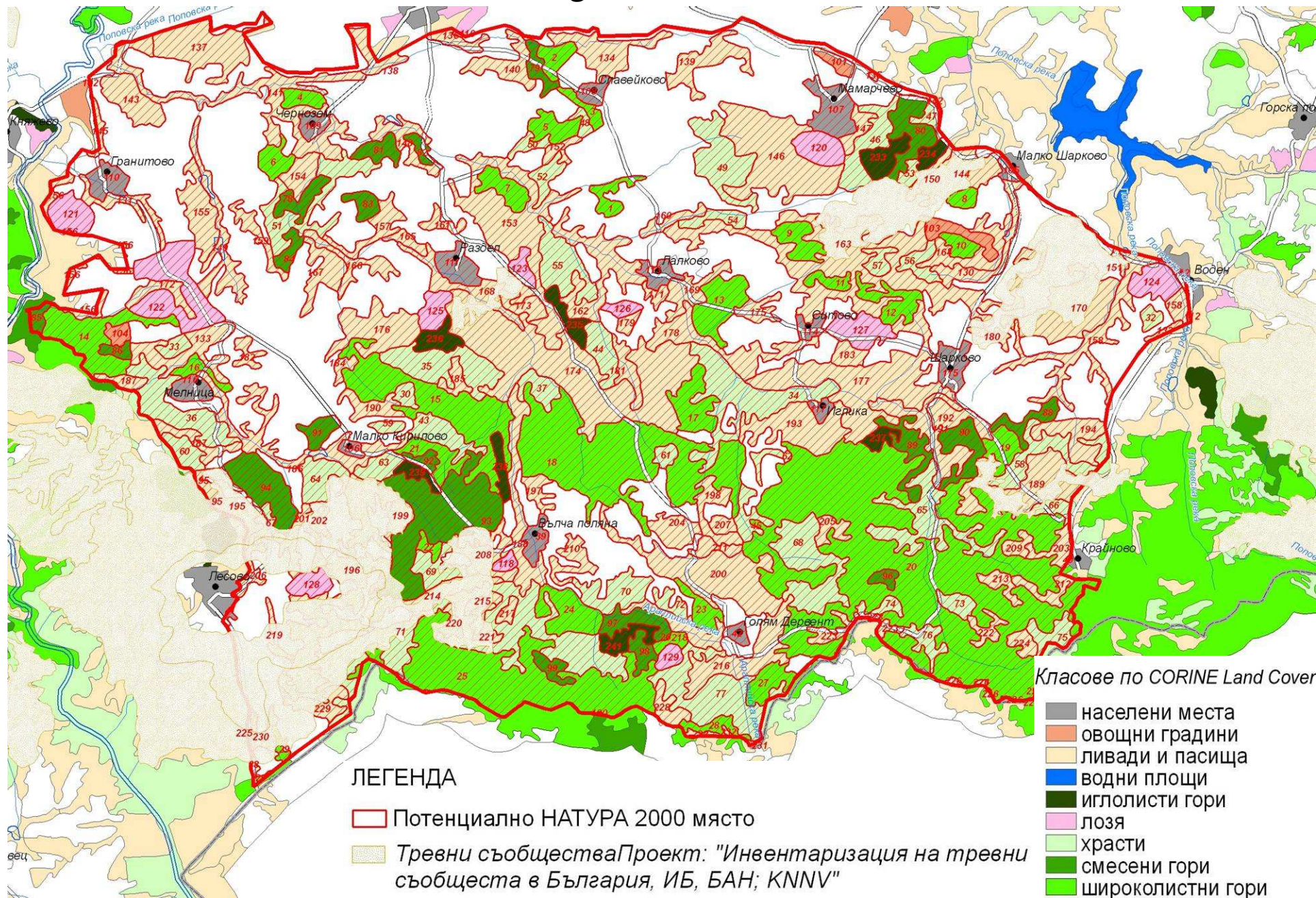
FIELD MAP
Scale 1 : 100 000



Legend

- Settlements
- Municipal centers
- Regional centers
- * Potential Natura 2000 sites
- Hydrographic net
- Road net
- Water areas (411+412+421+422+423
511+512+521+522+523)
- Orchards (222)
- Vineyards (221)
- Bushes (324)
- Pastures and meadows (231+243+
321+322+333)
- Coniferous forests (312)
- Mixed forests (312)
- Broad leaved forests (311)
- Agro-forestry areas (244)
- Settlements (112)
- Potential Natura 2000 Sites

Natura 2000 site "Dervishki vazvishenia- 1" - CORINE Land Cover, grassland

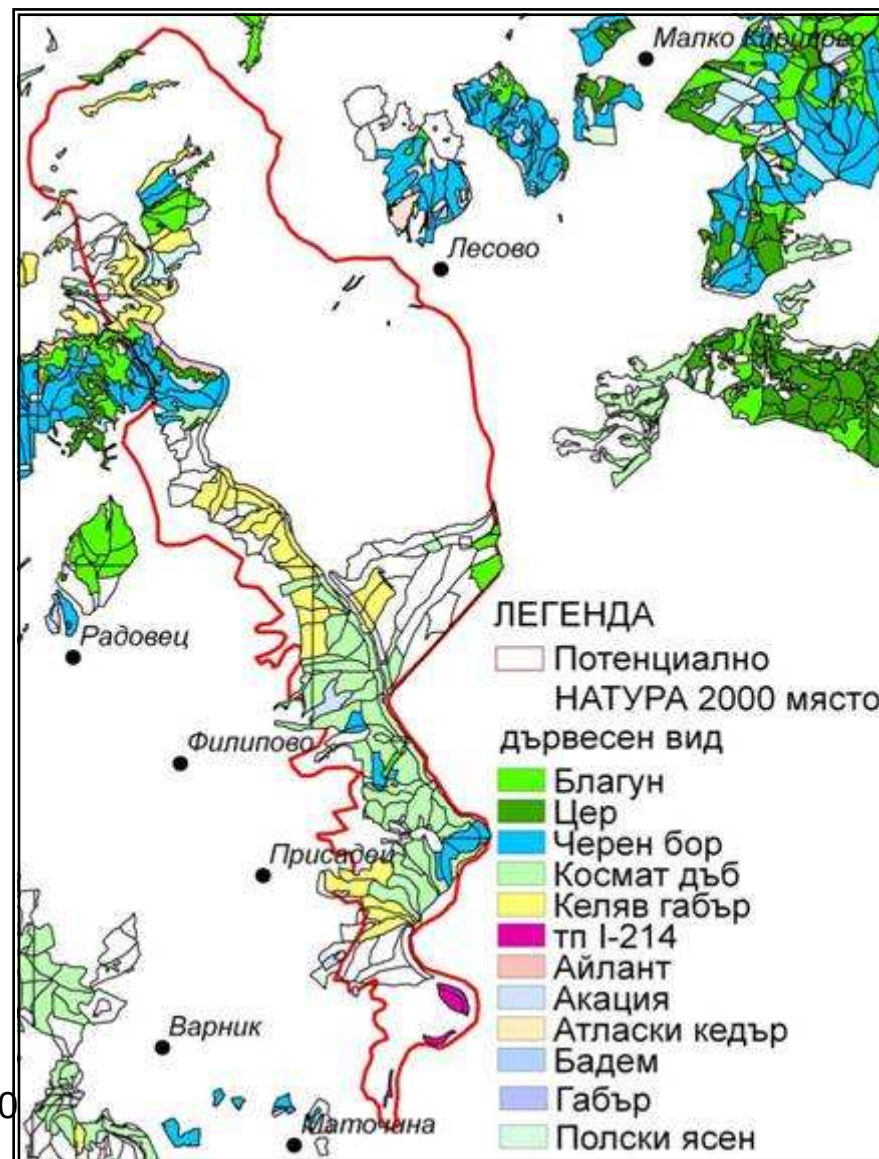


Natura 2000 site "Djdrelo river Tundja", BG0000217

CORINE Land Cover



Forest map



Water management

- DANUBE FLOODRISK-** project focused on the most cost-effective measures for flood risk reduction: risk assessment, risk mapping, involvement of stakeholders, risk reduction by adequate spatial planning
- Financed by South East Europe transition program(2009-2012)

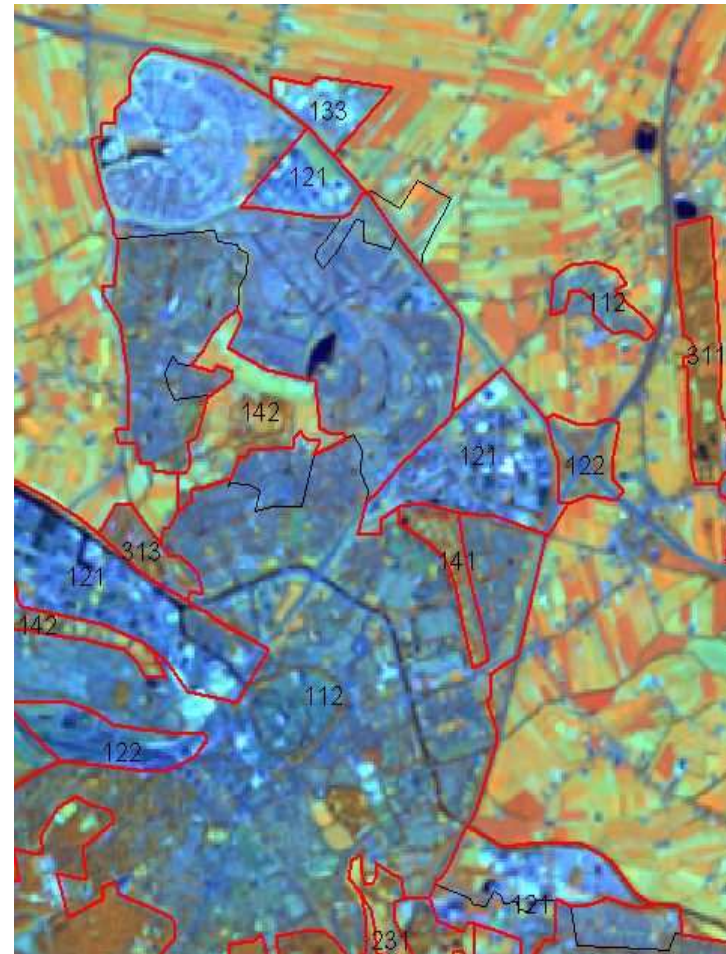
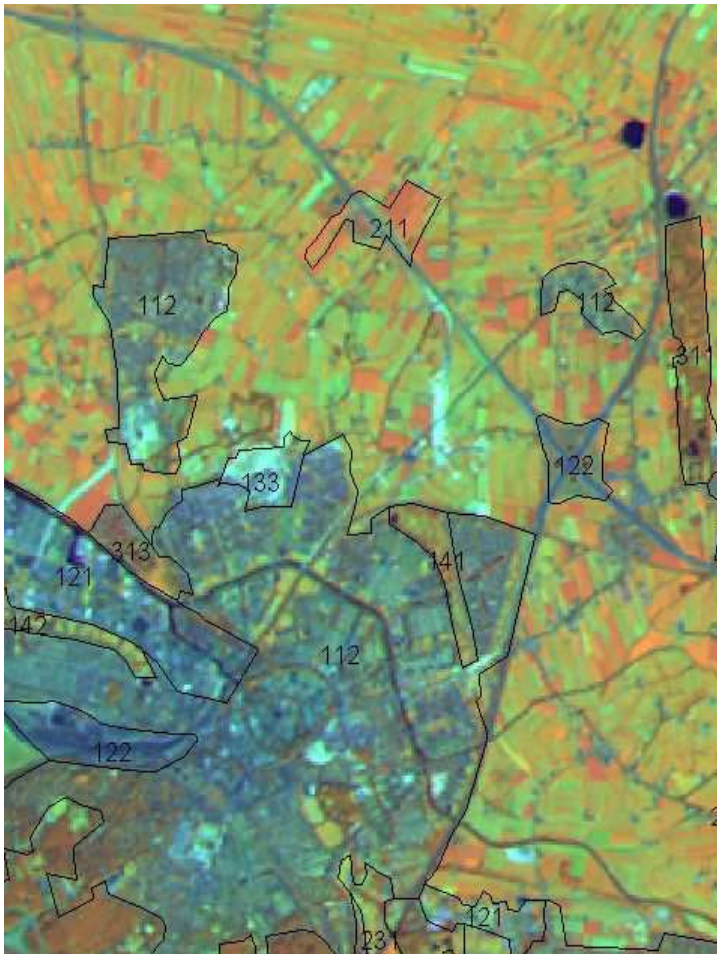
- **Flood Forecasting and Early Warning System for Maritza and Tundja rivers** – project aimed at **elaboration of scenarios for high wave security-** 1/20, 1/100 и 1/1000
- Financed by Phare 2007, Partners: Ministry of regional development and public works, consortium BCEOM&HKV and East Aegean Sea River Basin Directorate

Forest management

- Kyoto protocol-
 - » Afforestation/ Deforestation
- Forest fires
 - look atnext slides

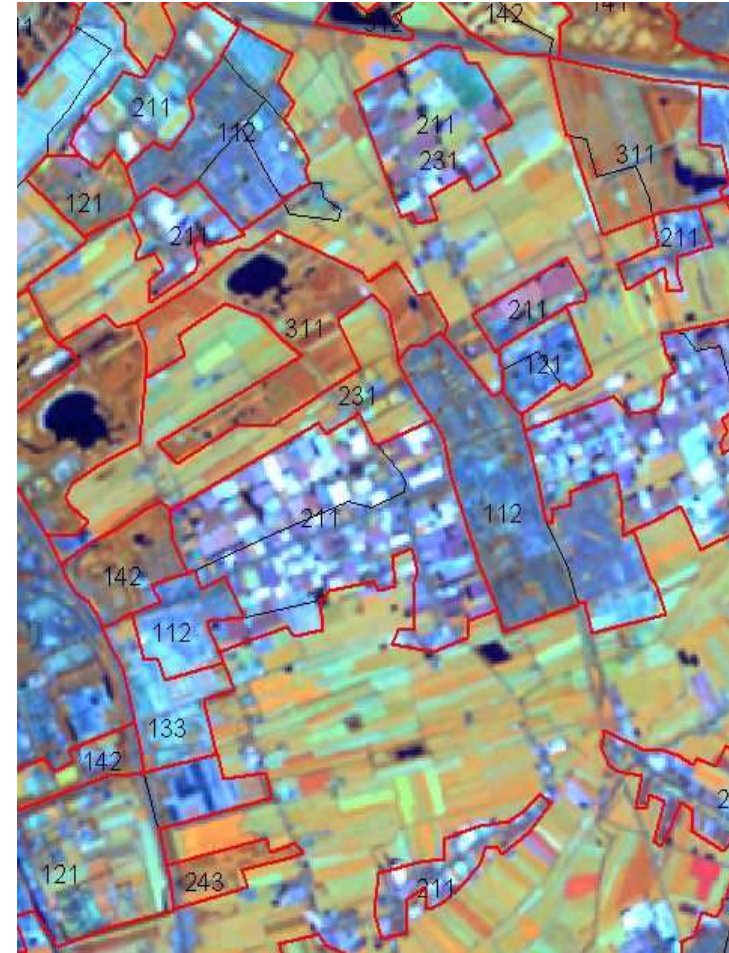
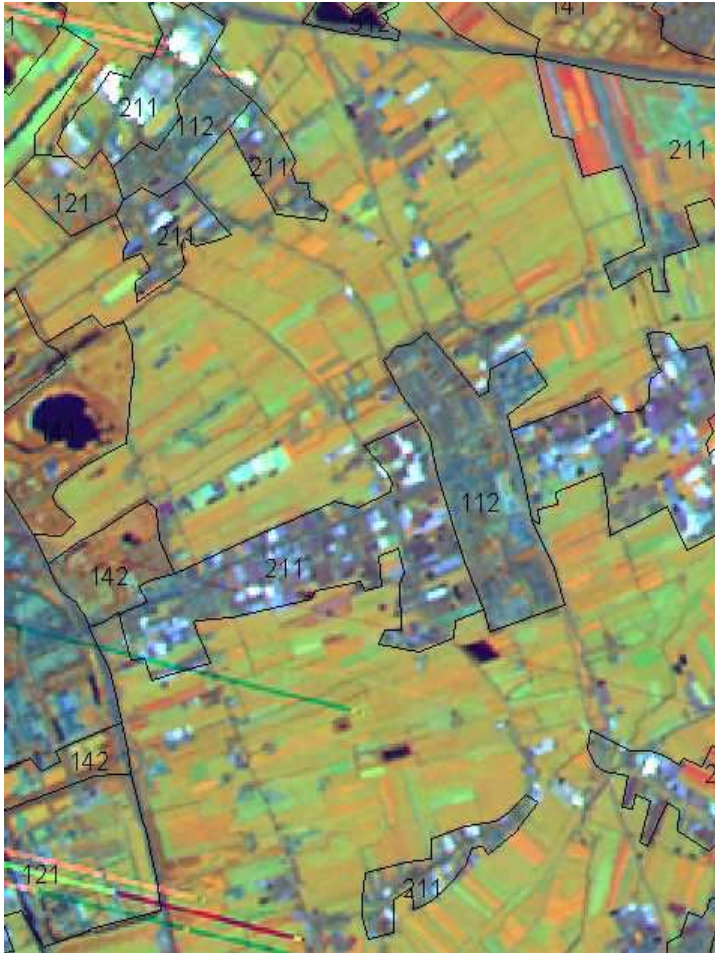


Urbanisation



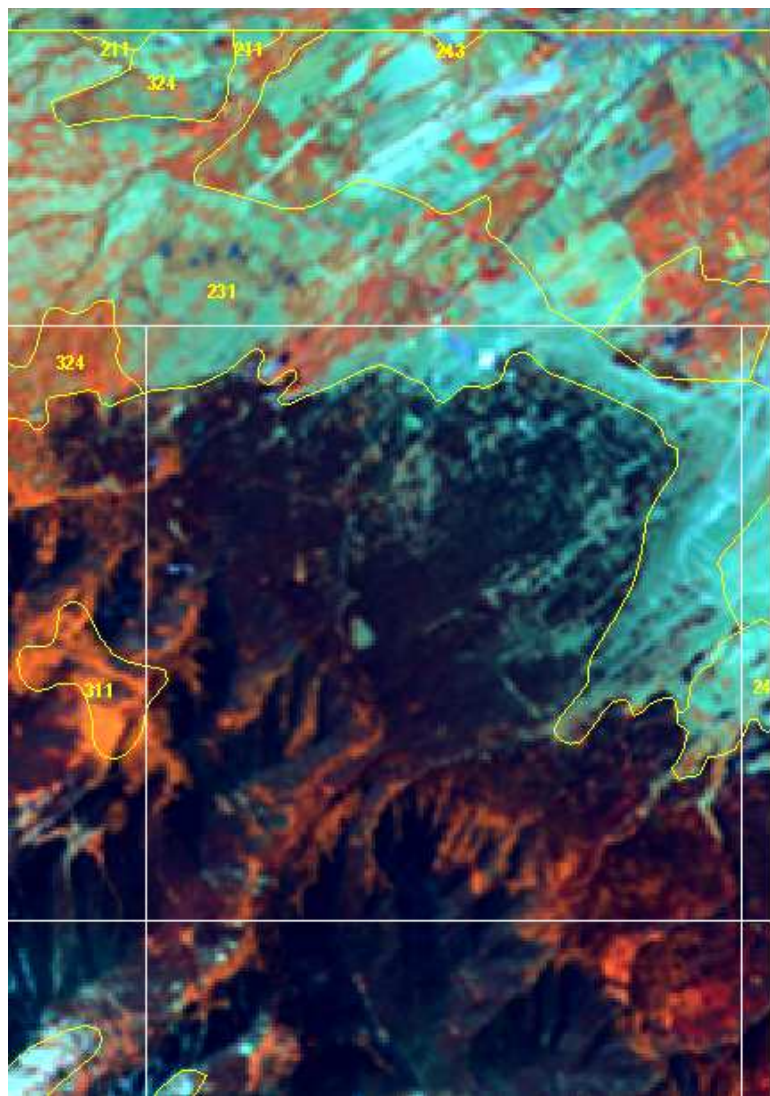
25-26 March 2010, Sofia

Intensification agriculture (greenhouses)



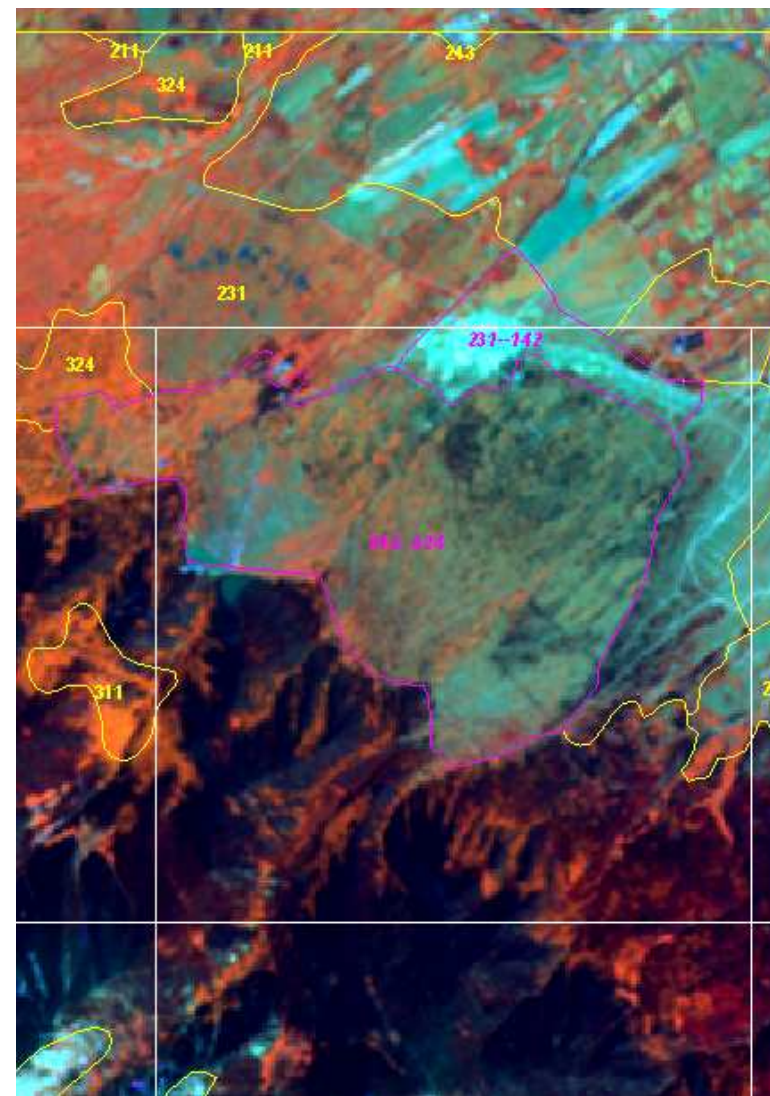
25-26 March 2010, Sofia

Fell trees/ fires – 368 ha



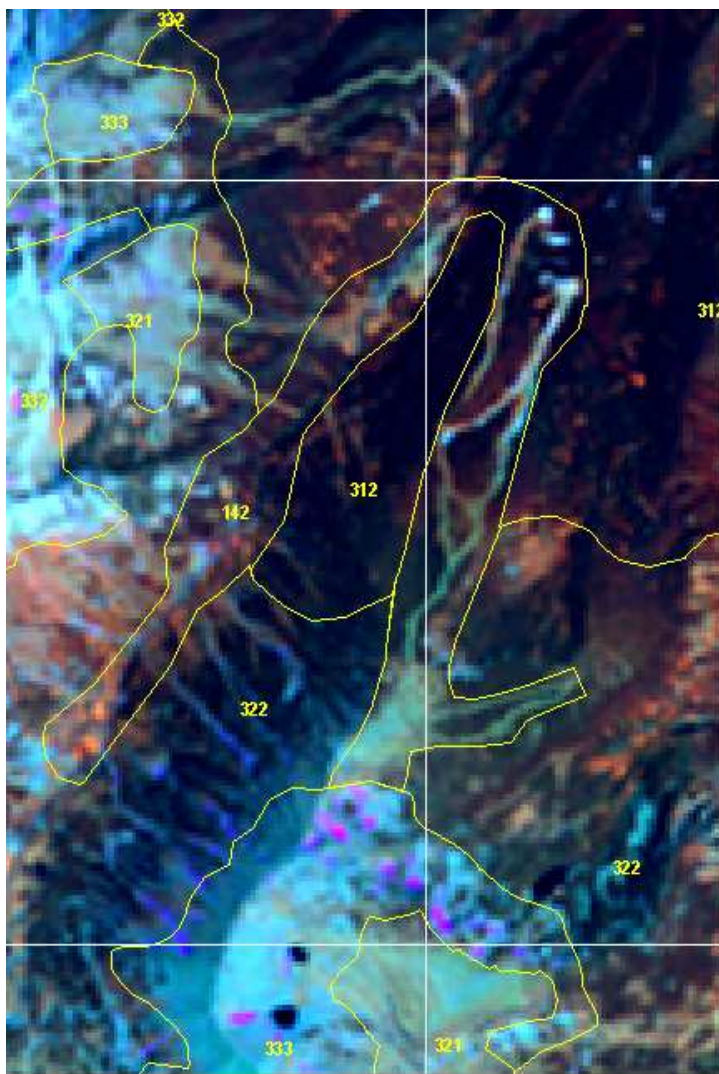
2000 г. – Bansko

25-26 March 2010, Sofia

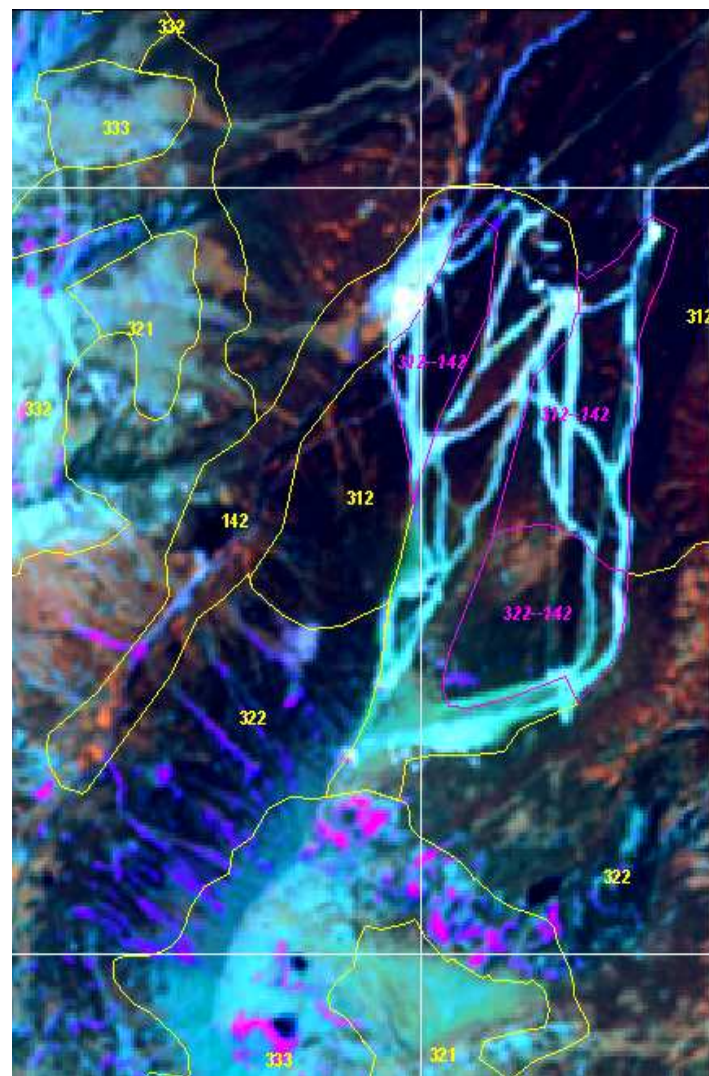


2006 г. – Bansko

Deforestation – ski slope in Bansko



2000 г. – Landsat 7

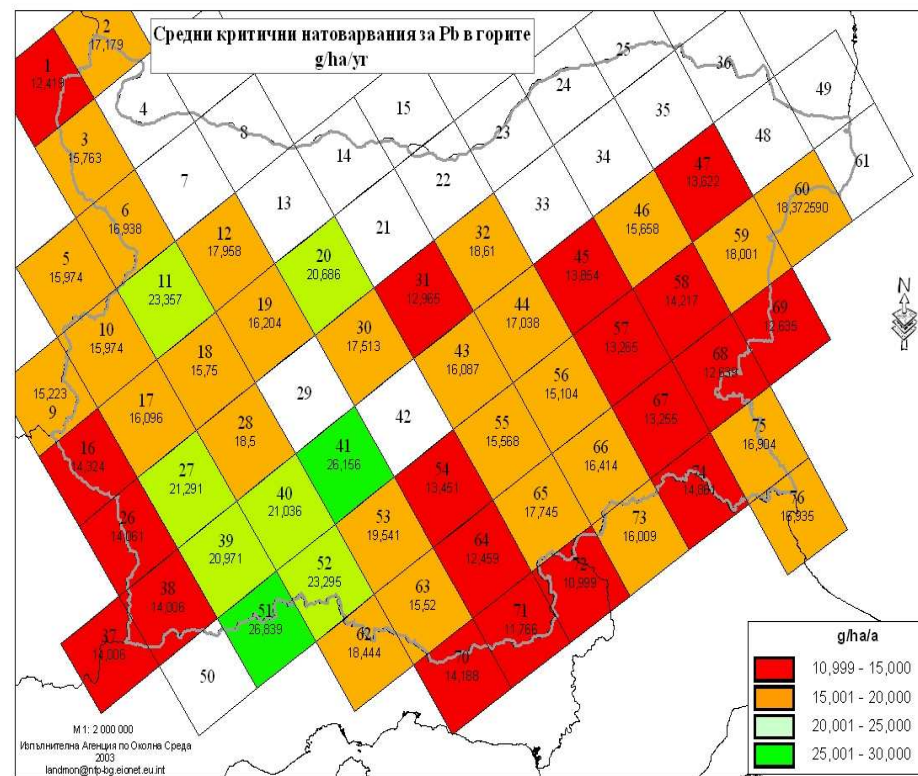
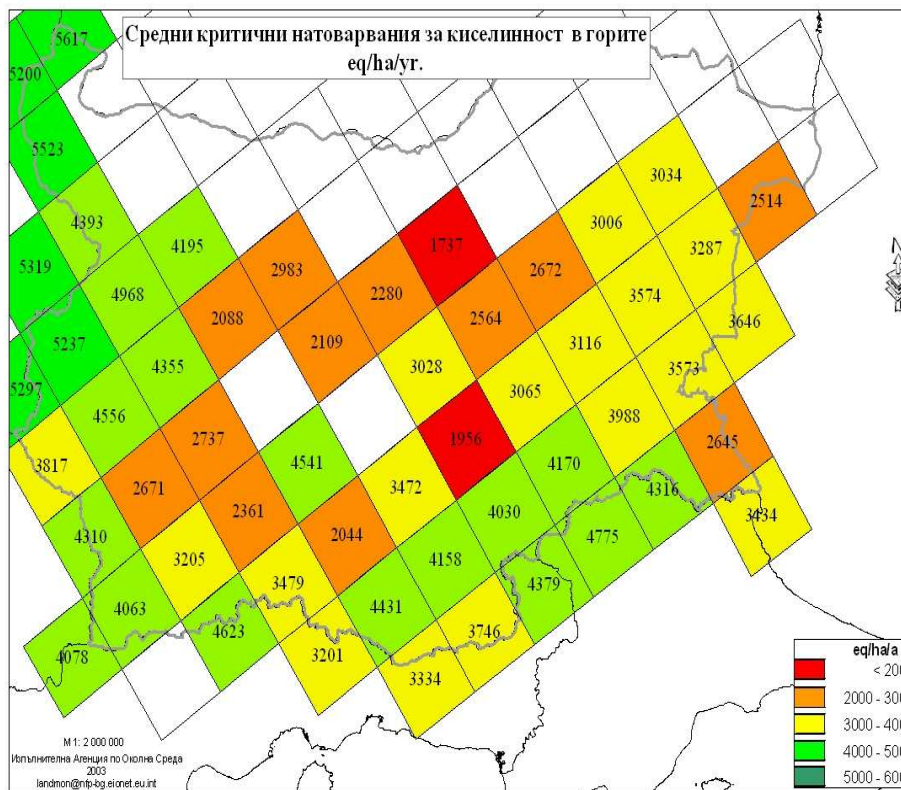


2006 г. – IRS P6 III

25-26 March 2010, Sofia



Critical loads



25-26 March 2010, Sofia

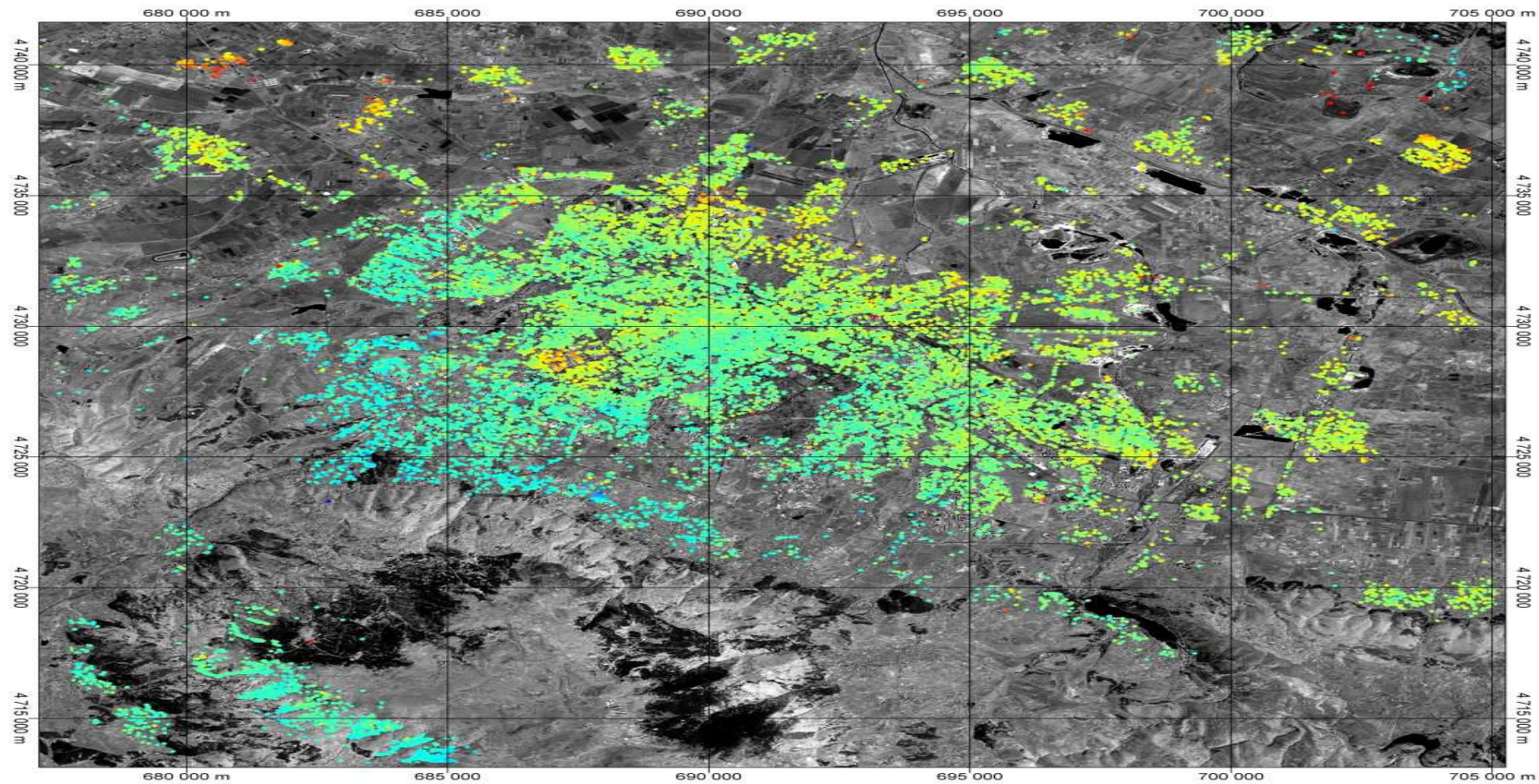
Terrafirma

- an ESA GMES project aimed at providing civil protection agencies, disaster management organisations, and coastal, rail and motorway authorities with support in the process of risk assessment and mitigation by using the latest technology to measure terrain motion from satellite radar data. Using these data acquired 800km above the Earth's surface, and in conjunction with expert interpretation by national geoscience organisations, the project provides a pan-European ground motion hazard information service in each of the 27 member states of the EU.



25-26 March 2010, Sofia

Geology-TRE 24 (Sofia)



★ Reference Point

Period: 11th December 1992 to 5th October 2003

No. Scenes: 45

Master Scene: 5th December 1999

Coordinate System: Universal Transverse Mercator

Zone: 34 (E 18 to E 24)

Projection: Transverse Mercator

Datum: World Geodetic System 1984

Ellipsoid: WGS 1984

Units: meters



Average annual motion rate (mm/yr)

5 and more

0

-5 and more



Image Copyright: NPA Group 2005

Data Copyright: ESA 1992-2003

Background image: Landsat ETM+ B8

Data processed by TRE 2004

New challenges

- Report to Kyoto protocol: LULUCF part
- Rural region/ agro environment schemes
- Soil erosion
- Soil sealing
- Habitats mapping
- River flood management
- Coastal zones management



25-26 March 2010, Sofia



Thanks

25-26 March 2010, Sofia