



Building operational capacity for risk prevention against natural disasters under the GMES Programme

Sofia, 25-26 March, 2010

**MINISTRY OF TRANSPORT, INFORMATION TECHNOLOGY AND COMMUNICATIONS
EXECUTIVE AGENCY "ELECTRONIC COMMUNICATION NETWORKS AND INFORMATION SYSTEMS"**





In 2006, after analysing the necessary preliminary activities in accordance with the European initiative for Global Monitoring for Environment and Security (GMES) the Bulgarian Government took the decision to assign the State Agency for Information Technology and Communications with the task of creating a data base and the relevant expertise that could be provided for the future development of that initiative on a European scale.

During its mandate, the State Agency for Information Technology and Communications was responsible for the following state priorities:

- 1. Implementation of the requirements of Directive 2007/2/EO /INSPIRE/ on building infrastructure for spatial information in Bulgarian legislation.**
- 2. Responsibilities within Bulgaria's involvement in the European Programme for Global Monitoring for Environment and Security.**





- 3. Establishment, operation, maintenance and development of an electronic communication network and command points for the national security;**
- 4. Provision of electronic communications for crisis management;**
- 5. Exercising control on adherence to the requirements for information security and operability;**
- 6. Pursuit of state policy in the field of information technologies and communications related to crisis management;**
- 7. Involvement in the processes of civil emergency planning in the field of information technologies and communications and provision of information exchange.**





In 2009, the State Agency for Information Technology and Communications was transformed into an Executive Agency under the Ministry of Transport, Information Technology and Communications, and on behalf of the ministry we report results achieved in the implementation of projects, related to the creation of spatial data bases in compliance with the INSPIRE Directive and in-situ components of the GMES initiative.

Comparison between the principles and requirements of the INSPIRE Directive and GMES Programme:

The Directive INSPIRE on building an infrastructure for spatial data:

- Creates a regulatory framework for the exchange of existing data on existing technologies and networks;**
- Requires periodical data updates;**
- Creates data specifications for interoperability and access services.**

The Directive INSPIRE creates the **horizontal approach to information exchange.**





Basic principles of the GMES Programme:

- Investment in a new European geo-information content;**
- Utilisation of innovative technologies for data acquisition and process modeling;**
- Acquisition of new data and their adaptation to trans-border global issues;**
- Continuous monitoring and data integration for service provision.**

The GMES initiative implements the **vertical approach to information exchange through service provision.**

CONCLUSION: The Directive INSPIRE and the GMES Programme are two complementary initiatives.





- **The projects under the GMES Programme and, in particular, concerning risk prevention and management, were implemented, using the good European practice for public-private partnerships with non-government organisations, research institutes with leading positions in specific fields and municipalities**
- **These projects are related to data acquisition by remote sensing and creation of data bases to be used in risk prevention against natural disasters. The objective is to provide services and materials to the decision-making bodies.**





Project on methodology development, technical description and mitigation of the consequence of over-moistening of the soils, levy bursts and floods

1. Project activities:

- Processing of updated satellite images in the visible, infra-red and radar spectrum;
- Testing modern remote information technologies for early diagnostics of soil over-moistening by scanning small-size microwave radiometers and optical spectrometers;
- Development of a software application for visualisation of the elevation of the water level, using a digital model of the terrain;
- Publication of an exemplary information handbook for municipalities and citizens for risks of floods and high water, using the development for the river valley of the Iskar River.

2. Presentation of some of the results of the project:

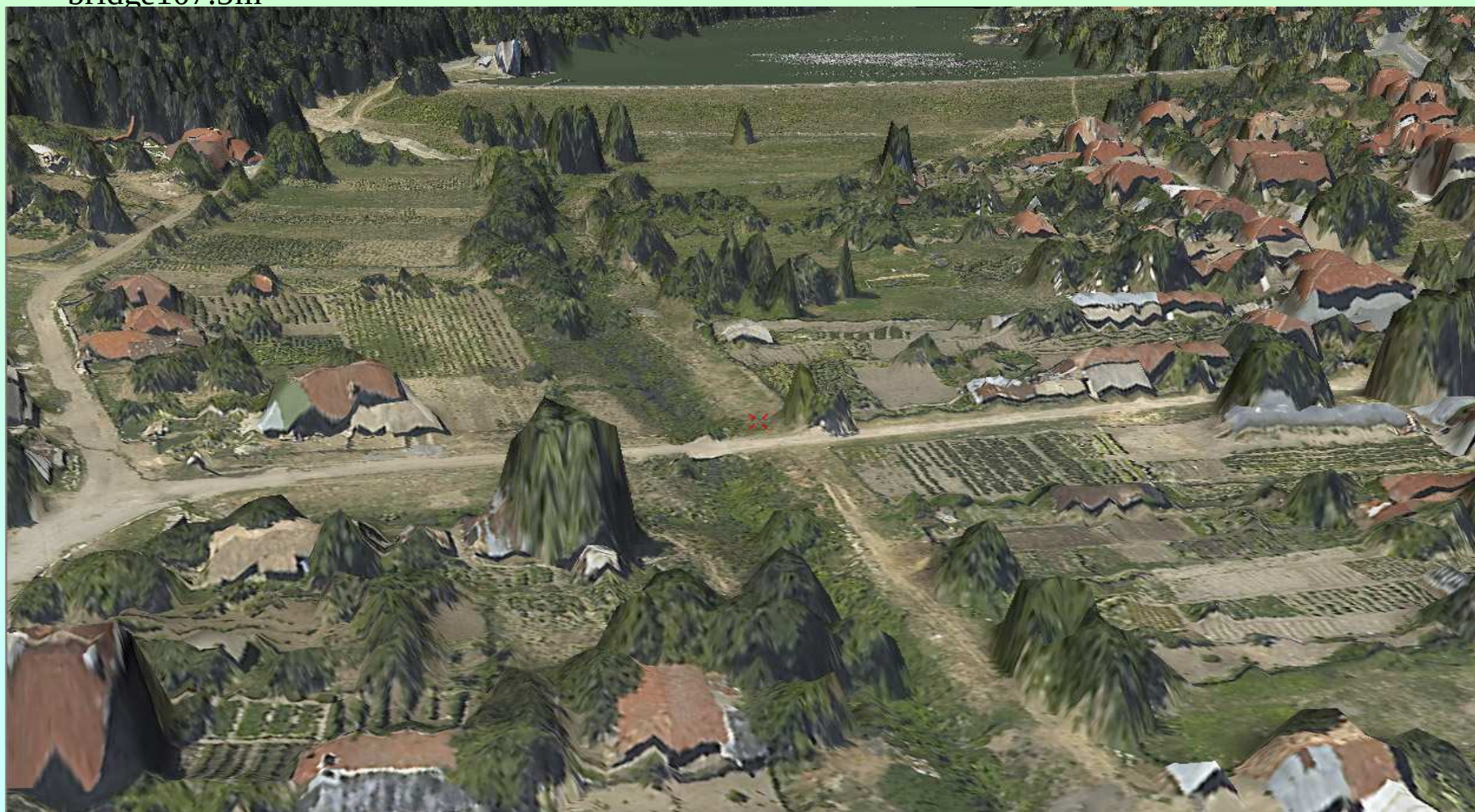
- map of flood simulation models created for the river valleys of 116 rivers on the territory of the Republic of Bulgaria;





Simulation model of water level rising for Nikolovo Dam near the town of Rousse.

Processing is carried out in ArcGIS application environment of ESRI. Height above sea level of the bridge 107.5m



Water level rising to elevation 107m

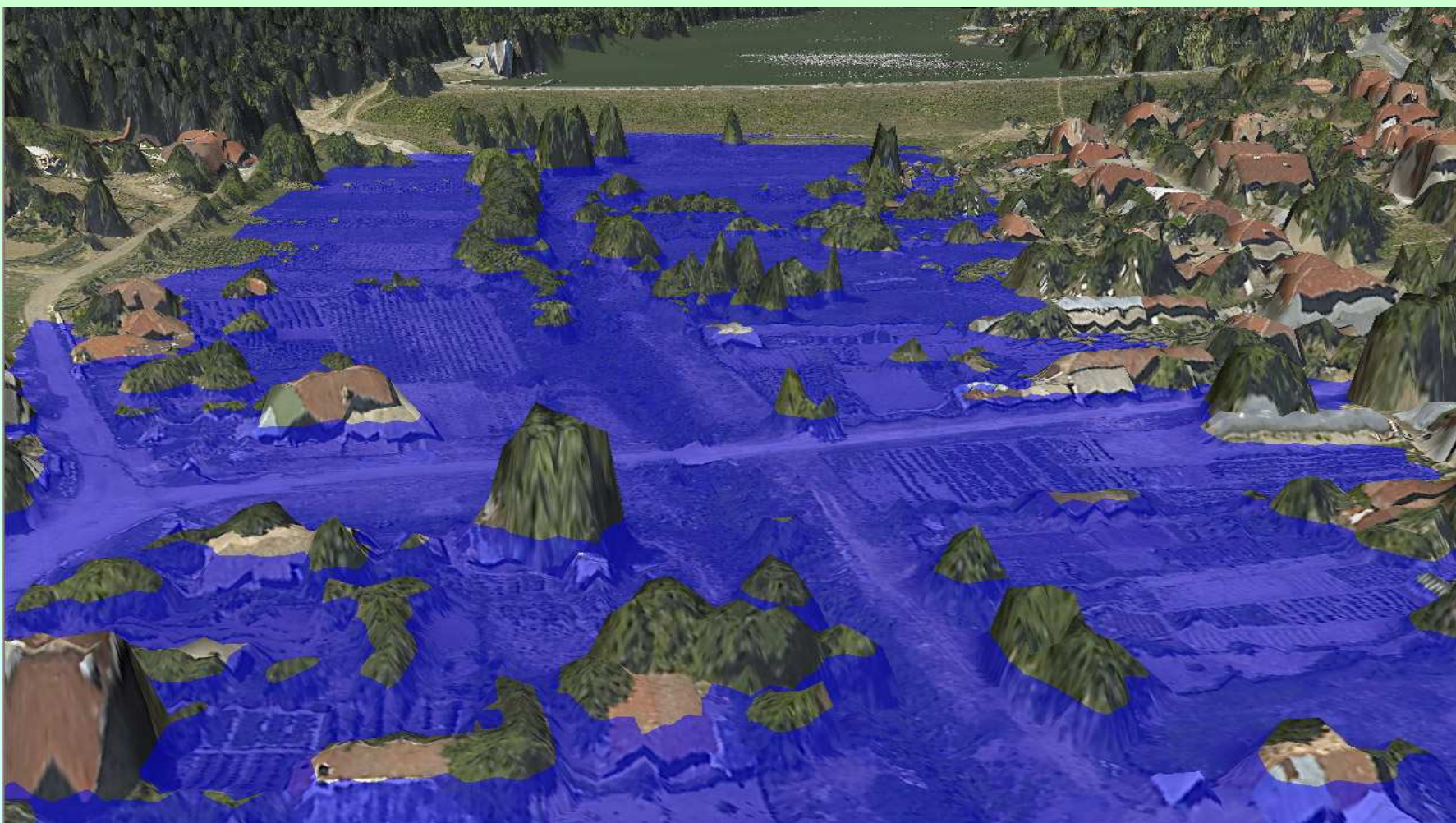


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Water level rising to elevation 108m.



Water level rising to elevation 110m (around 5m water column). Most of the houses, located in the ravine below the earth dam of Nikolovo Dam are flooded.





Project on fast-track maps of big fires across the country for the period of July 2007 based on satellite images from SPOT-5 and DMC-II

In the project implementation, representatives of the Interdepartmental Coordination Council for Fighting Forest Fires were involved, and the project was supported by the Joint Research Centre (JRC) to the European Commission.

1. Project activities:

- creation of data bases from daily observation maps TERRA and AQUA; maps supported by JRC – European Information System for Forest Fires, National Service for Fire Safety and Protection of the Population; State Forest Agency; satellite images /DMC, SPOT, MODIS/;**
- processing and aggregation of data from various sources;**
- analysis of the general situation;**
- data authenticity checks – forests, agricultural land, urbanised territories;**
- giving a general forecast for fire probability one day in advance, using JRC methodology;**
- assessment of damages by types of forest vegetation and areas under crop.**

2. Presentation of some of the project results:

- map of territories affected by forest fires in July 2007;**
- processed satellite images from satellite SPOT-5 with a resolution of 10m for different territories of the country with forest fires and assessment**



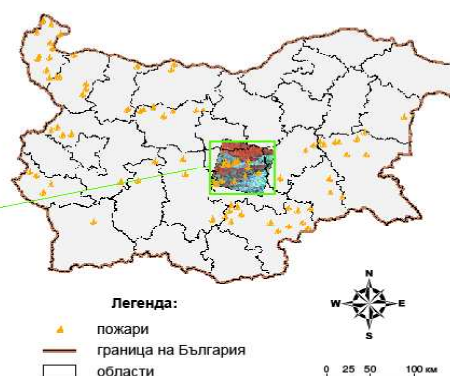
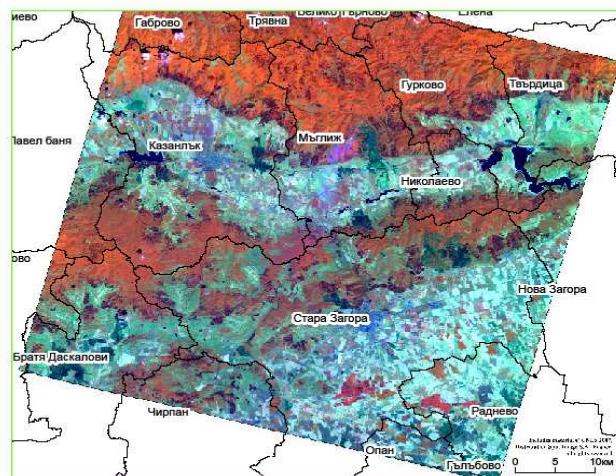


ОЦЕНКА НА ЗАСЕГНАТИ ТЕРИТОРИИ ОТ ПРИРОДНИ БЕДСТВИЯ – ГОРСКИ ПОЖАРИ

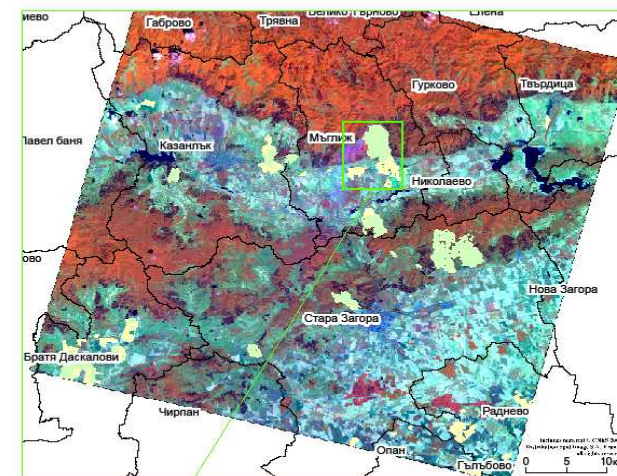




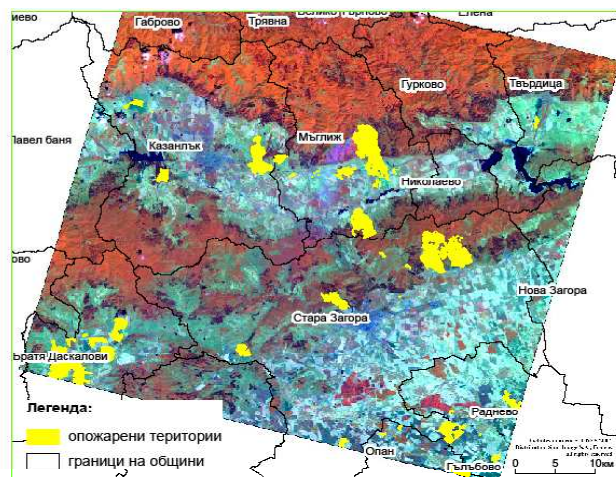
ПРИМЕР ЗА ОЦЕНКА НА ЗАСЕГНАТИ ТЕРИТОРИИ ОТ ГОРСКИ ПОЖАРИ ПО ОБЩИНИ - ЗА ПЕРИОДА ЮЛИ 2007 Покритие на част от България с изображение от спътника SPOT-5 с разделителна способност 10 m от 28.07.2007г.



Анализът е направен на база спътникови изображения от спътници SPOT, DMC, Terra/MODIS, Aqua/MODIS. Разработката е в рамките на научно-приложна задача по управление на риска, възложена от Държавната агенция за информационни технологии и съобщения и е изготвена от Център за приложение на спътникови изображения - RECAK в сътрудничество с НС "Пожарна безопасност и защита на населението" - MBP. При обработката е използвана автоматична класификация, последвана от визуална интерпретация от оператор. Спътниковите данни са съгласувани със Справките за произшествия на НС "Пожарна безопасност и защита на населението" - MBP.



Земно покритие на опожарени територии според CORINE Land Cover 2000.



Опожарени територии след визуална интерпретация.

Име на община	Обща площ на общината [ха]	Опожарени площи [ха]	% на опожарените площи спрямо площта на общината
Братя Даскалови	40 216.6	2 243.2	4.7%
Казанлък	63 399.9	945.5	1.5%
Мъглич	38 868.7	2 490.2	6.4%
Опан	25 733.7	283.8	1.1%
Раднево	54 480.9	517.7	1.0%
Стара Загора	106 265.4	2 487.6	2.3%
Твърдица	44 225.4	46.5	0.1%
Общо	381 190.6	9 014.5	2.4%



Легенда:

- Антропогенни площи
- Горски и полустепенни площи
- Селскостопански площи

Земно покритие	Опожарени площи [ха]	% спрямо общата опожарена територия
Антропогенни площи	37.5	0.4%
Горски и полустепенни площи	5 041.4	55.9%
Селскостопански площи	3 935.5	43.7%
Общо	9 014.5	100.0%



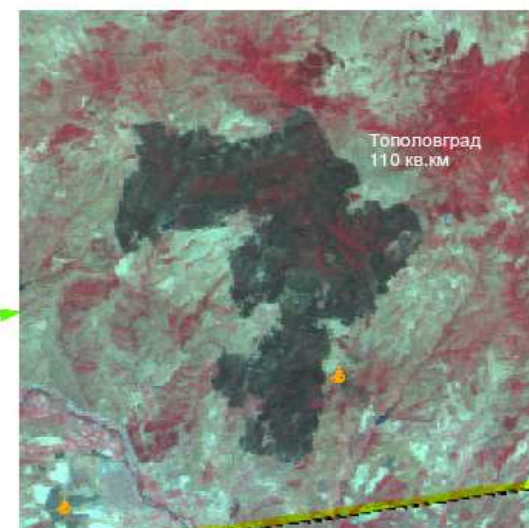
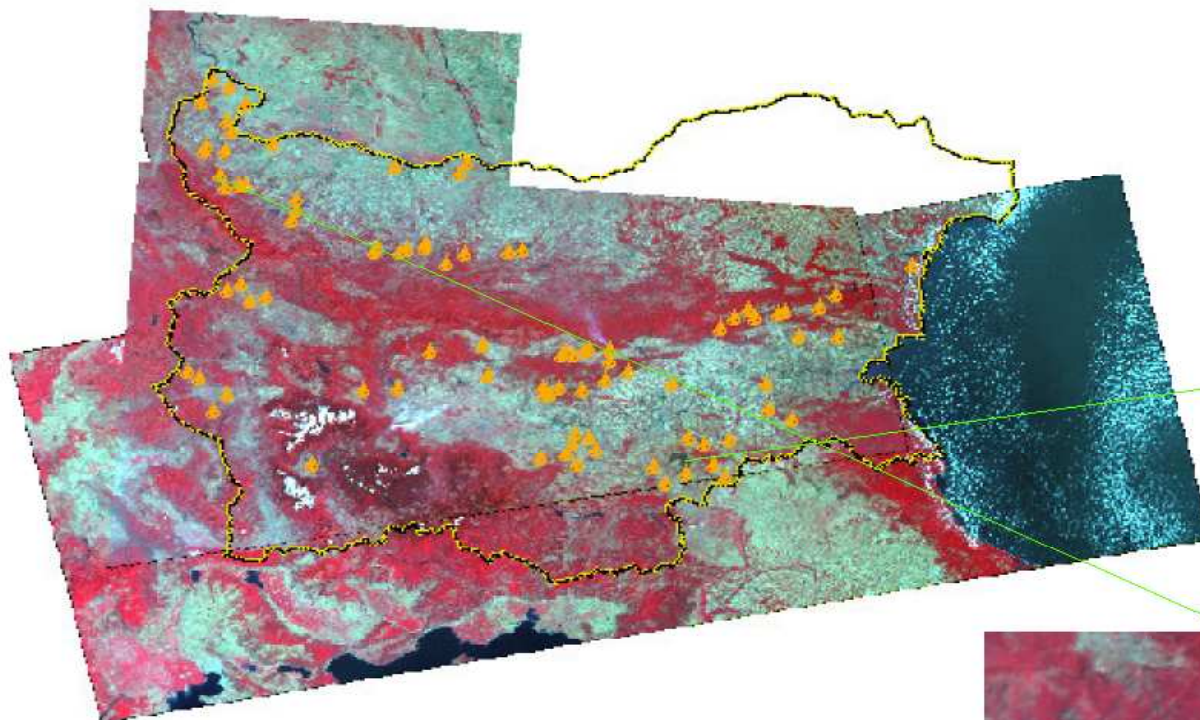
ОЦЕНКА НА ЗАСЕГНАТИ ТЕРИТОРИИ ОТ ПРИРОДНИ БЕДСТВИЯ – ГОРСКИ ПОЖАРИ ЗА ПЕРИОДА ЮЛИ 2007



Покритие на България
с 3 сцени спътникови изображения от DMC - II
с разделителна способност 32 m от 11, 24 и 27 юли 2007г.



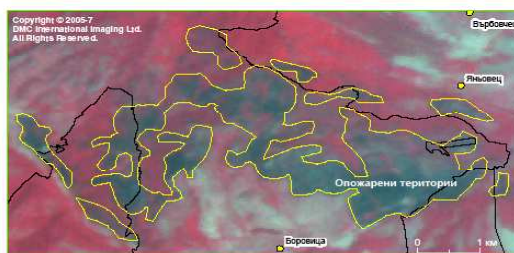
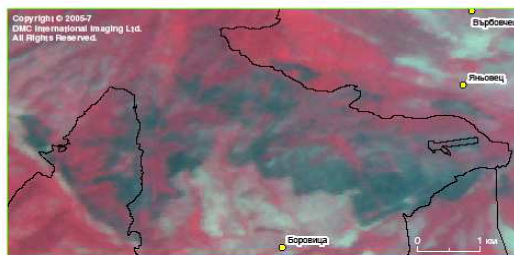
Анализът е направен на база спътникови изображения от спътници SPOT, DMC Terra/MODIS, Aqua/MODIS.
Разработката е в рамките на научно-приложна задача по управление на риска, възложена от Държавната агенция за информационни технологии и съобщения и е изготвена от Център за приложение на спътникови изображения – РЕСАК.



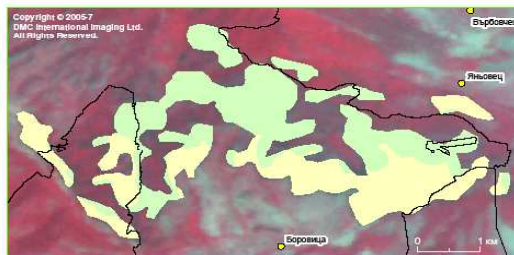


ОЦЕНКА НА ЗАСЕГНАТИ ТЕРИТОРИИ ОТ ПРИРОДНИ БЕДСТВИЯ – ГОРСКИ ПОЖАРИ ЗА ПЕРИОДА ЮЛИ 2007

Покритие на България с 3 сцени изображения от спътник DMC - II с разделителна способност 32 m от 11, 24 и 27 юли 2007г.



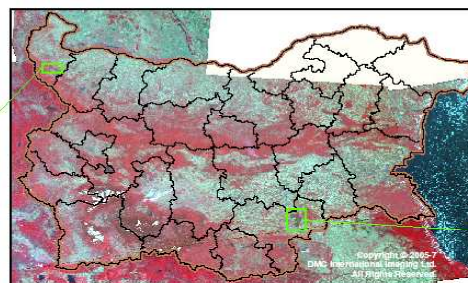
Опожарени територии след визуална интерпретация.



Земно покритие на опожарени територии според CORINE Land Cover 2000.

Легенда:

- граници на общини
- Горски и полустествени площи
- Селскостопански площи



Легенда:
— граница на България
— области

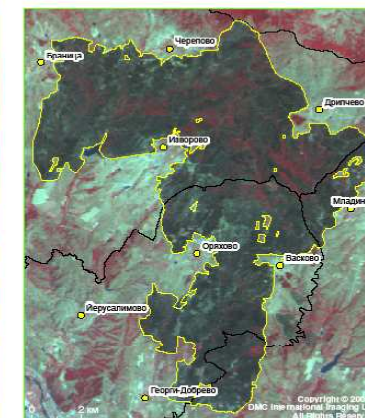


Анализът е направен на база спътникови изображения от спътници SPOT, DMC, Terra/MODIS, Aqua/MODIS за териториите обхванати от големите пожари в близост до гр.Белоградчик и гр.Харманли. Разработката е в рамките на научно-приложна задача по управление на риска, възложена от Държавната агенция за информационни технологии и съобщения и е изготвена от Център за приложение на спътникови изображения – REСAC в сътрудничество с НС "Пожарна безопасност и защита на населението" - МВР.

При обработката е използвана автоматична класификация, последвана от визуална интерпретация от оператор. Спътниковите данни са съгласувани със Справките за произшествия на НС "Пожарна безопасност и защита на населението" - МВР.

Име на община	Обща площ на общината [ха]	Опожарени площи [ха]	% на опожарените площи спрямо площта на общината
Белоградчик	41 156.3	683.2	1.7%
Димово	40 326.8	58.8	0.1%
Чупрене	32 803.1	127.6	0.4%
Общо	114 286.2	869.6	0.8%

Земно покритие	Опожарени площи [ха]	% спрямо общата опожарена територия
Горски и полустествени площи	473.8	54.5%
Селскостопански площи	395.8	45.5%
Общо	869.6	100.0%



Опожарени територии след визуална интерпретация.

Име на община	Обща площ на общината [ха]	Опожарени площи [ха]	% на опожарените площи спрямо площта на общината
Любимец	34 406.1	3 427.8	10.0%
Сопотград	89 993.8	1 202.1	1.3%
Тополовград	71 022.8	0.6	0.0%
Харманли	69 428.3	6 151.0	8.9%
Общо	244 843.0	10 781.5	4.4%

Земно покритие	Опожарени площи [ха]	% спрямо общата опожарена територия
Антропогенни площи	20.8	0.2%
Водни площи	12.9	0.1%
Горски и полустествени площи	2 898.3	26.9%
Селскостопански площи	7 849.5	72.8%
Общо	10 781.5	100.0%



Земно покритие на опожарени територии според CORINE Land Cover 2000.

Легенда:

- граници на общини
- Горски и полустествени площи
- Антропогенни площи
- Водни площи
- Селскостопански площи



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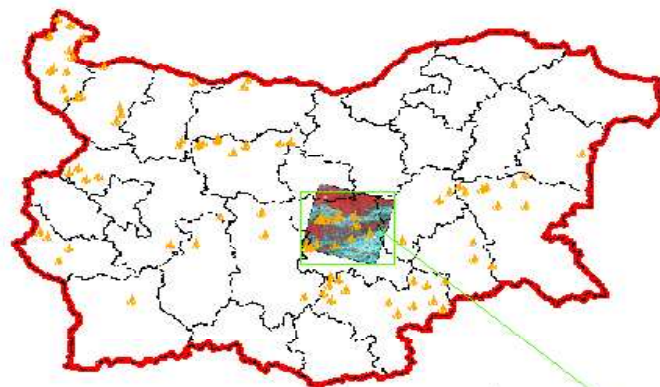
ПРИМЕР ЗА ОЦЕНКА НА ЗАСЕГНАТИ ТЕРИТОРИИ ОТ ГОРСКИ ПОЖАРИ ПО ОБЩИНИ - ЗА ПЕРИОДА ЮЛИ 2007



Покритие на България
сът спътниково изображение SPOT
с разделителна способност 10 m от 28.07.07г.



Анализът е направен на база спътникови изображения от спътници SPOT, DMC Terra/MODIS, Aqua/MODIS. Разработката е в рамките на научно-приложна задача по управление на риска, възложена от Държавната агенция за информационни технологии и съобщения и е изготвена от Център за приложение на спътникови изображения – РЕСАК.



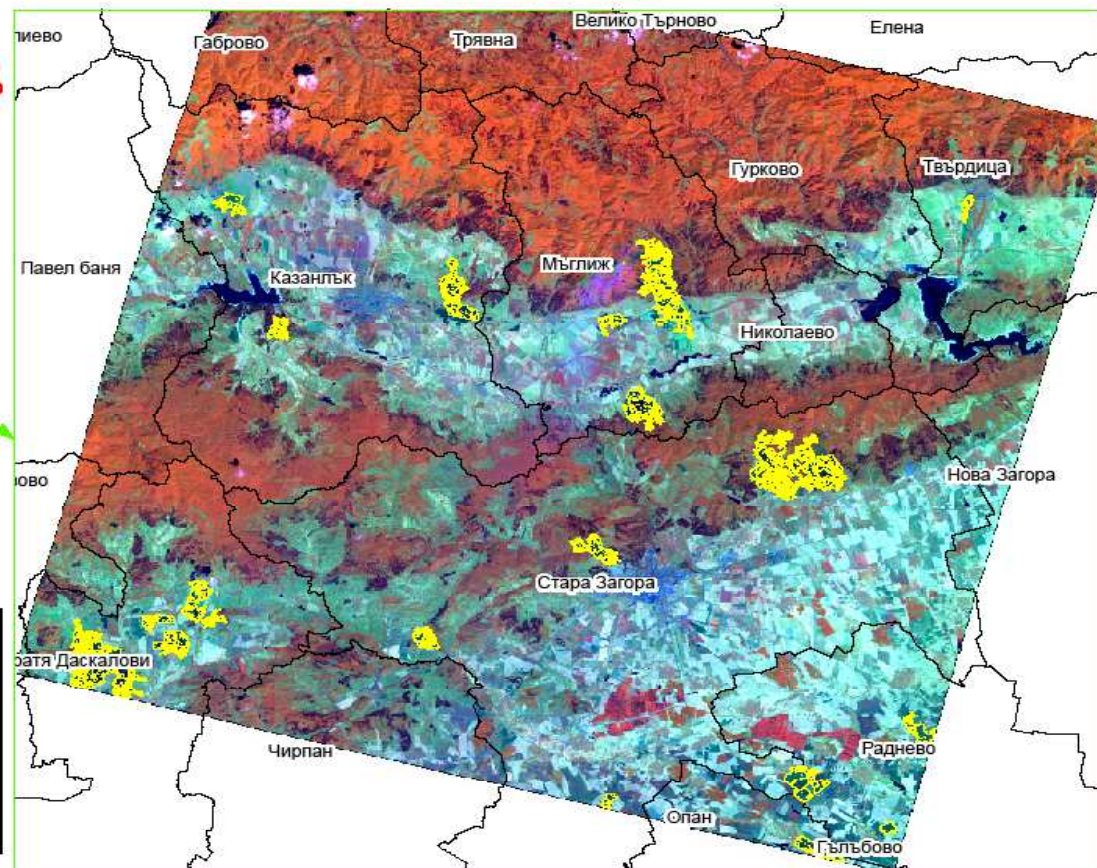
Легенда:
 пожари
 области
 граница на България



0 25 50 100km

Код на Община	Име на община	Опожарени площи [ха]
SLV24	Твърдица	68.4
SZR23	Опан	247.0
SZR27	Раднево	471.4
SZR12	Казанлък	770.5
SZR22	Мъглиж	1 479.6
SZR04	Братя Даскалови	1 947.8
SZR31	Стара Загора	2 070.4

Приложение 5





Project “Geo-information System for Prediction and Assessment of Seismic Risk”

1. Project activities:

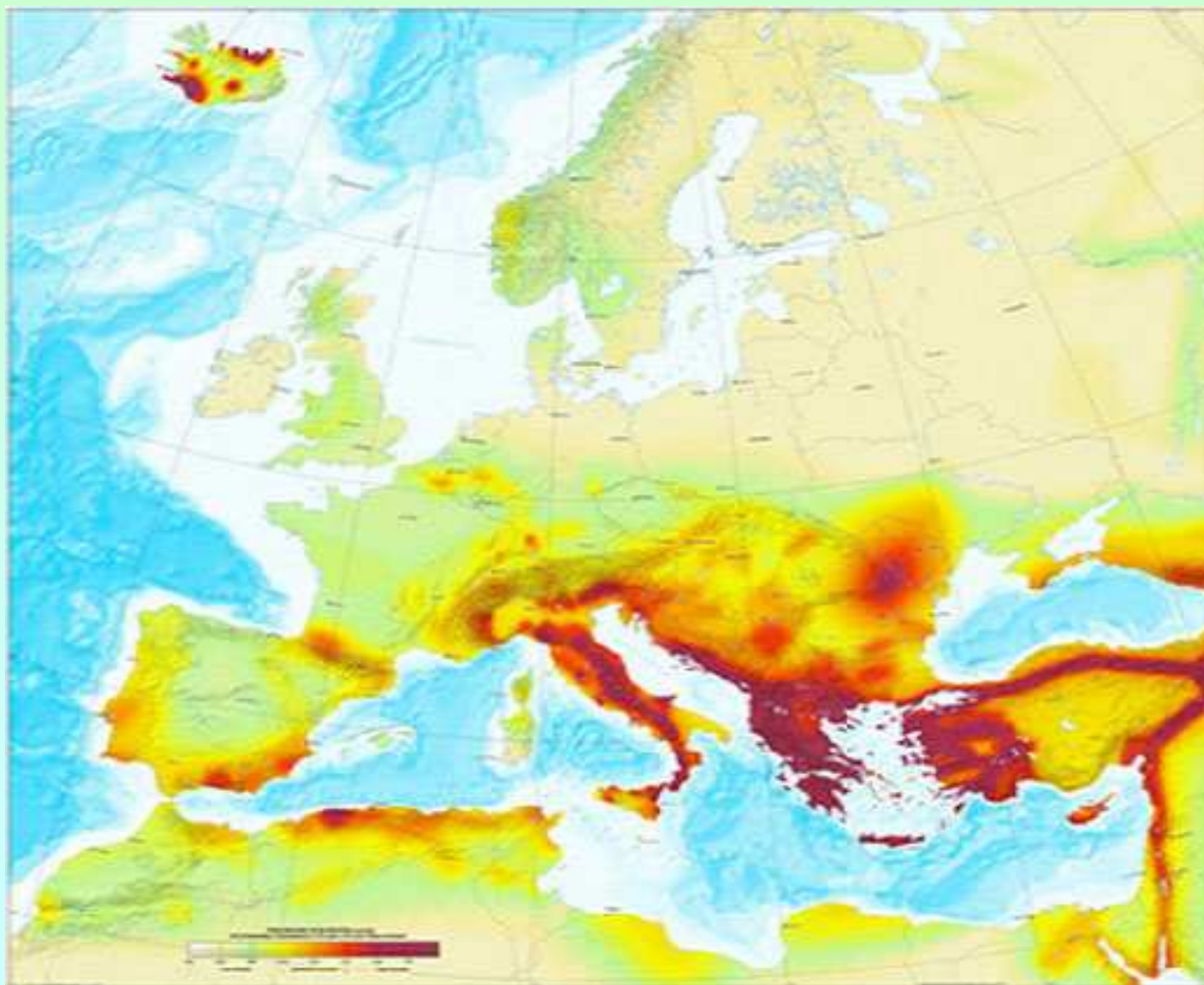
- studying the European and global experience in building local systems and data bases for seismic risk assessment;
- building a local geo-information system and data base for pilot regions – Rousse, Vratsa and Sofia;
- analysis and assessment of seismic risk in the pilot regions;
- creation of a model of a centralised geo-data base;
- development of economic risk methodology and resource management.

2. Presentation of some of the results of the project:

- creation of maps of Bulgaria on the degree of seismic risk on the basis of the map of anticipated microseismic intensity drawn up by the Institute of Geo-Physics at the Bulgarian Academy of Sciences;
- map of Bulgaria with zones of seismic intensity for a period of 1000 years;
- creation of a general map of anticipated damages from a maximum-intensity seismic disaster as a percentage of the total residential housing for every municipality;
- simulation model of an earthquake with an epicentre – using a German modeling method

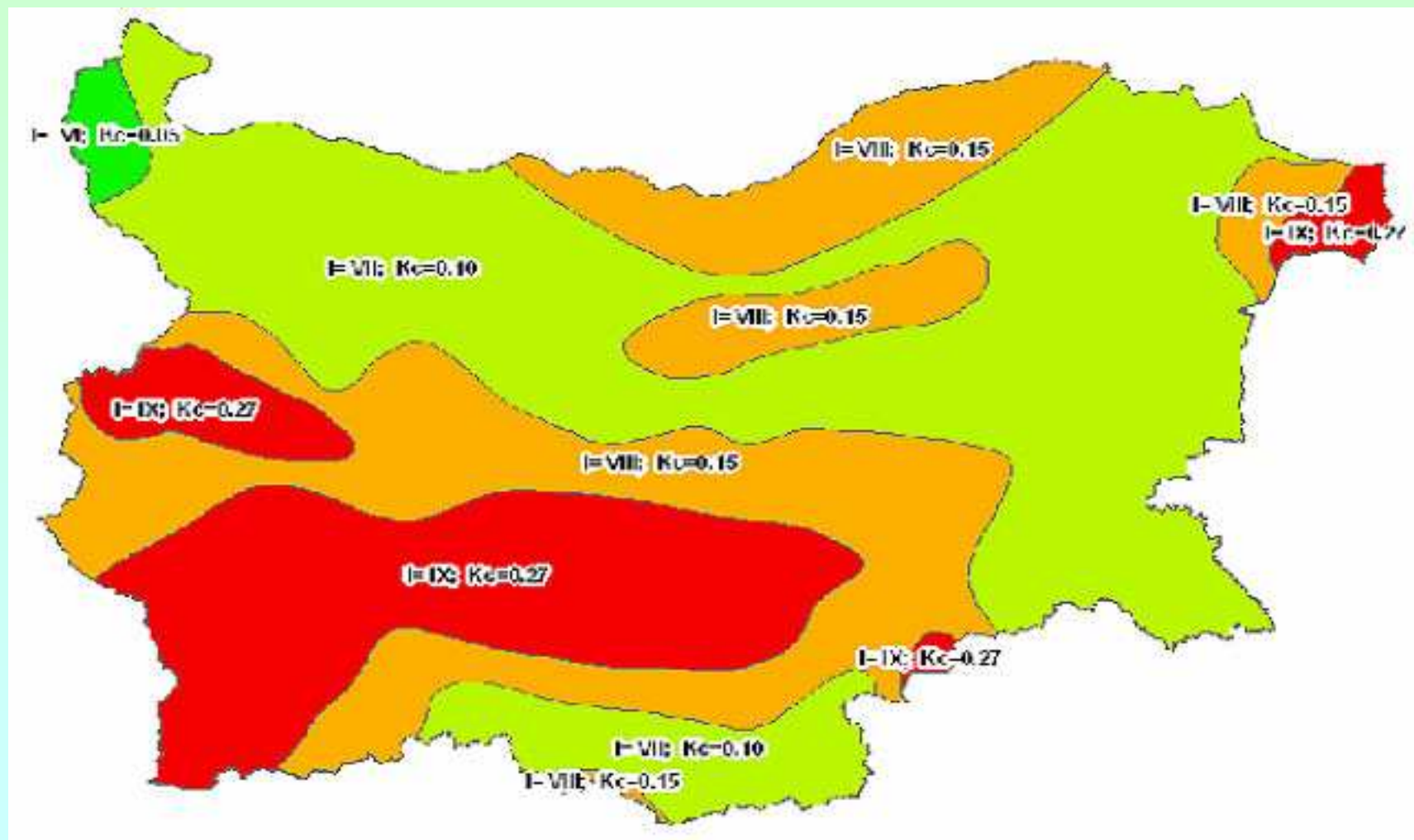


European Mediterranean map of seismic risk

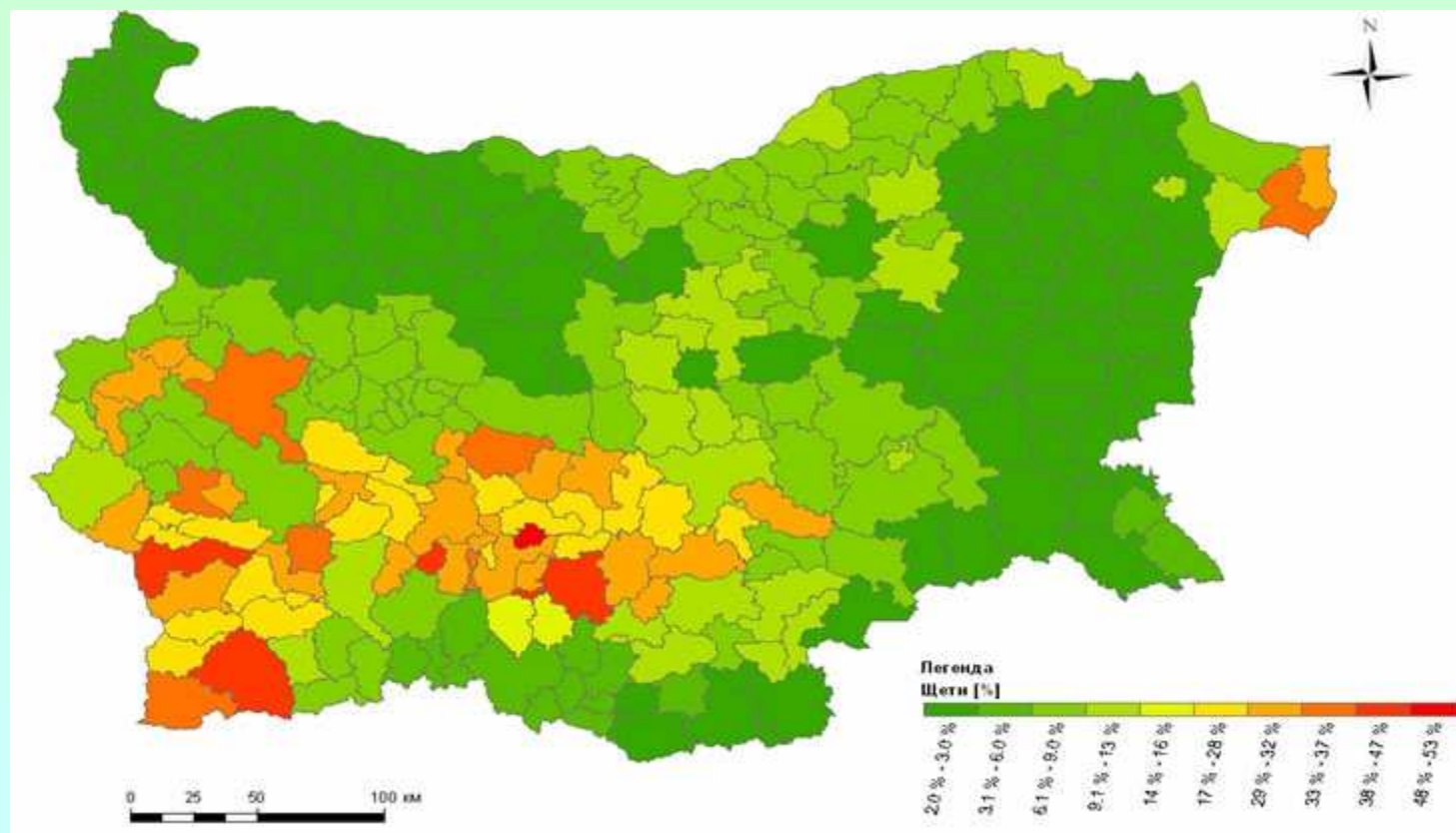


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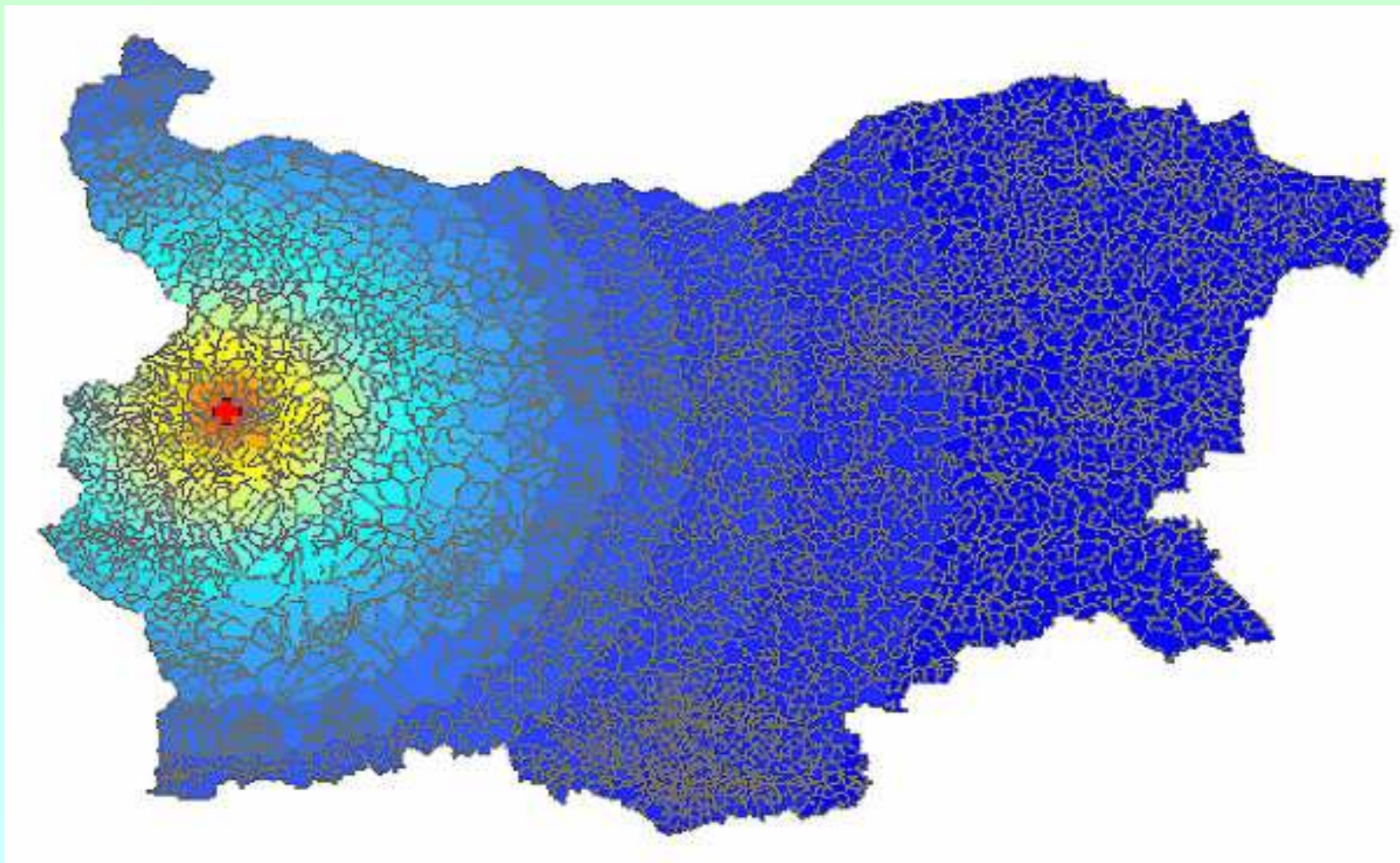
Map of Bulgaria with zones of seismic intensity for a period of 1000 years



**General map of anticipated damages from a maximum-intensity seismic disaster
as a percentage of the total residential housing for every municipality**



Simulation model of an earthquake with an epicentre near Sofia – using a German modeling method





Project Risk Manager – Internet-based system for registration, monitoring and preventive resource risk management against natural disasters

1. Project activities:

- collection and summarisation of data from municipalities and mayoralities on the risk of natural disasters and occurred events – floods, forest fires, earthquakes, landslides;**
- archiving and summarisation of the information in historical perspective;**
- information processing using specific methodology, quantification of the risk and determination of the efficiency of the resources for implementation of the preventive measures.**

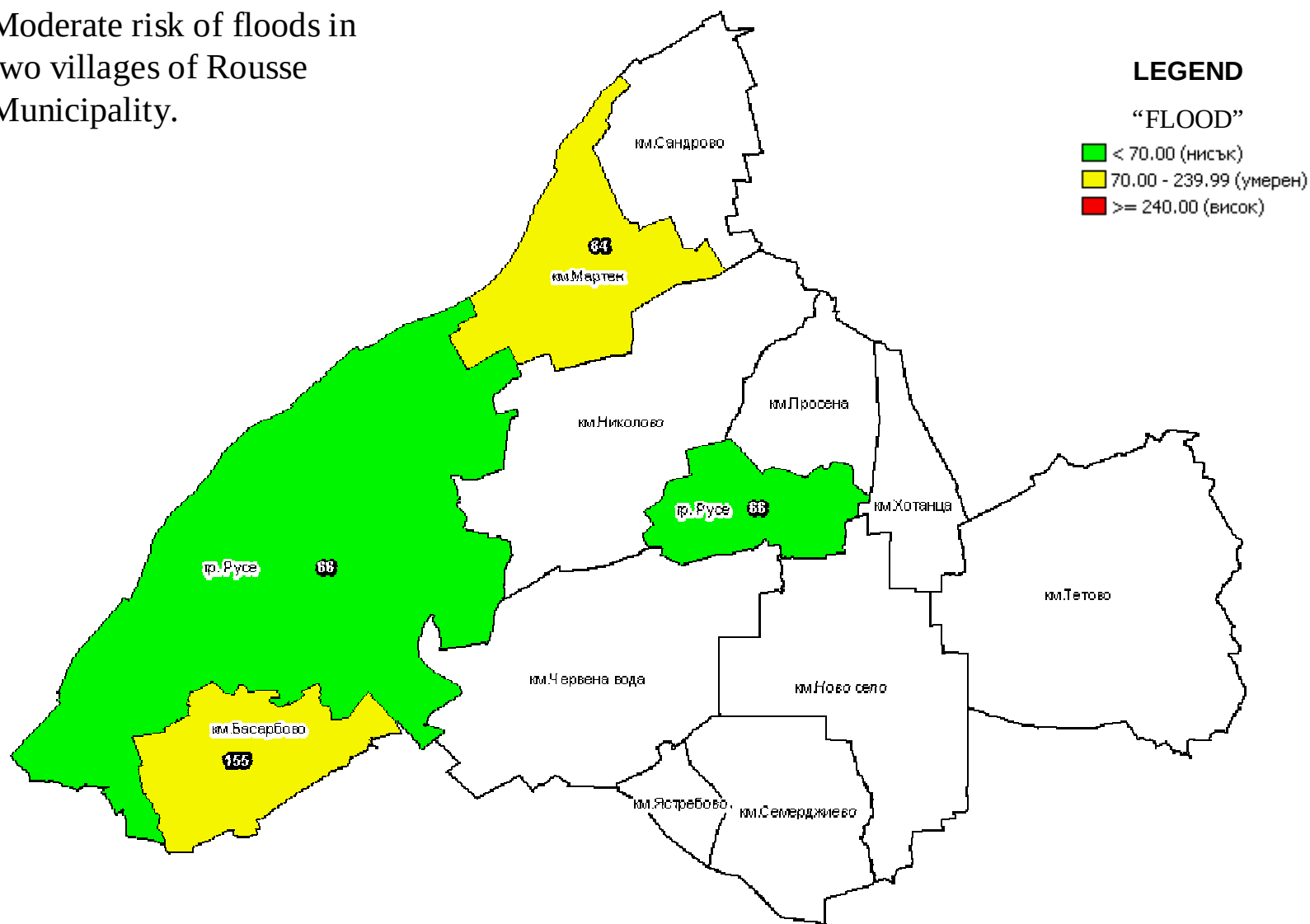
2. Project results:

- assessing the effects of the different types of natural disasters by municipalities and mayoralities;**
- planning and control of preventive measures, actions and their financial dimensioning and assessment of their efficiency;**
- options for queries and inspection of dangerous zones and damages in the historical data base.**



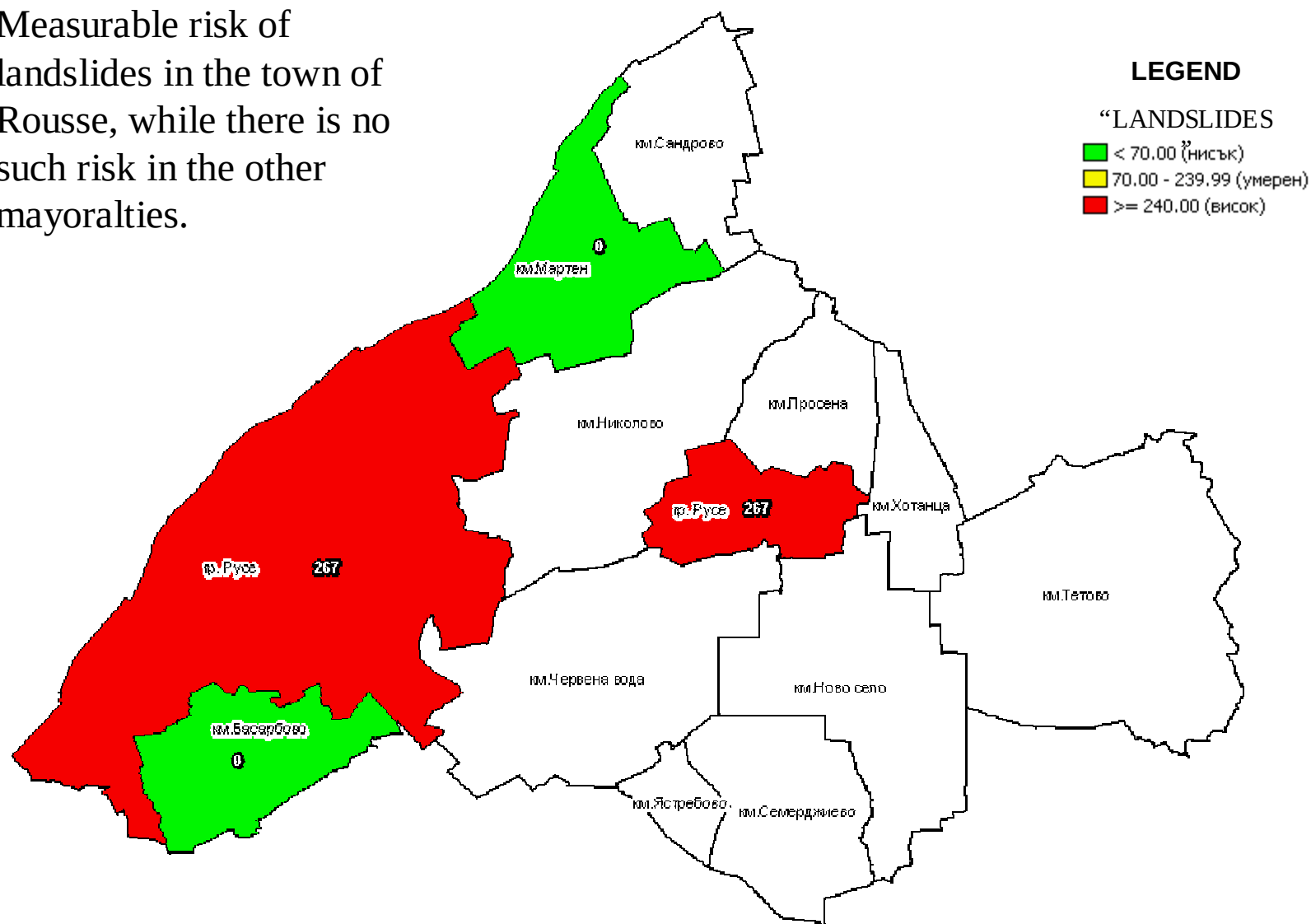
RISK FACTOR “FLOODS” 2008

Moderate risk of floods in two villages of Rousse Municipality.



RISK FACTOR “LANDSLIDES” 2008

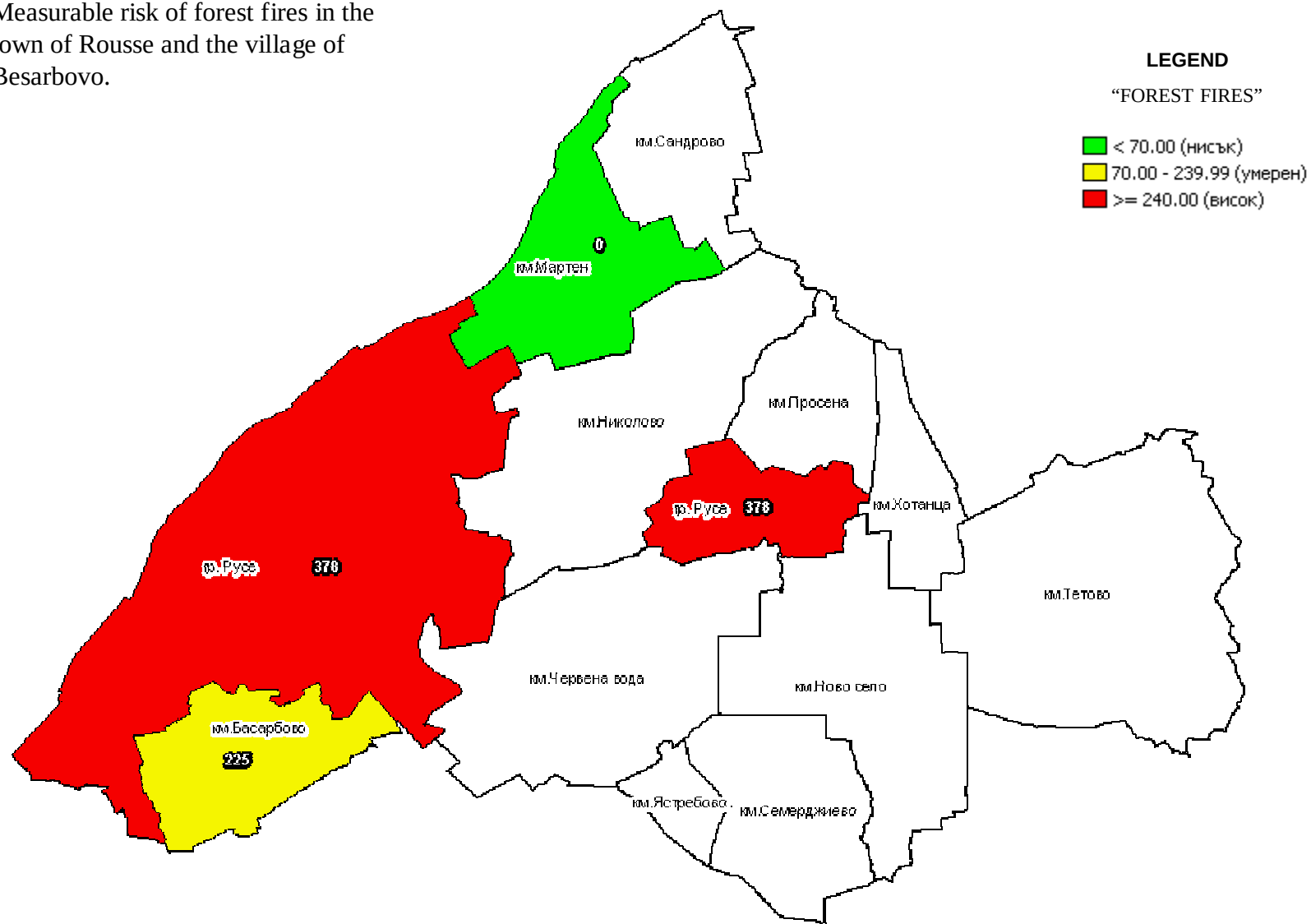
Measurable risk of landslides in the town of Rousse, while there is no such risk in the other mayoralties.



RISK FACTOR

“FOREST FIRES” 2008

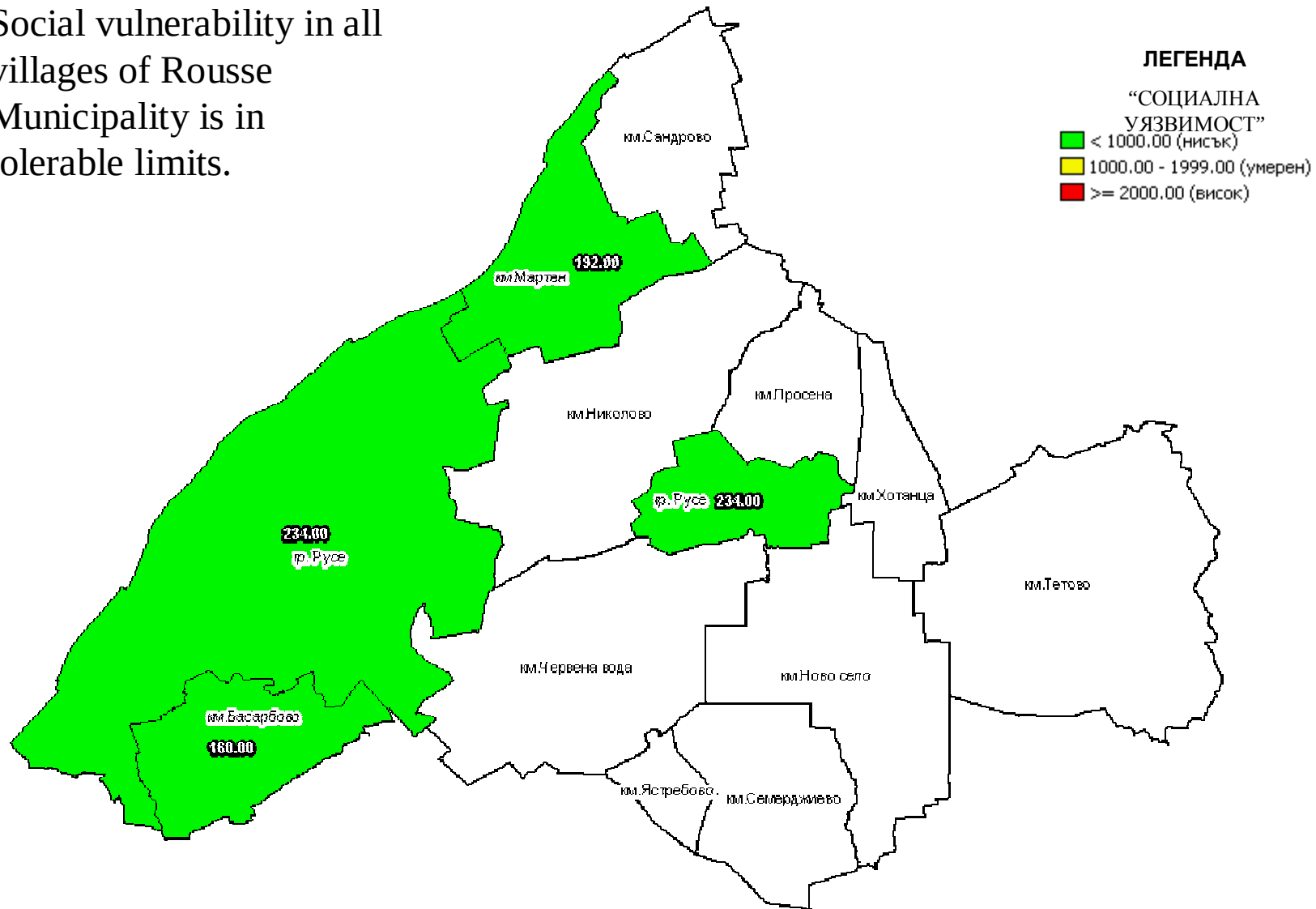
Measurable risk of forest fires in the town of Rousse and the village of Besarbovo.



RISK FACTOR

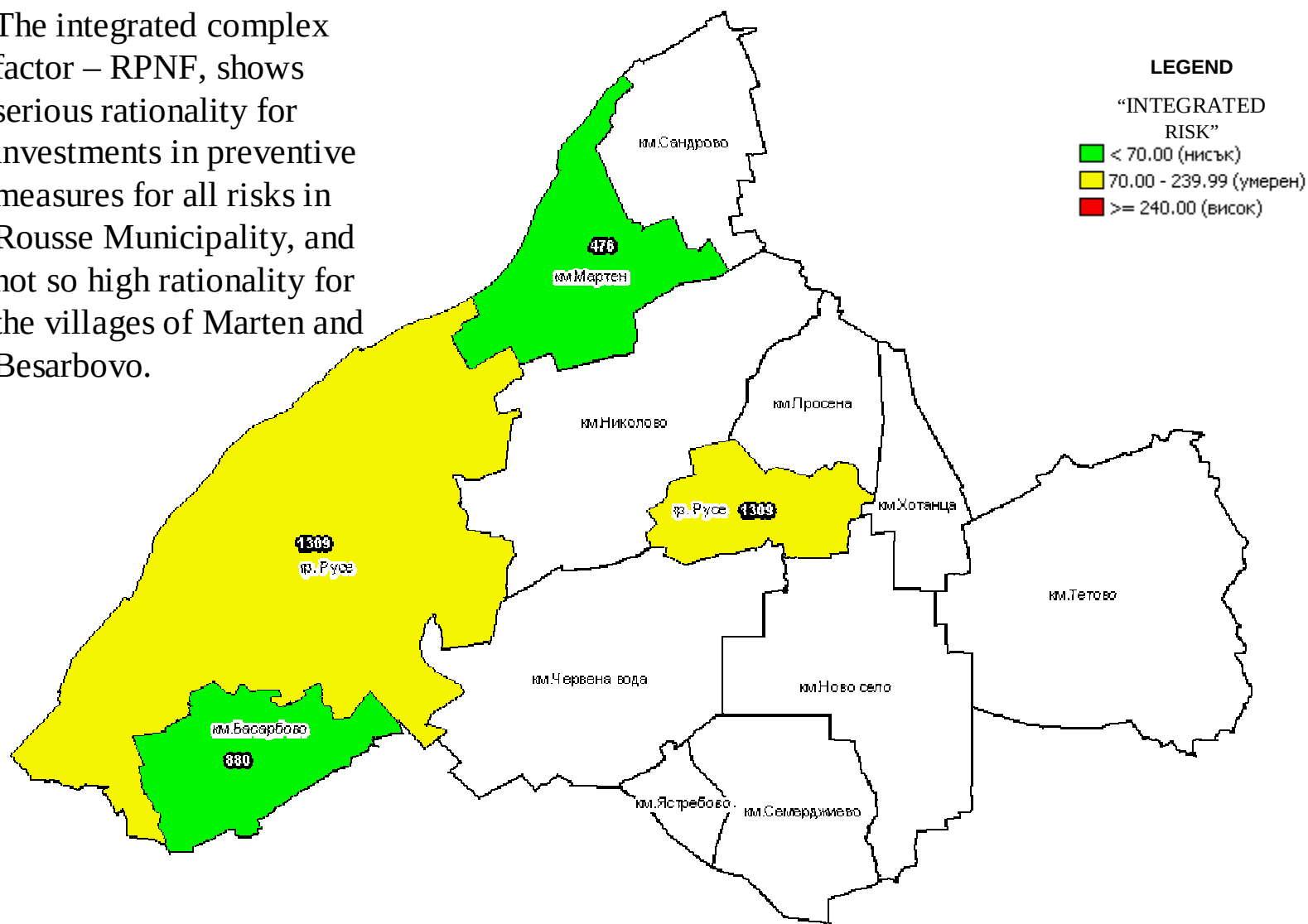
“SOCIAL VULNERABILITY” 2008

Social vulnerability in all villages of Rousse Municipality is in tolerable limits.



INTEGRATED COMPLEX FACTOR **RPNF** - 2008

The integrated complex factor – RPNF, shows serious rationality for investments in preventive measures for all risks in Rousse Municipality, and not so high rationality for the villages of Marten and Besarbovo.



3D simulation model of a risk zone for the region of Nikolovo Dam



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THANK YOU FOR YOUR ATTENTION!

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