Strengthening Global Forest resilience and user oriented services

A vision/Proposal for collaboration/Project ideas

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Note:1. The presentation is prepared jointly with experts from ASDE-ECOREGIONS and ReSAC;
2. The Big Data concept part of the presentation is based on a collaboration with prof. KRASSIMIR MARKOV Institute of Mathematics and Informatics, Bulgarian Academy of Science (BAS);Institute of Information Theories and Applications - FOI ITHEA
Sofia, Bulgaria

CONTENT:

1. **Garbage in - garbage out** – data accuracy and harmonization;

2. **Reference LC/LU layer under ISO 19144-2** – parallel regular monitoring of changes on global and local level;

3. **Big Data challenge –** simple solution for all users;

4. **Proposal for Cooperation for EU – "important projects of common European interest - synchronization", Africa, Silk Road**

Do you believe there a local USER for such maps? - Need of national operational capacity and decentralized management
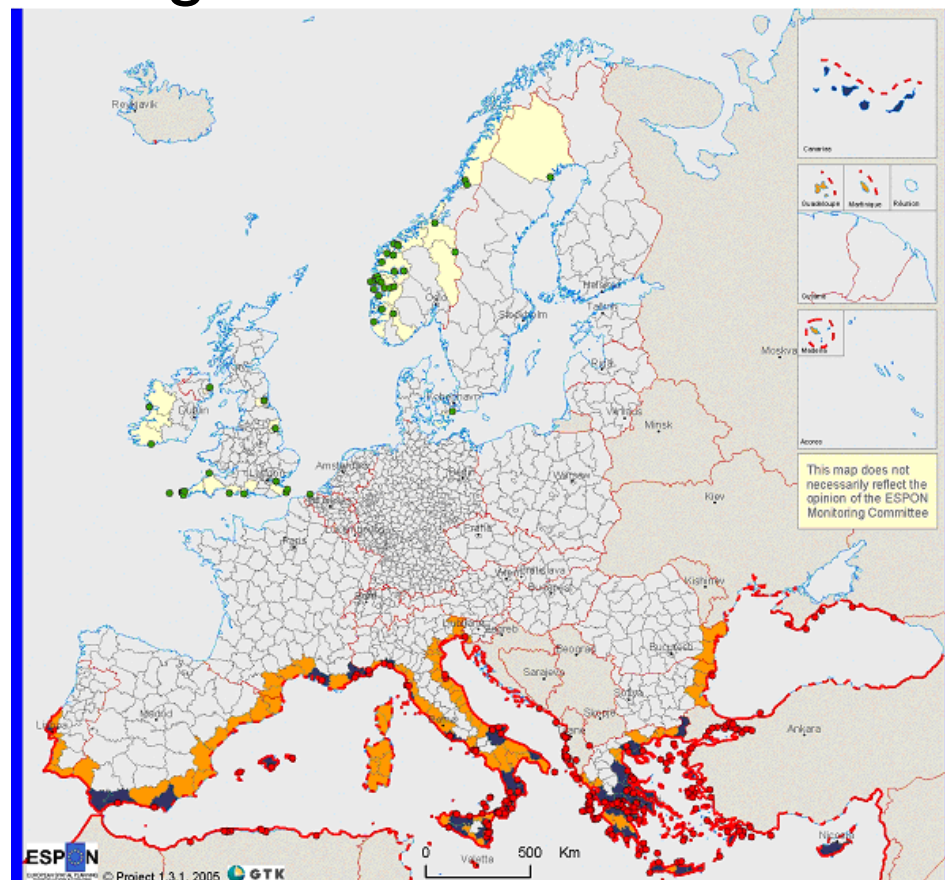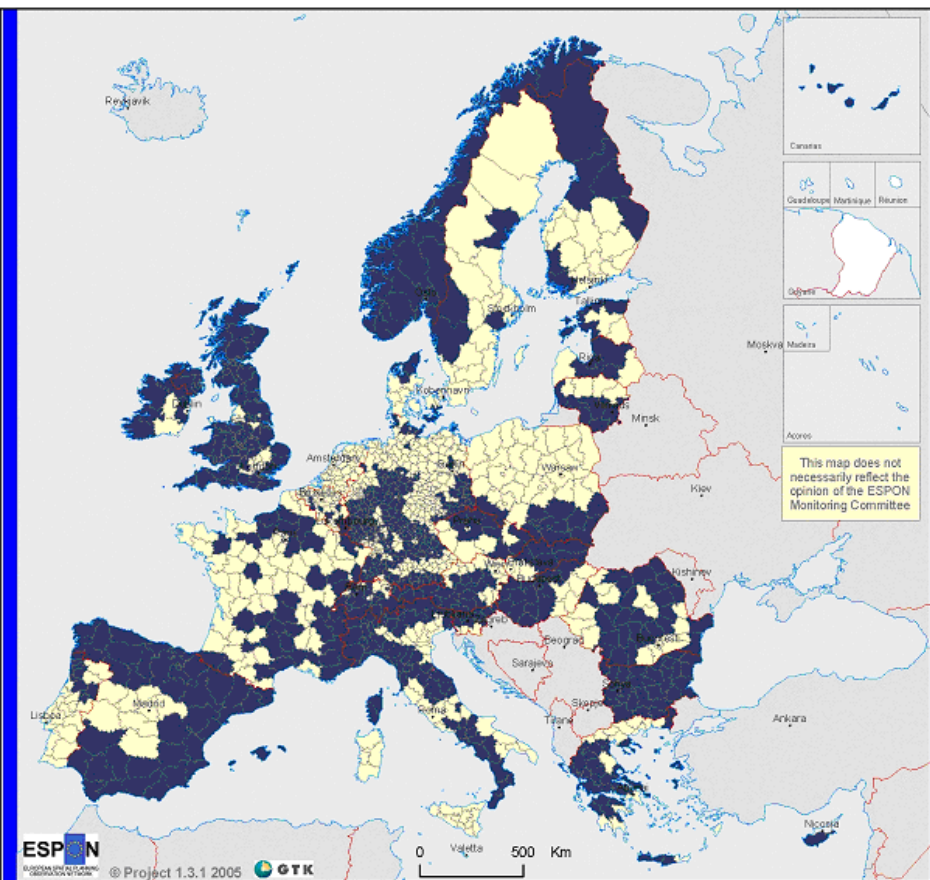
1-2. Garbage in / garbage out – this problem has an epidemic character; SDB's Solution –Data accuracy and harmonization, based on reference LC/LU layer under ISO 19144-2; (LPIS support)

What we need – data accuracy and harmonization + upgrading, coordination with global methodologies and integrated approach under the so-called "important projects of common interest"

Example : Cross-border "SPATIAL" flagship project deliverables - two spatial datasets for the Bulgarian and Romanian part of the cross-border cooperation (CBC) project area (72 000 km2)

❑**Both national SDB various thematic layers <u>fully interoperable </u>(INSPIRE principles);**

❑**Reference LC/LU layer - ISO 19144-2 and COPERNICUS satellite images (ESA contribution) , for the needs of <u>regular monitoring of changes</u>**

❑**Common specification ensuring efficient cross-border analysis and reporting**

❑**Classification coherence ensured by the use of standardized semantic language**

❑**Provided through Web-based geo-service**

❑**85% thematic accuracy of the land cover data (2014),**

2. Reference LC/LU layer under ISO 19144-2 – regular monitoring of changes and <u>forget CLC</u>; reference LC/LU layer under ISO 19144-2; Support from the LPIS (land Parcel Identification System – BG-RO cross border example - 72 000 km2
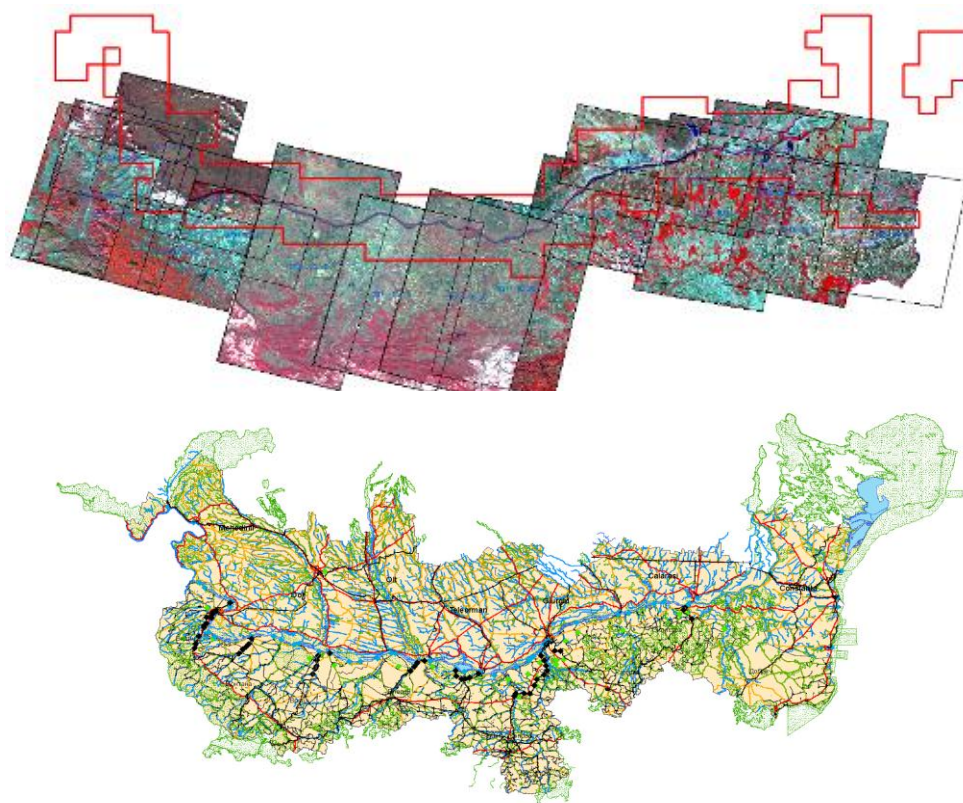
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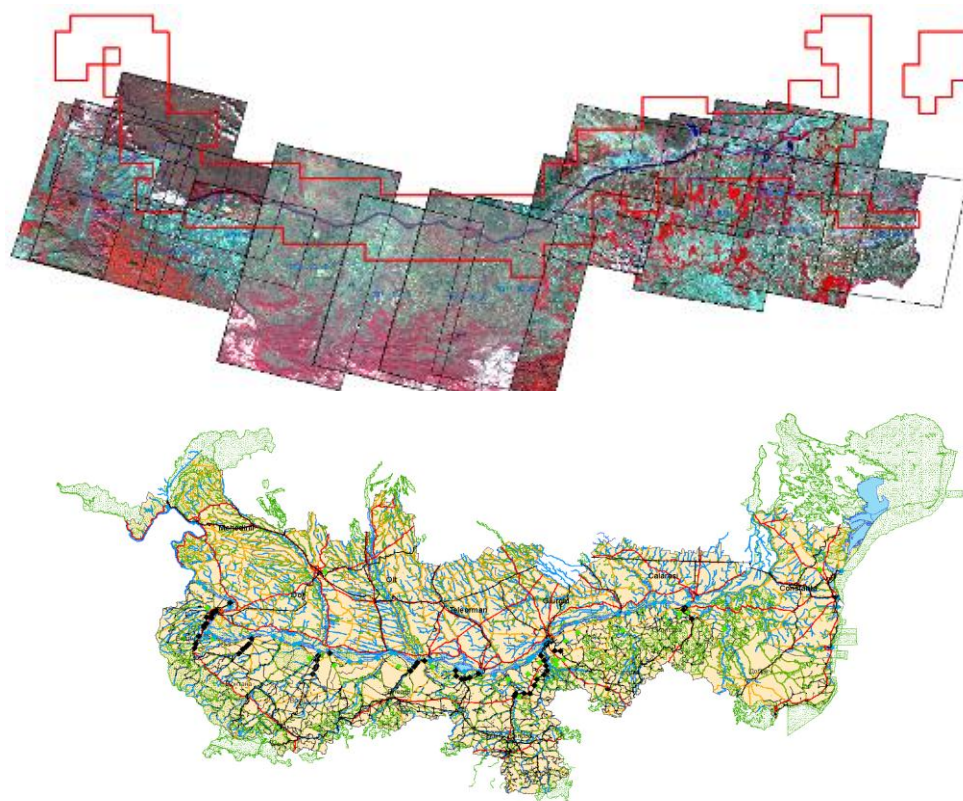
Land use/ land cover concept-Two sides of the same coin

Land cover: Physical and biological cover of the earth's surface including artificial surfaces, agriculture areas, forests, (semi-) natural areas, wetlands, water bodies.

Land Use: Territory characterised according to its current and future planned functional or socio-economic purpose (e.g. residential, industrial, commercial, agricultural, forestry, recreational)

Two key concept in land monitoring that have never been properly managed in most of the land inventory initiatives

Pastures- Old/EU-CommReg 1120/2003)

Pastures- New/EU - (DPR 1307/2013)

Forests- how many layers ??

Guess what is it?

The answer is: Colonia Ulpia Ratiaria, the ancient capital of the roman Dacia Danubiana - completely destroyed by treasure hunters
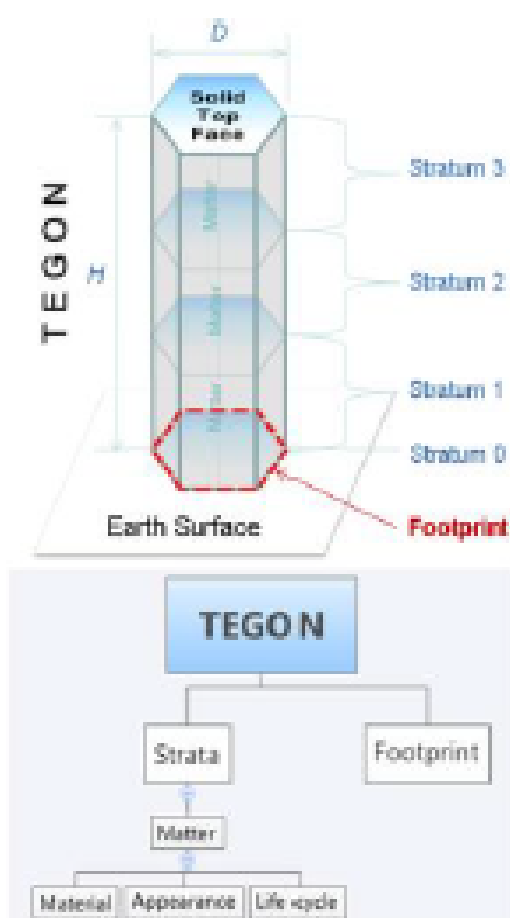
TWO UNIQUE BASIC ELEMENTS, INTERPRETING FUNCTIONAL & CARTOGRAPHIC MIX for Regular Monitoring of Changes

**TEGON CONCEPT – JRC-IES-MARS UNIT**

URBAN BRICK DRAFT CONCEPT – ASDE

COMMON BASIC IDEA:

1. Import LCCS Class from FAO Legend

2. Decompose the LCCS class using TEGON or URBAN-BRICK concept:
   - Analyze the presence of cartographic or functional mix
   - Filter out land use descriptors

3. Design of LC type with LCML

4. Convert relevant spatial data to the new LC type
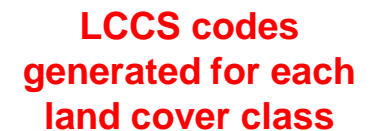
Bucharest, Romania;

Data harmonization
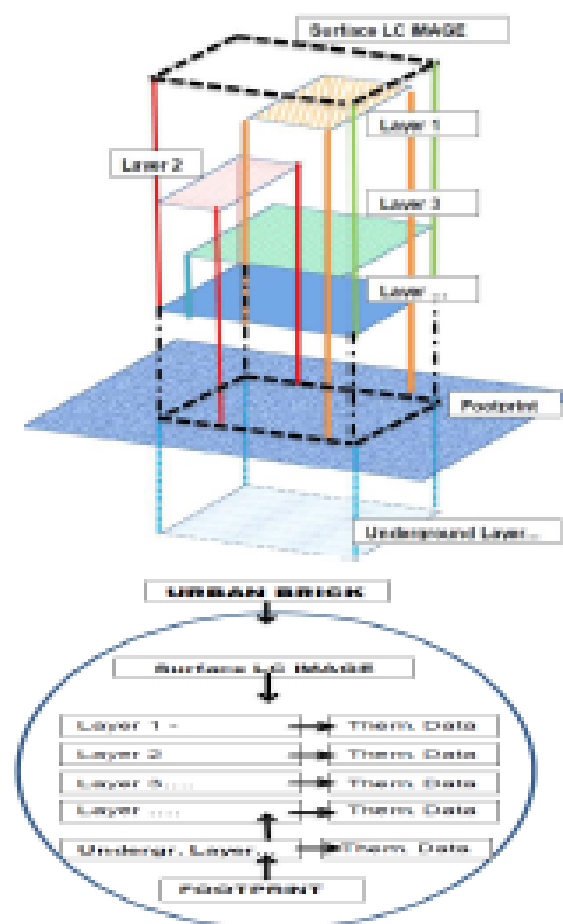
Local land cover nomenclatures, described with national connotations

Local land cover nomenclatures, translated with LCML

Land Cover Meta Language (LCML)

Input of the local land cover nomenclature

LCCS codes generated for each land cover class

- SOUTH EAST EUROPEAN RISK AND TERRITORY REFERENCE DATA AND SERVICES INFRASTRUCTURE (INTEGRATED BIG DATA, HIGH PERFORMANCE COMPUTING, PREVENTION ANALYSIS/GAMIFICATION AND REGULAR MONITORING) – currently Trans-border reference SDB and SmartCover Architecture geo-portal for Bulgaria and Romania; next step – Bulgaria-Macedonia, Bulgaria-Serbia, Bulgaria-Greece and Bulgaria-Turkey); Possibility to include also Moldova and Ukraine; Third step – Danube region countries; Forth step ……

2+4. Next step(proposal) Reference LC/LU layer under ISO 19144-2 + Proposal for Cooperation for EU - important projects of common European interest

EU NETWORK OF REGIONAL CENTERS FOR INTEGRATED MANAGEMENT of RISK, TERRITORY AND COTIZENS SECURITY IN SUPPORT TO THE EU MACRO_REGIONAL STRATEGIES AND POLICIESOF

3. Big Data challenge – simple solution for all users

Storing Big Data using Natural Language Graph Information Bases (NLGIB) - Proposed approach for Big Data Management from the Bulgarian expert group (ITHEA® &ASDE)

| Operational Environment (Cloud "Collect/Report" Paradigm); |
| Operational Environment (Cloud "Collect/Report" Paradigm); |
| External data models (NL-Graph Information Bases) |
| Program realizations (MDAM1, ... ,Arm32, BigArM) |
| Natural Language Access Method |
| Multi-Domain Access Method |
| Natural Language Addressing |
| Multi-Domain Information Model |
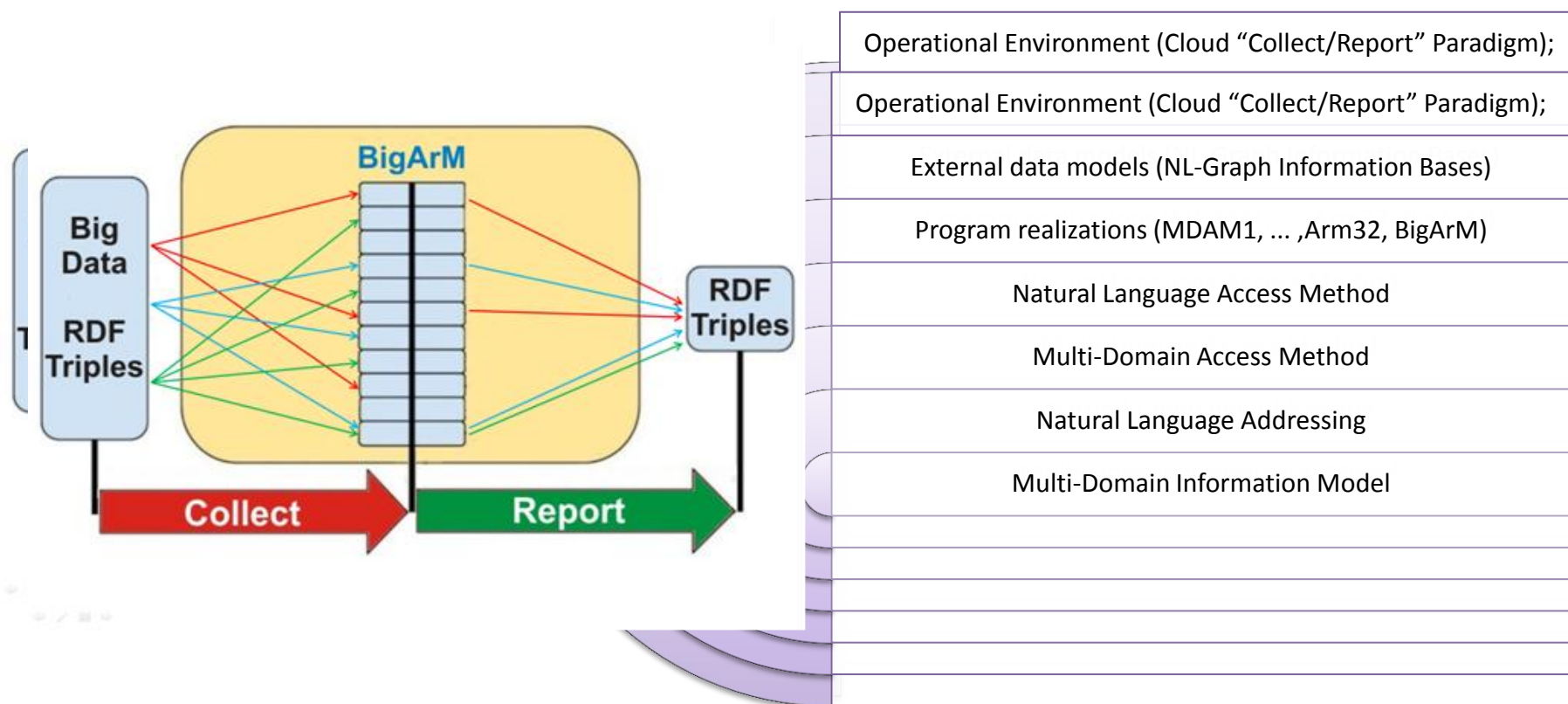
Prof. Krasimir Markov courtesy

3. Big Data challenge – a real time data interpretation using Multi-Domain Access Method for system aggregators of messages (data mining)

Automatic system-aggregator of messages for analysis and output trends in the risk "Riskwatch"

Riskwatch is a system (aggregator), which monitors continuously, filter and extract disaster news happened over the territory of Bulgaria, from 20 - Bulgarian news websites. Riskwatch is a fully automatic system that uses artificial intelligence methods and RSS – technology, and works in realtime. Six natural disaster types have been assigned to look for:

Earthquakes   Forest Fires   Floods   Landslides   Severe Snowing   Severe Wind

Having their hands on Riskwatch state and local governmental organizations have an important tool for strategy planning and prevention for monitoring and risk management. Nonetheless, it can serve cross-border monitoring and risk management as well.

The system is available online at:
www.bsdi.asde-bg.org/riskwatch.php

Provided Services

I. Daily disaster bulletin – it represents the disaster issue with various parameters related to the news, and the disaster type.
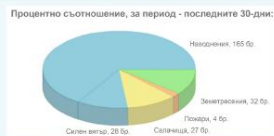

II. Web-GIS application that represents the disasters. This application provides an opportunity to illustrate the natural disaster types together with their geographic information.

Statistical Analyzes of the "Riskwatch"

Statistics depicting the distribution of messages about a disaster is displayed on interactive graphics. Accordingly, for a particular disaster we can extract information about the statistical distribution of the number of messages in a given period.

"Riskwatch" allows you to identify disastrous events' trends and the most likely reasons for their occurrence and evolution.

Interactive and thematic maps related to "Riskwatch" are made on request to display statistical analysis of trends, possible causes and strategic planning.

Thematic maps represent specific statistical distribution of the data imposed in GIS environment. So produced maps provide information on the different types of natural disasters for a specific period of years or months according to user needs.

■ *Synergy map of registered messages for natural disasters in Bulgaria by type per municipalities for 2011*
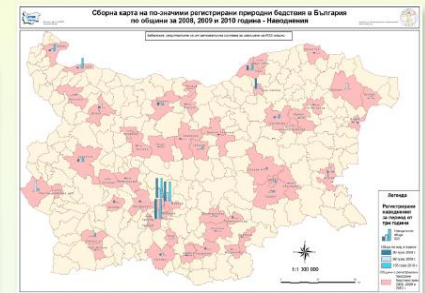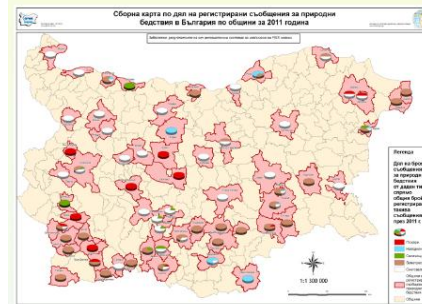
■ *Synergy map of registered Flood's messages in Bulgaria by municipalities for years 2008, 2009 and 2010*

Integration with similar European Systems

Risk Observer is a flexible system, synchronized with the European Commission information systems such as:

- European Forest Fire Information System - EFFIS
- European Flood Awareness System - EFAS
- Operational Programme ESPON - European Observation Network for Territorial Development (ESPON)

EFAS (IES - JRC)   РИСК - НАБЛЮДАТЕЛ (БИПД)   EFFIS (IES - JRC)

ESP☆N

Additional services according to the user requirements
ASDE team is continuously improving the system based on new projects or user demands. An example is set for monitoring indicators for urban areas - population, condition of infrastructure and buildings, quality of life etc.

3. Big Data challenge – simple solution with ordinary computers- ASDE case
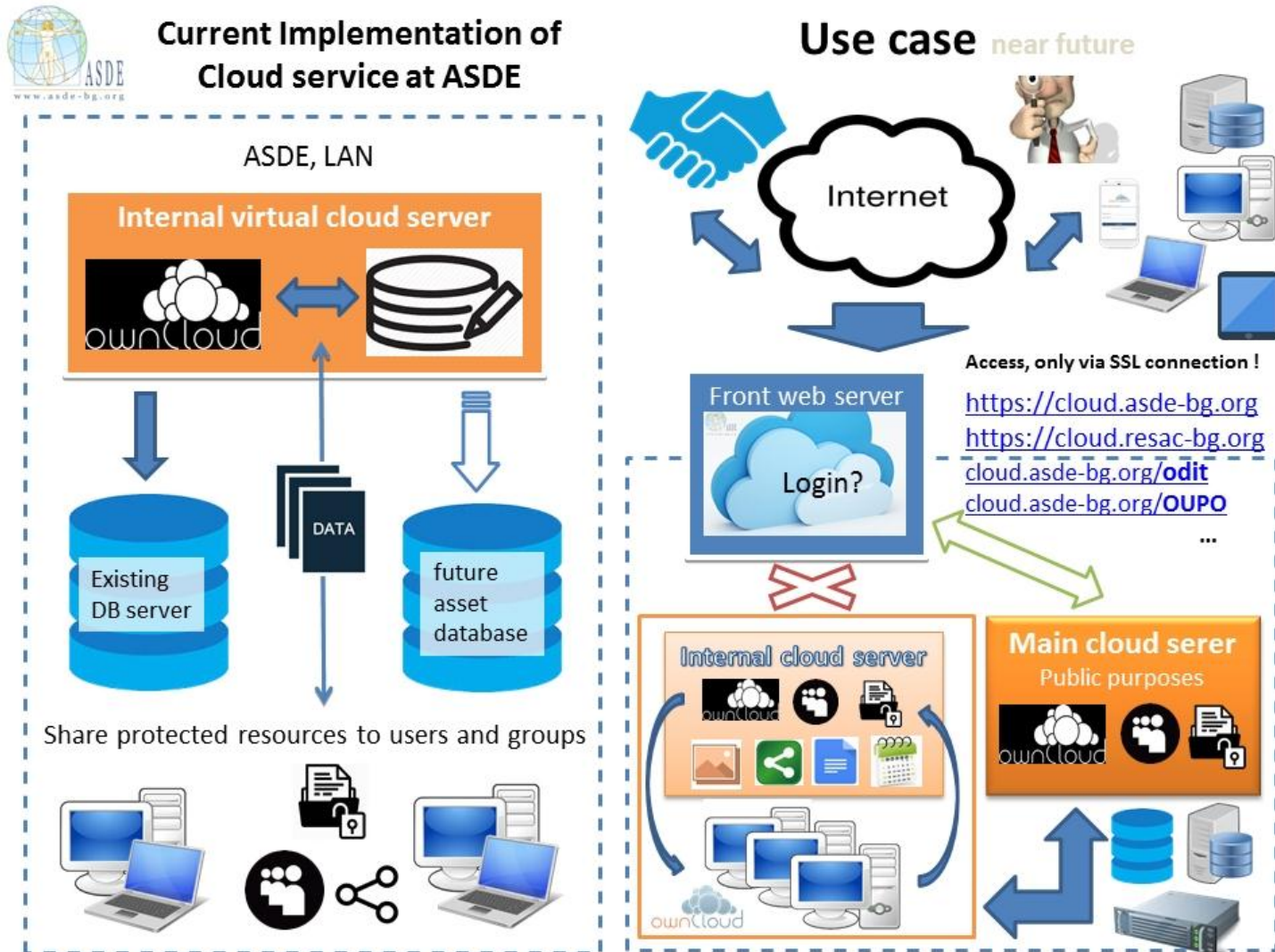
3. Big Data - The USER INTEREST (ASDE experience)

ADMINISTRATIVE LEVEL	VERY HIGH RESOLUTION	HIGH RESOLUTION	MEDIUM RESOLUTION	GLOBAL SCALE RESOLUTION
LOCAL	1 M (URBAN) 2.5 M	5 – 10 M	20 – 60 M	0.2 – 1 KM
DISTRICT/ NATIONAL	1 M (URBAN) 2.5 M	5 – 10 M	20 – 60 M	0.2 – 1 KM
REGIONAL (EU)	1 M (URBAN) 2.5 M	5 – 10 M	20 – 60 M	0.2 – 1 KM
CONTINETIAL	1 M (URBAN) 2.5 M	5 – 10 M	20 – 60 M	0.2 – 1 KM
GLOBAL	1 M (URBAN) 2.5 M	5 – 10 M	20 – 60 M	0.2 – 1 KM

NO/VERY LOW IMPORTANCE	LOW IMPORTANCE	HIGH IMPORTANCE	VERY HIGH IMPORTANCE

4. Proposals for a cooperation based on the GlobBiomass platform:

- EU – "important projects of common European interest"; Africa; Silk Road;

First Proposal: Integration of GlobBiomass data with data from flagship projects (Geoland, SPATIAL, Grassland/EFA, national forest models, etc..)- based on a Global/Regional Reference basic LC/LU layer – ISO 19144-2

Second Proposal: Smart&Resilient approach on Integrated Risk and Resources management – Forest fire prevention Maps using "Big Data for all" and "Biomass algorithm, supported by probative value of satellite imagery";

Third Proposal: Integrated Regular monitoring of Forest and Grassland changes, including strengthening the probative value of sat. data – support to agri + env + regional policies

Fourth Proposal: Checking whether forest spatial data (Globbiomass) and information collected within the frame of the DANUBE_NET project as part of JRC DRDSI could be used in the context of the grassland ecosystem mapping and assessment

Note: According to the interest, more detailed information is available, depending on the area of realization – EU, Africa, Silk road

4.Examples – upgrading&synergy from leading projects – GlobBiomass, Geoland, UrbanApi,Grassland, Spatial, etc….
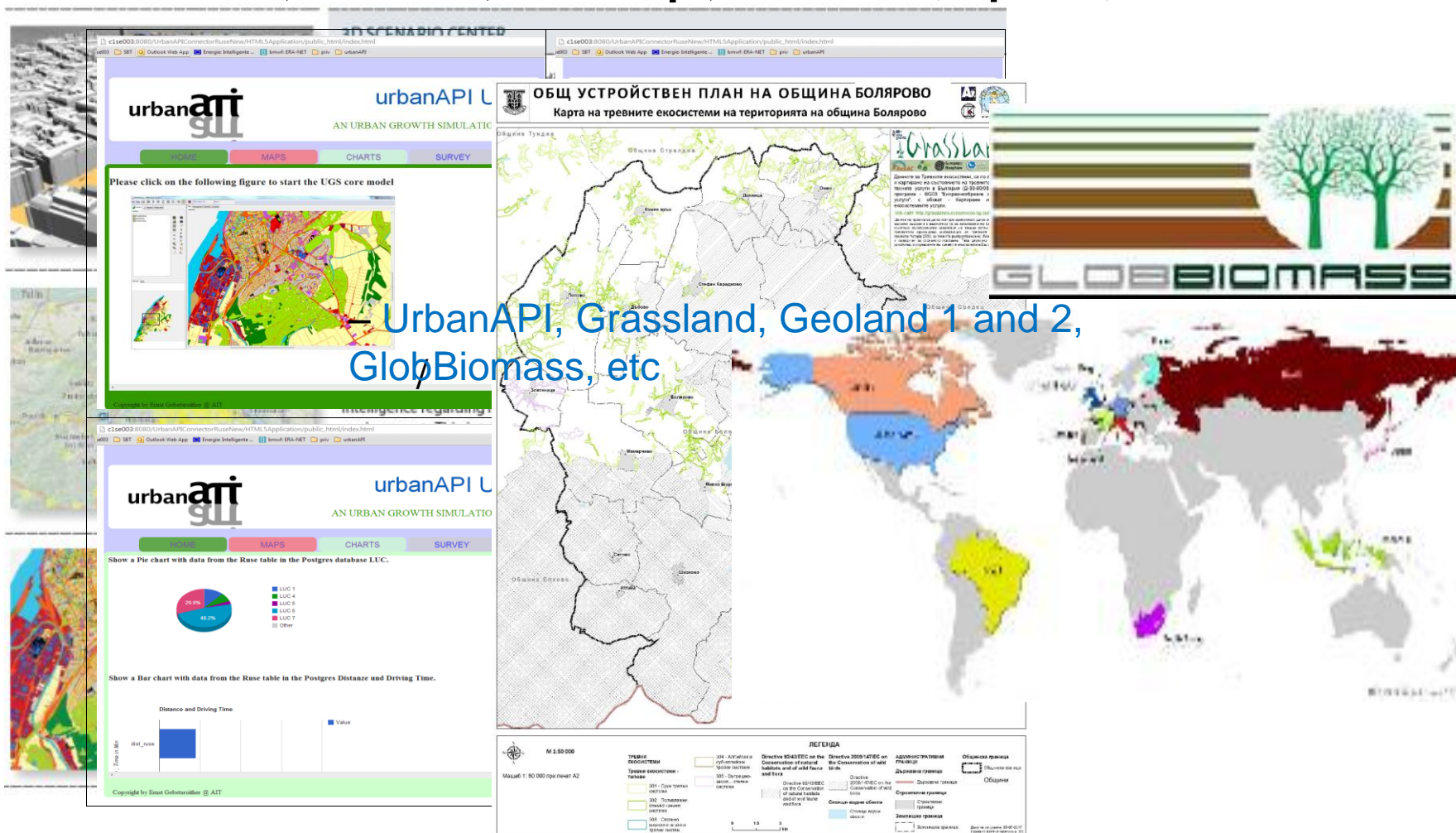
– UrbanAPI, Grassland, Geoland 1 and 2, GlobBiomass, etc

# 4. Examples- projects of common European interest – synhronization of GlobeBiomass with national forest models

BULGARIAN FOREST MONITORING MODEL + GLOBBIOMASS ?

The Value chain – under implementation in several municipalities

	Set 1	Set 2	Set 3	Set 4
	Primary service provider – during the R&D phase - BSDI/ASDE/ReSAC	Universities, Research&Science structure, NGOs		Citizens, local economy, tourism, leisure, property
		Executive Forest Agency/ State Agency for E-government	State administrative owners, Municipalities,	
	It is expected that in close future the primary service provider will be the Executive Forest Agency(EFA) or the State Agency for E-government(SAEG)	Ministry of agriculture; Ministry of Environment; other ministries	Private forest owners	
		VA service providers	Timber companies, other related production	
		GIS company	Others: agriculture/ tourism/industry/infrastructure	
Type of service used	Satellite imagery	Reference land cover layers; Forest maps ; maps of clear-cut areas; GIS Shape files	Diverse	Environmental&Social values

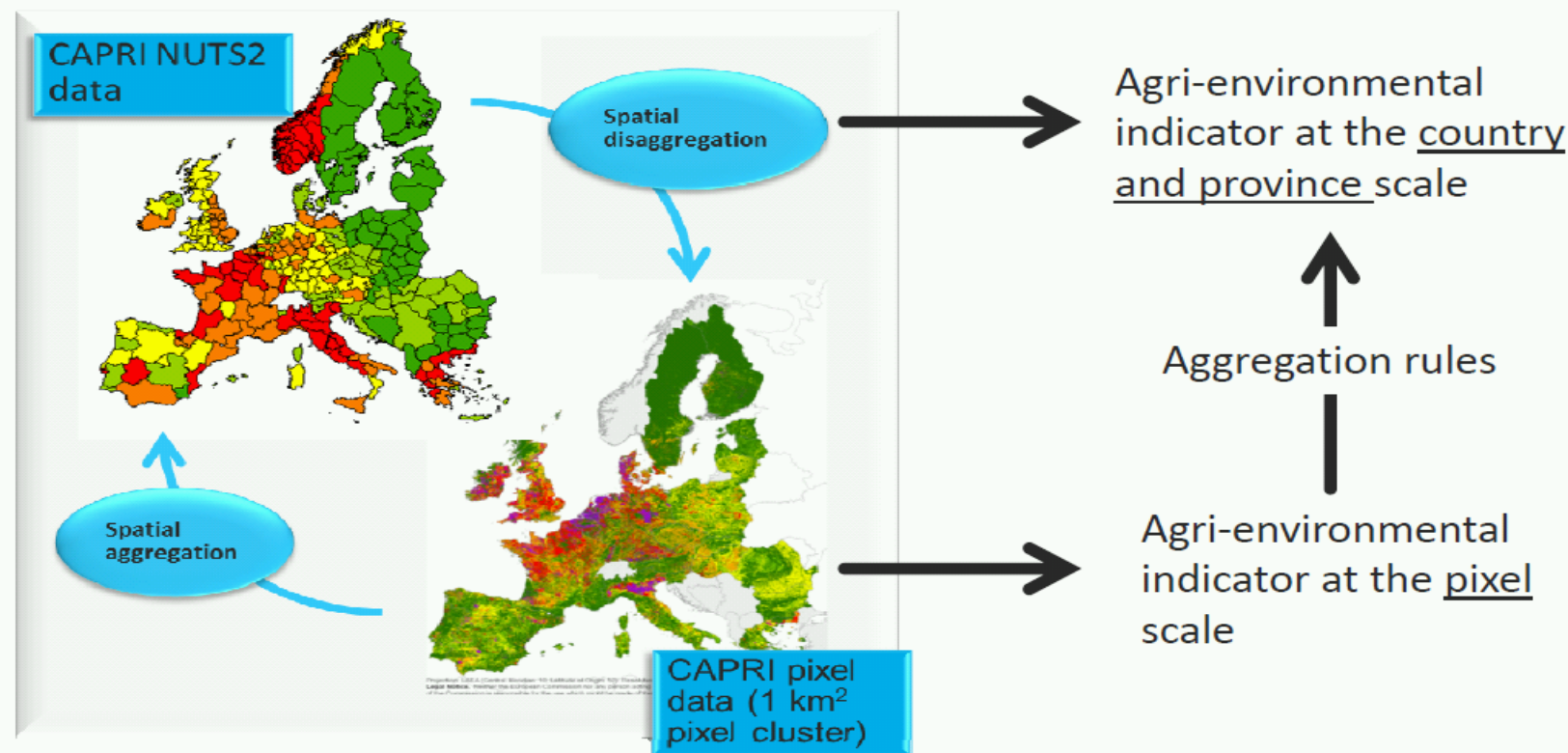## 4. Examples- projects of common European interest – synhronization of GlobeBiomass with cross-border forest models

INTERREG – cross-border programs – BG/RO; BG/MAC; BG/GR/; BG/TUR

Kumanovo, MK

Delcevo, MK

Macedonia

Gevgelija, MK

Kjustendil, BG

Bul

Blagoevgard, BG
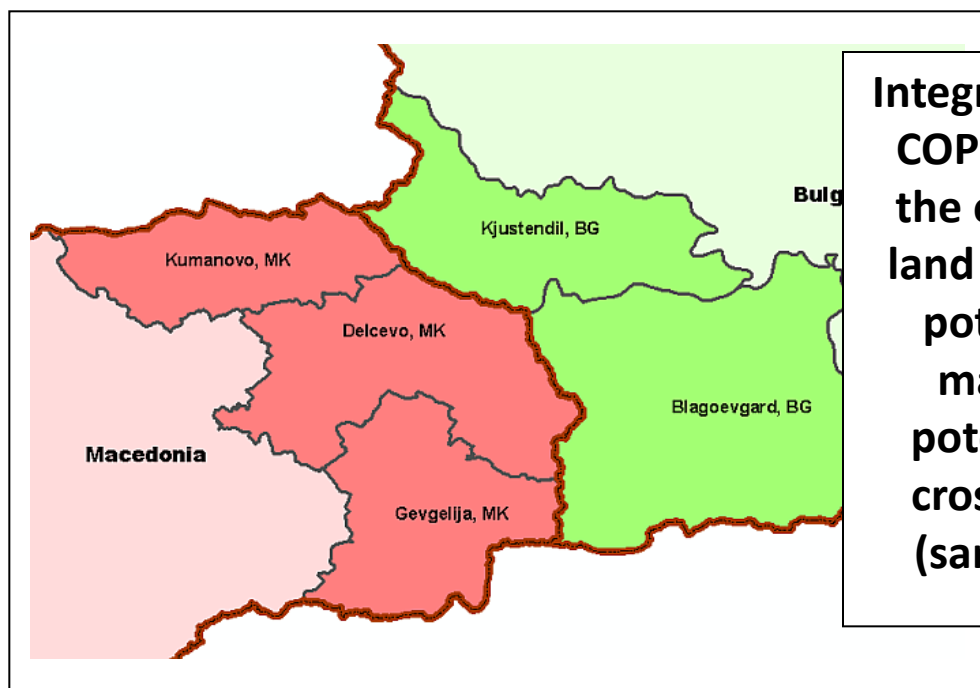
Integrated use of GlobeBiomass algorithms, COPERNICUS data and in-situ LPIS data in the elaboration of trans-border reference land cover and forest biomass modeling – potential realization for integrated risk management – forest fires, resources potential forecast, illegal logging for the cross-border area Bulgaria – Macedonia (same for BG-RO, BG-GR, BG-TURK, etc.

4. Examples- projects of common European interest – regular monitoring of changes for leading EU policies – Agri + Regional + Env + Risk management

CAPRI data for CBC area from DG JRC

CAPRI NUTS2 data → Spatial disaggregation → Agri-environmental indicator at the country and province scale

Spatial aggregation

CAPRI pixel data (1 km² pixel cluster) → Agri-environmental indicator at the pixel scale

Aggregation rules

Available data: activities (areas by crop, yield, livestock number/density) and farm input (manure, mineral fertiliser, irrigation share), GHG and Nr flows

Adrian Leip, MARS Unit, JRC

4. Examples - EU and Silk Road

- China created a LC dataset for the whole world based on Landsat data – GlobeLand 30 project
- ASDE elaborated reference land cover dataset for the cross-border area of BG and RO – CBC project SPATIAL (Danube region)
- Product comparison undergoing
- Initial discussions conducted with the National Geomatics Center of China and ISPRS Secretariat
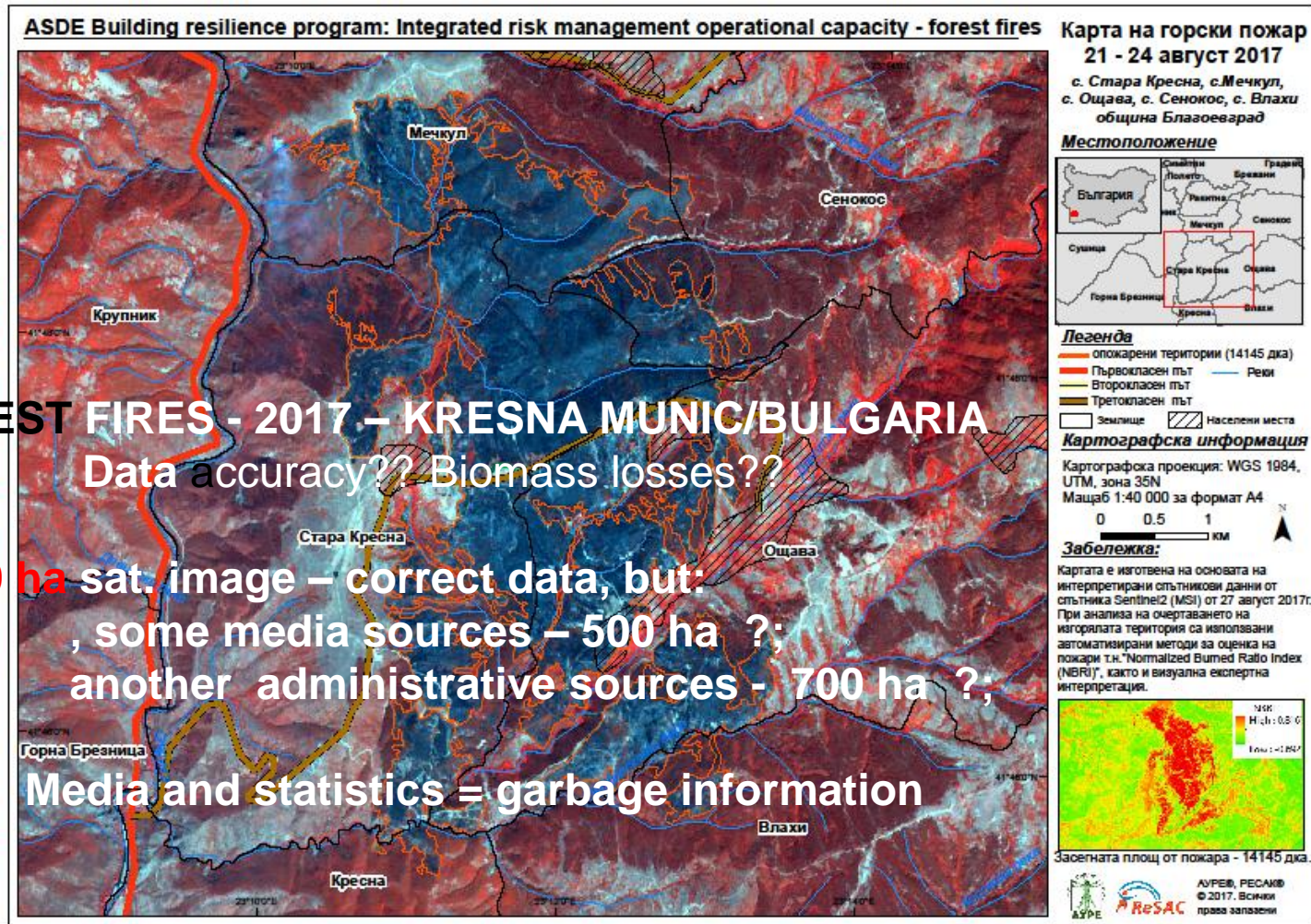

Project GlobeLand 30
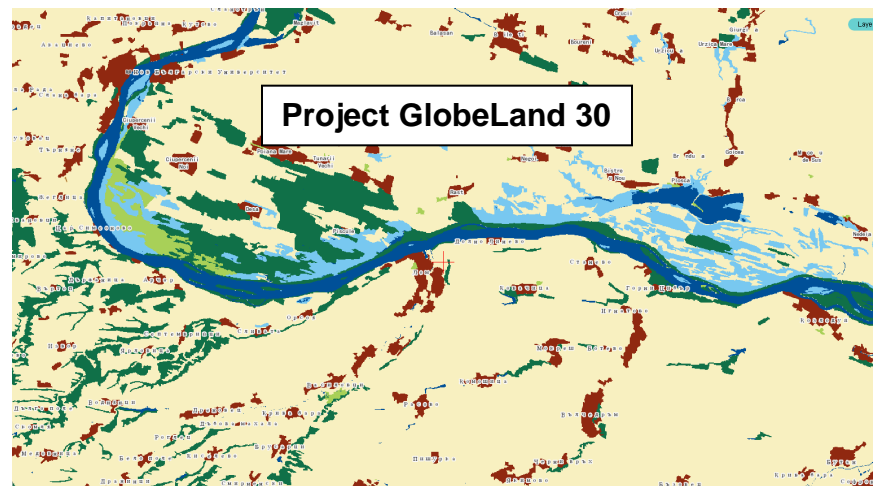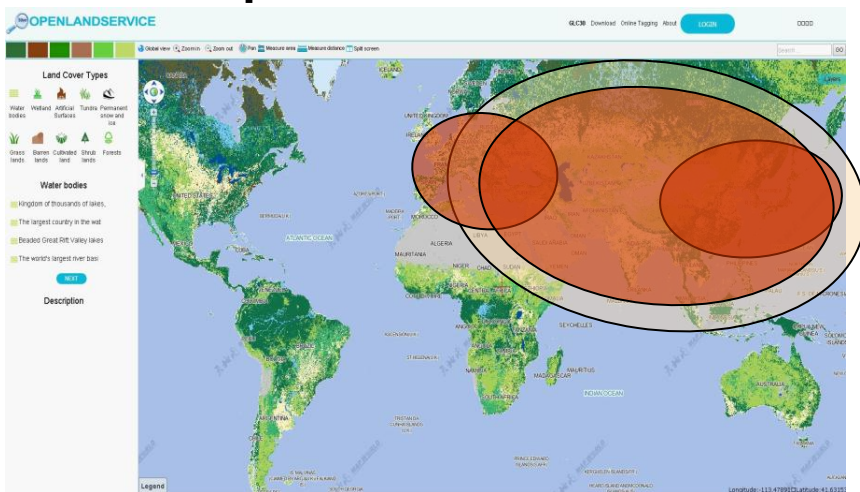
4. Examples- projects of common EU interest–regular monitoring& strengthening resilience on leading EU policies – Agri + Regional + Env + Risk management

Thank you for your attention!

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www.resac-bg.org