

# Ruumiandmete integreerimisest Euroopa tasandil

Andrus Meiner, Euroopa Keskkonnaamet  
21. oktoober 2011, Sagadi



# Improving our knowledge base

## ICT strategy towards 2013

- **Enhance the EEA's capabilities around spatial data**
  - Spatial data sharing and integration, support to INSPIRE
- **Increase EEA capacity to handle new types of data**
  - near real time data, satellite data, citizen observations (through mobile devices), models
- Strengthen role of EEA as **European Environmental Data Centre** and
  - contribute to the European Spatial Data Infrastructure

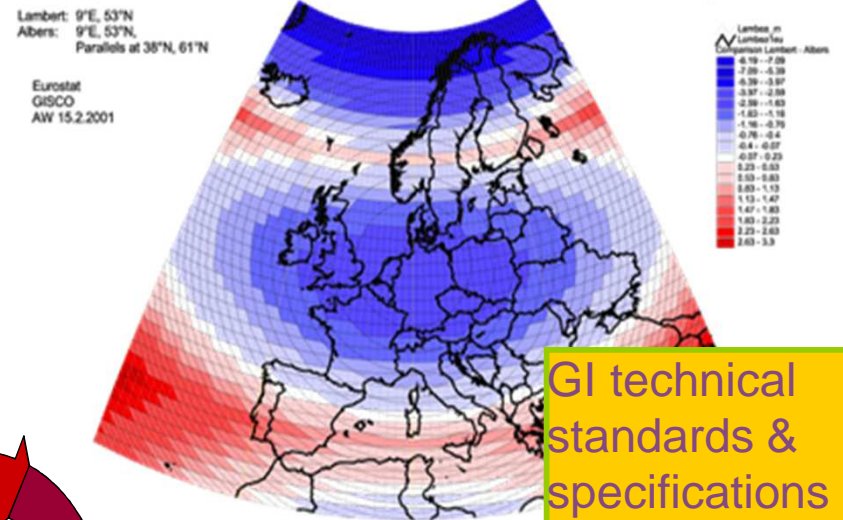
# Spatial Data Infrastructure: Concept

Launched in September 2001  
MoU signed in April 2002  
by Commissioners  
Wallström, Busquin and  
Solbes provides the basis  
for continued co-operation  
between DG ENV,  
EUROSTAT and the JRC  
for developing the initiative

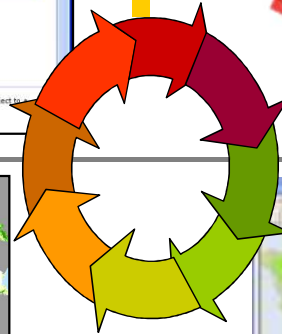
Institutional  
framework and  
organization



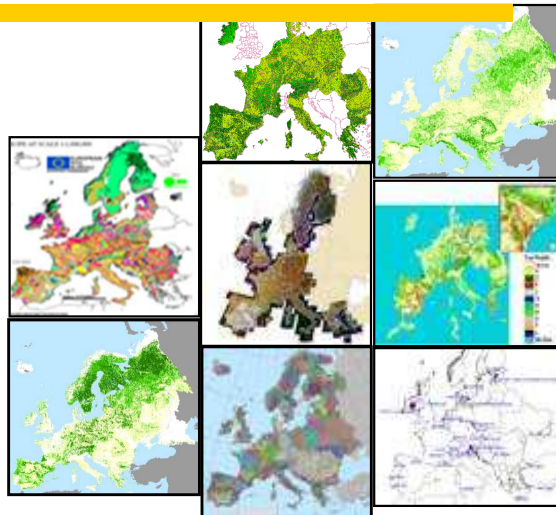
Comparison of Scale Error between Lambert Azimuthal and Albers Projections



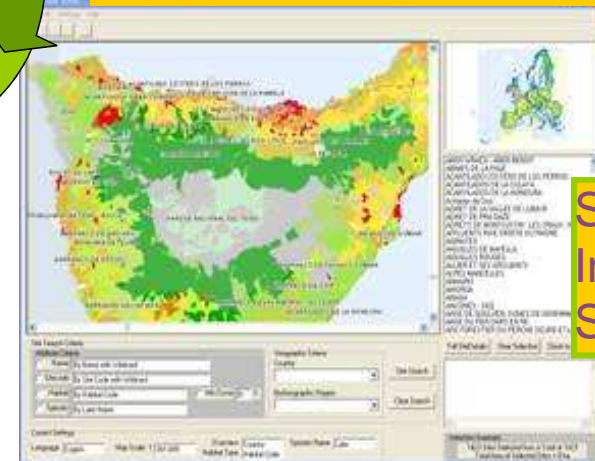
GI technical  
standards &  
specifications



Geospatial  
data sets  
and  
metadata



Spatial  
Information  
Services

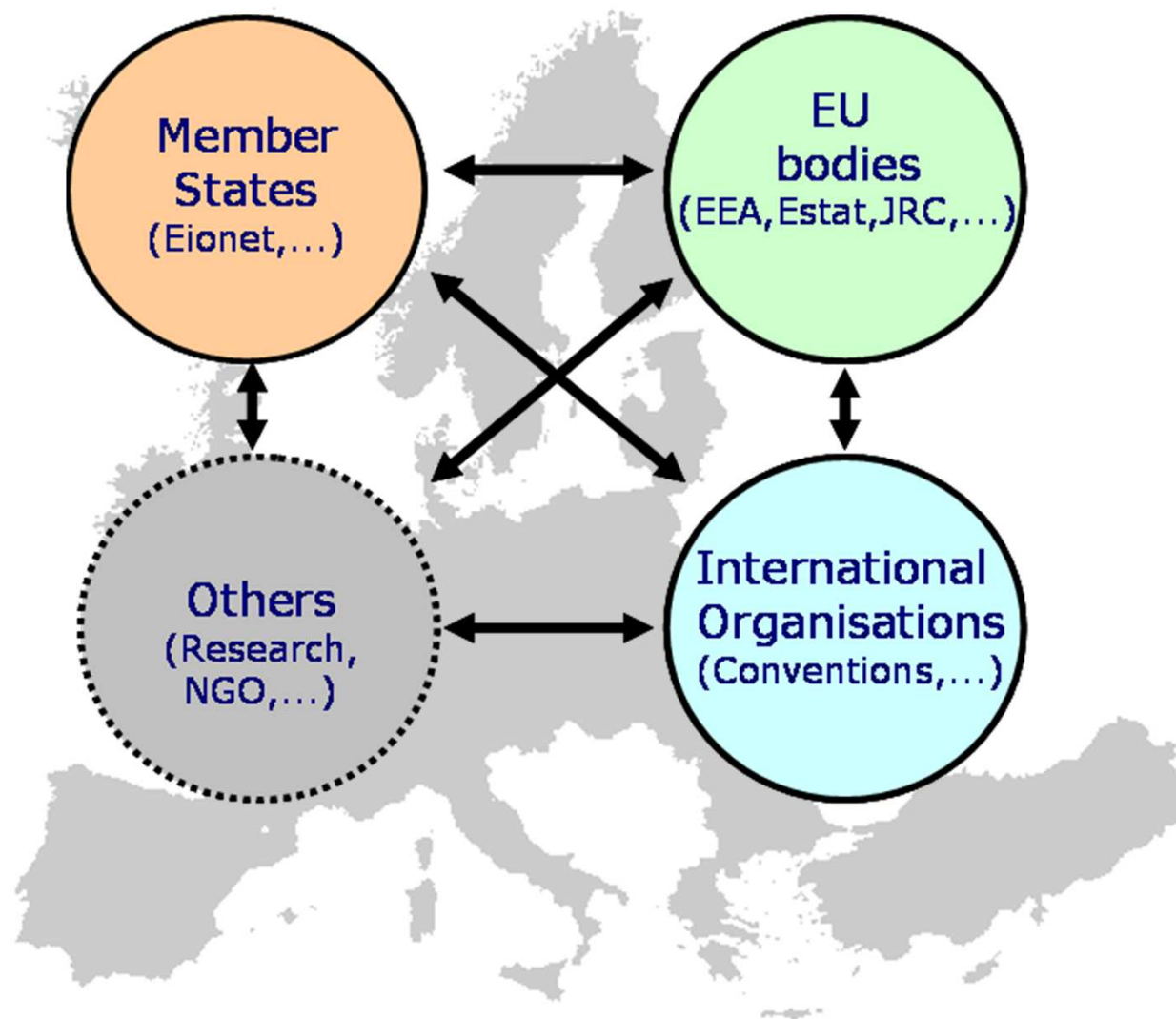


# Shared Environmental Information System a framework for future

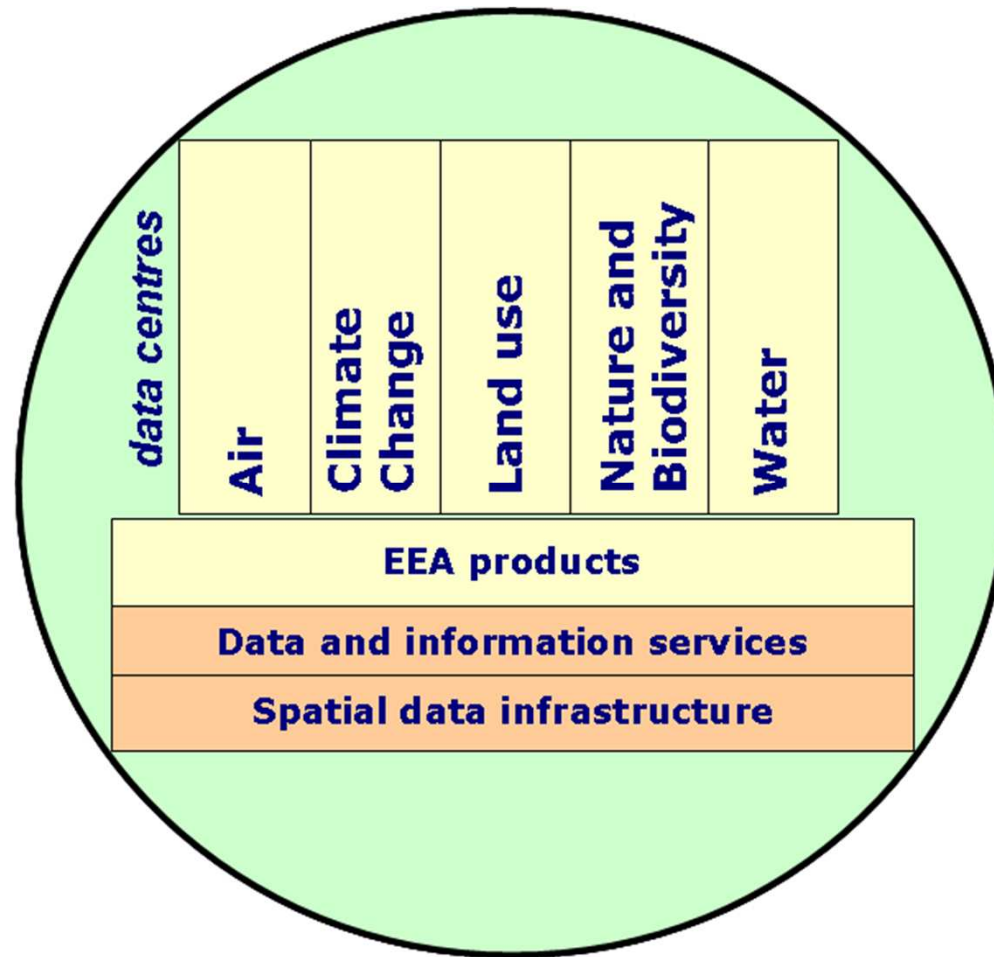
## Scope of SEIS

- ✓ Improve
- ✓ Modernise
- ✓ Streamline

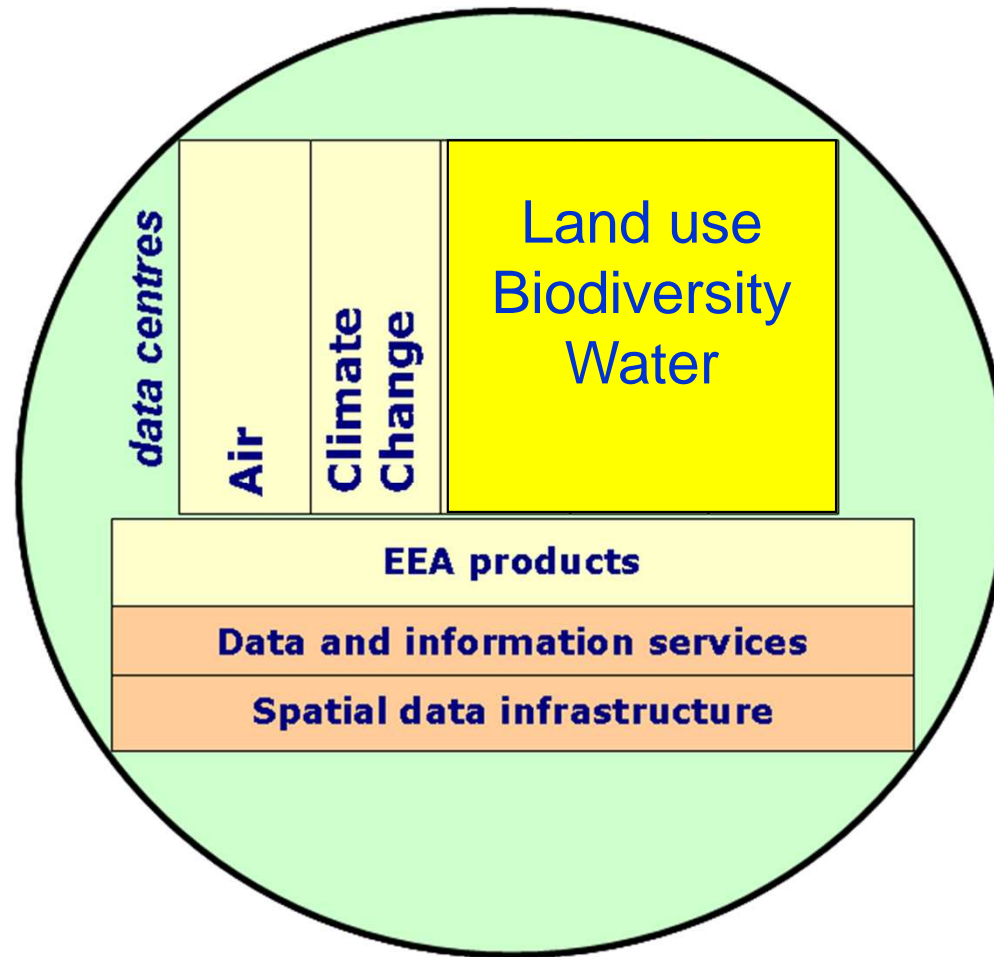
the present  
information  
systems



# EEA information node as part of SEIS

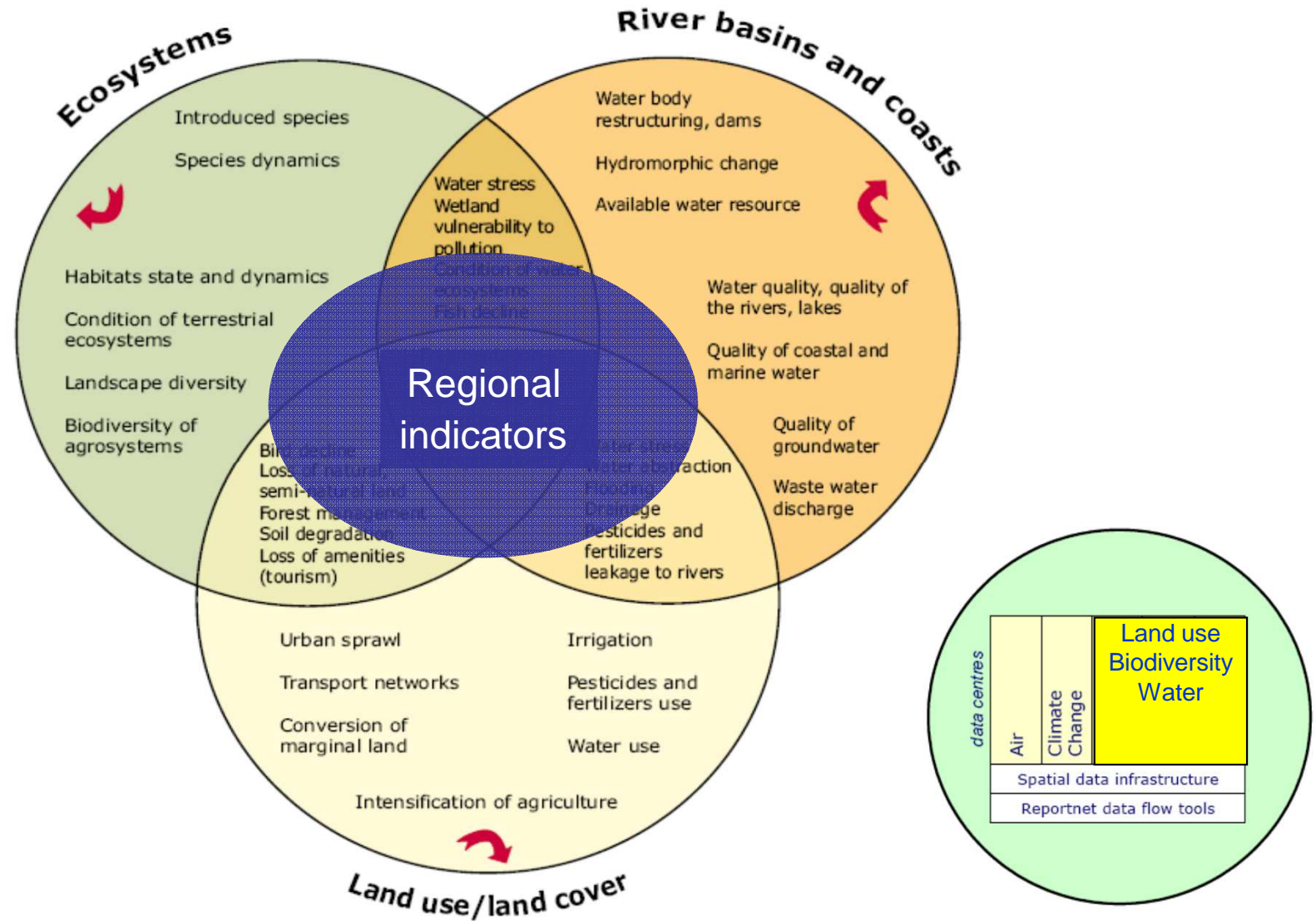


# Integrated spatial assessment platform as strategic component of SEIS

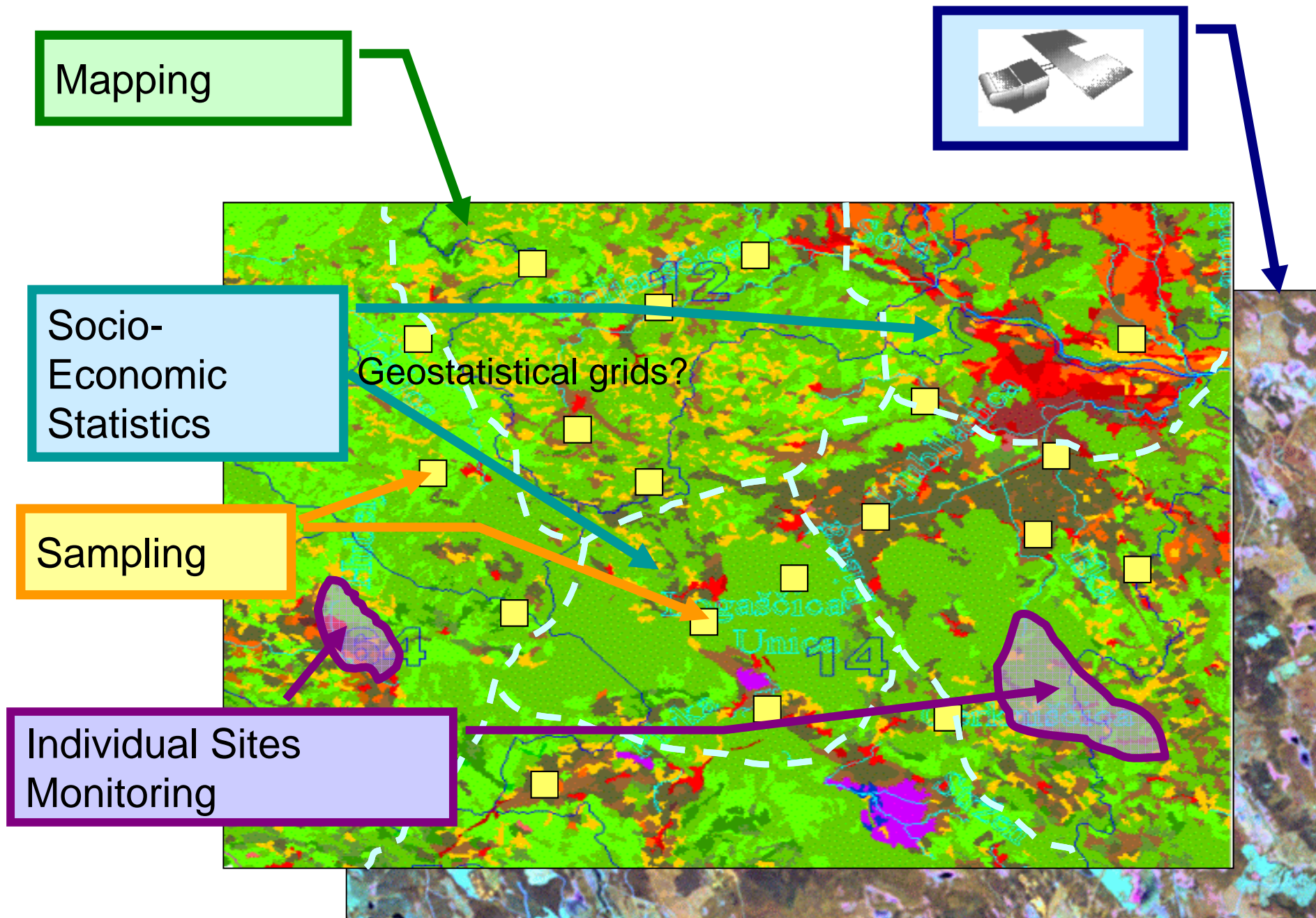




# Concept of EEA integrated spatial assessment platform



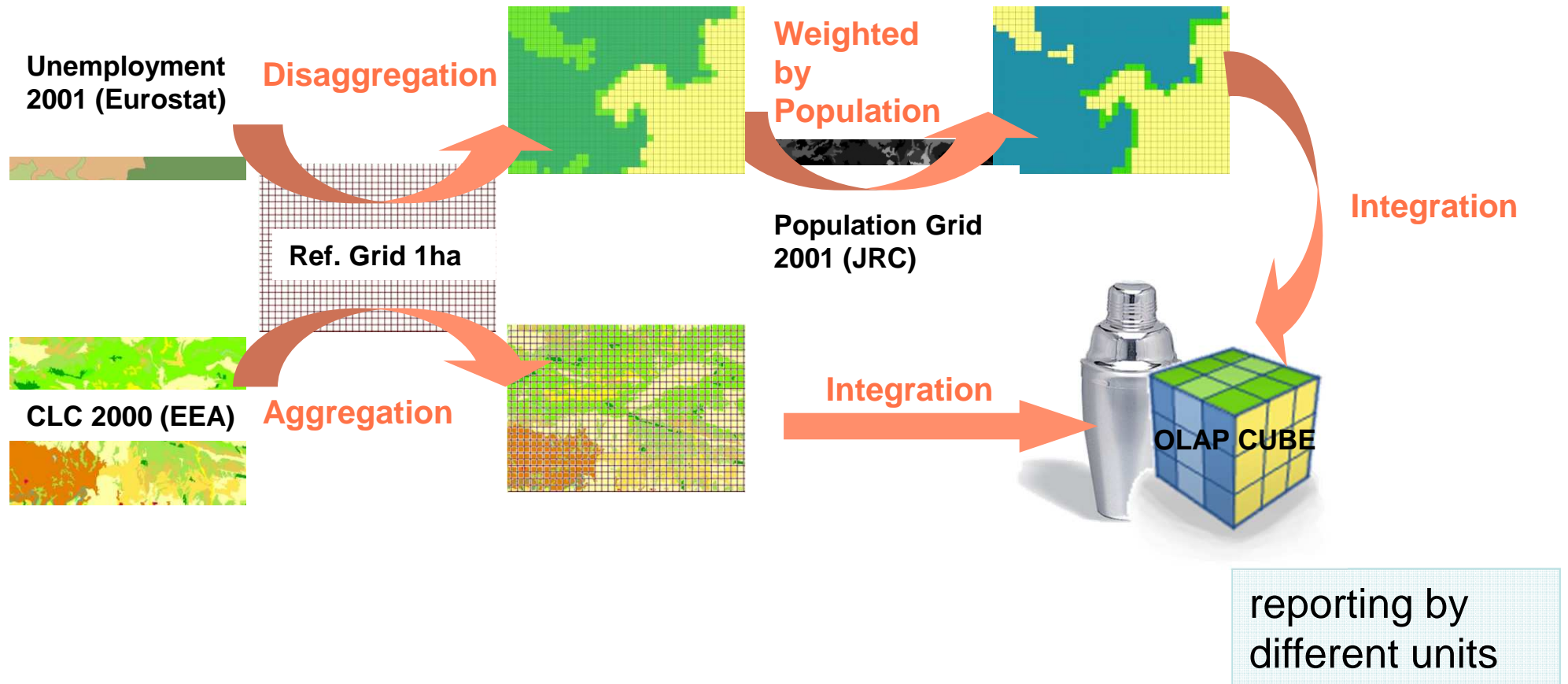
# Spatial Integration of Earth Observation, Environmental and Socio-Economic Data Collection





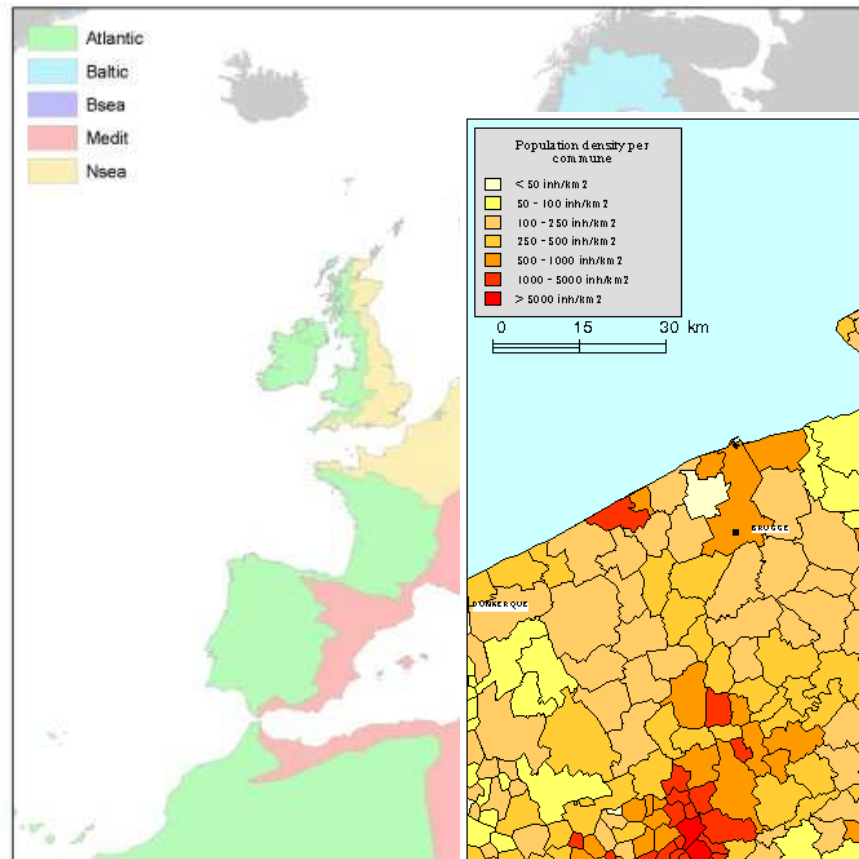
# Regular grid - common interface for data integration

different delineations and types of data

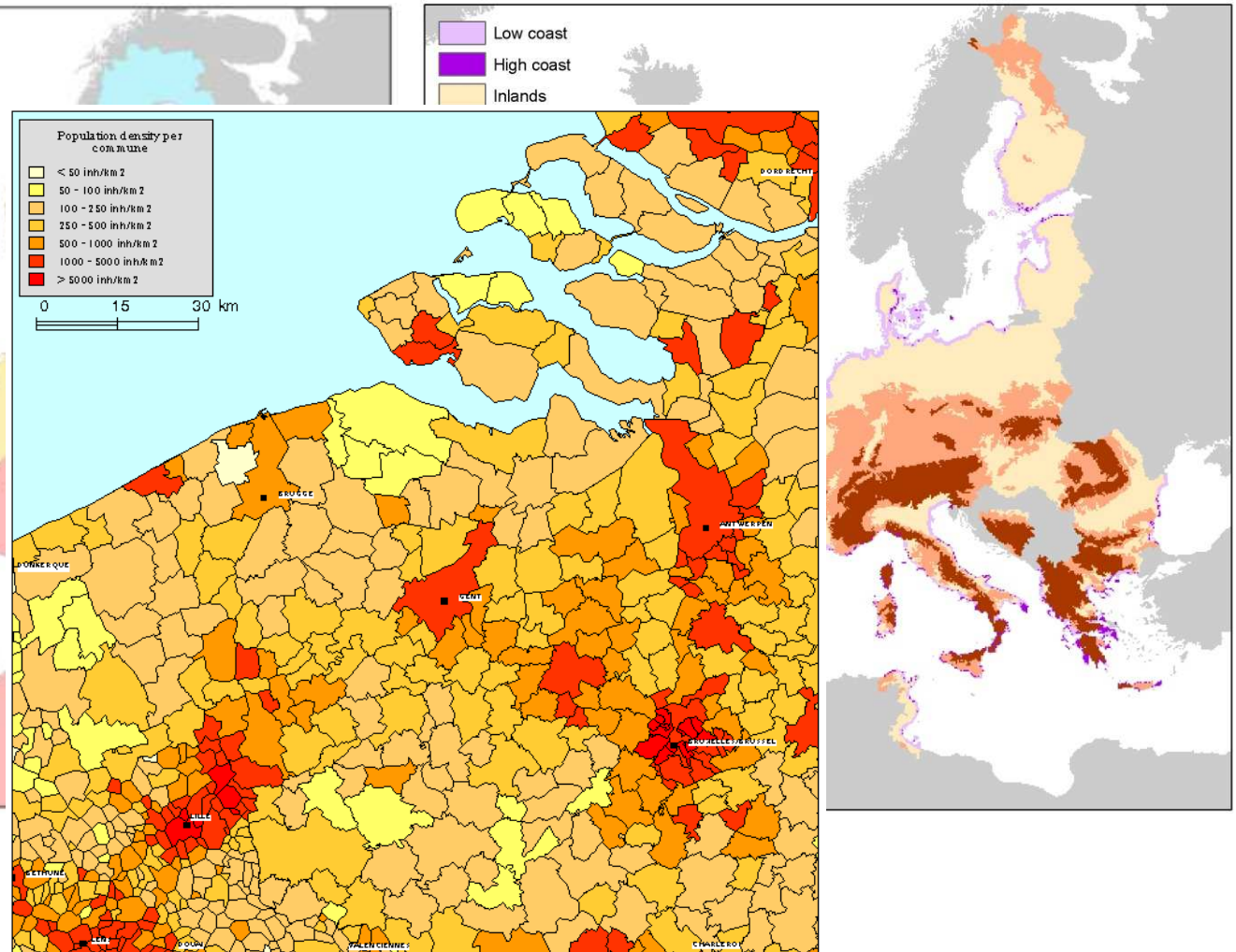


# Analytical units

## Sea Catchments



## Elevation Breakdown

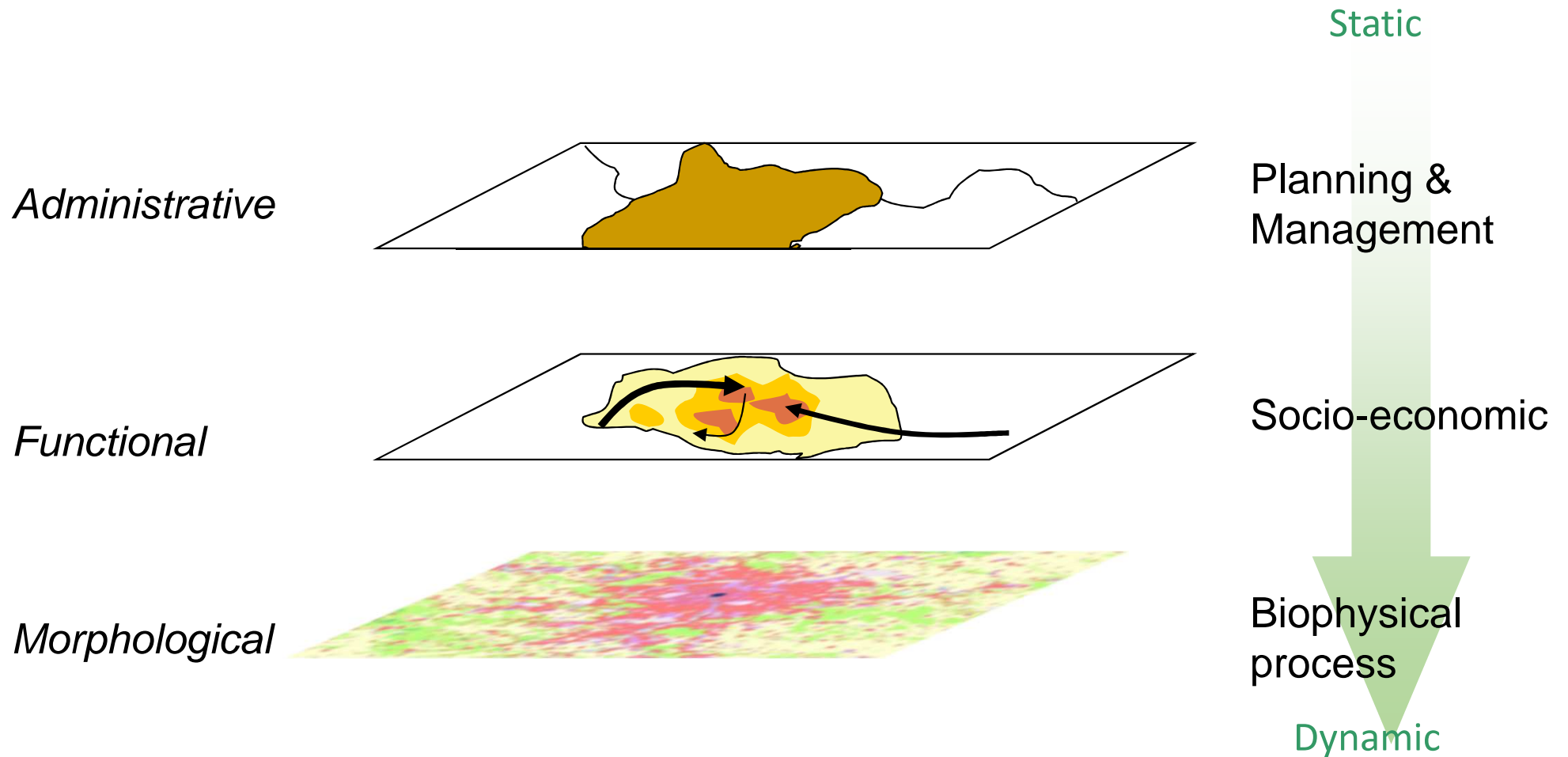


# Example of urban data

main typologies of urban delineations in Europe

- **Urban Audit**
- **Urban Atlas**
- **GMES Land** (Corine LC Class 1, HR Soil sealing)
- **UMZ Urban Morphological Zones** (built up areas less than 200 m apart)
- **ESPON**
  - MUA Morphological Urban Areas
  - FUA Functional Urban Areas (beyond admin borders)
- **MOLAND** (urban areas + periurban buffers)
- **Air quality** Zones and agglomerations in relation to EU air quality thresholds
- **Noise** urbanised areas (defined by MS)

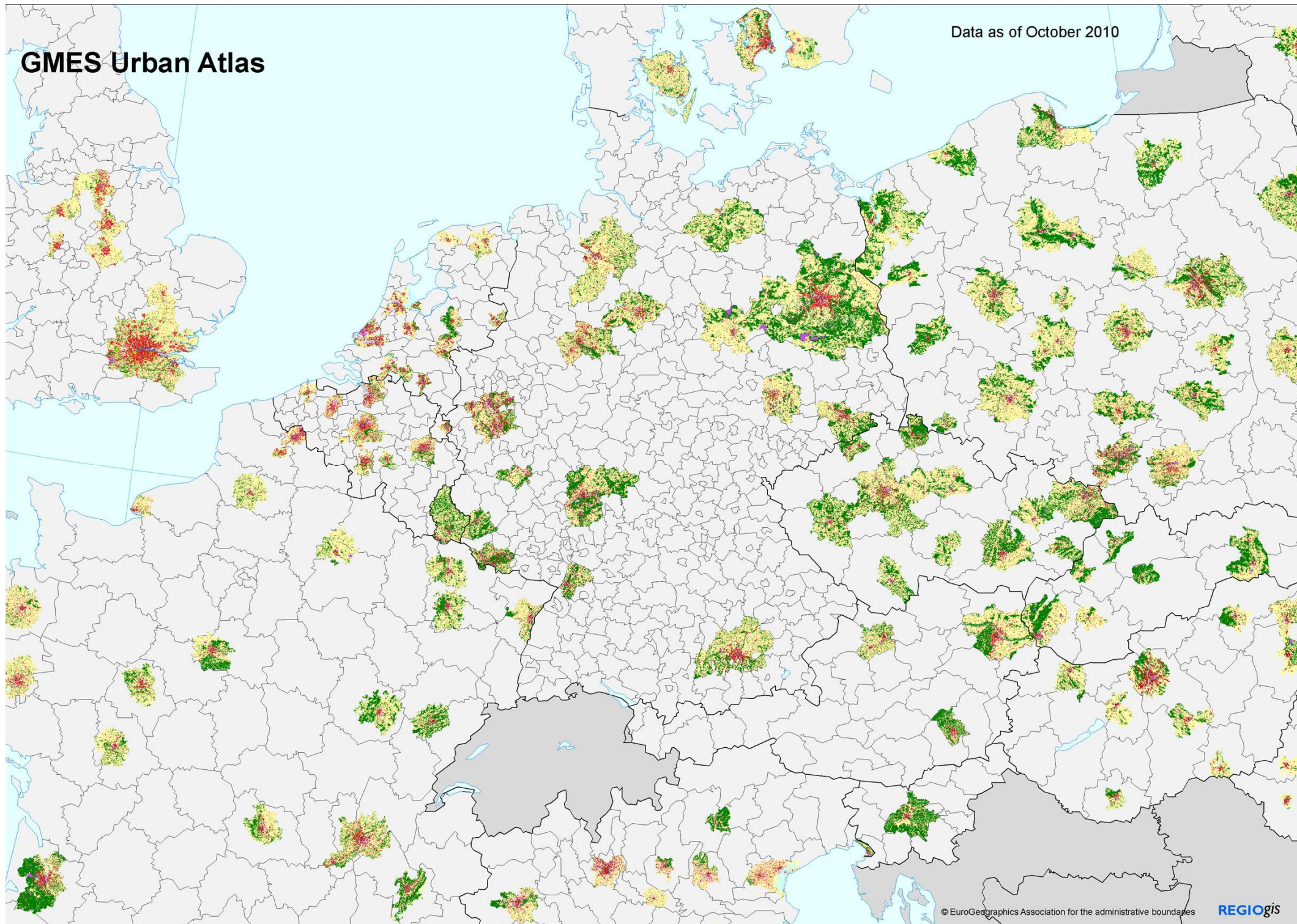
# Different delineations for different purposes



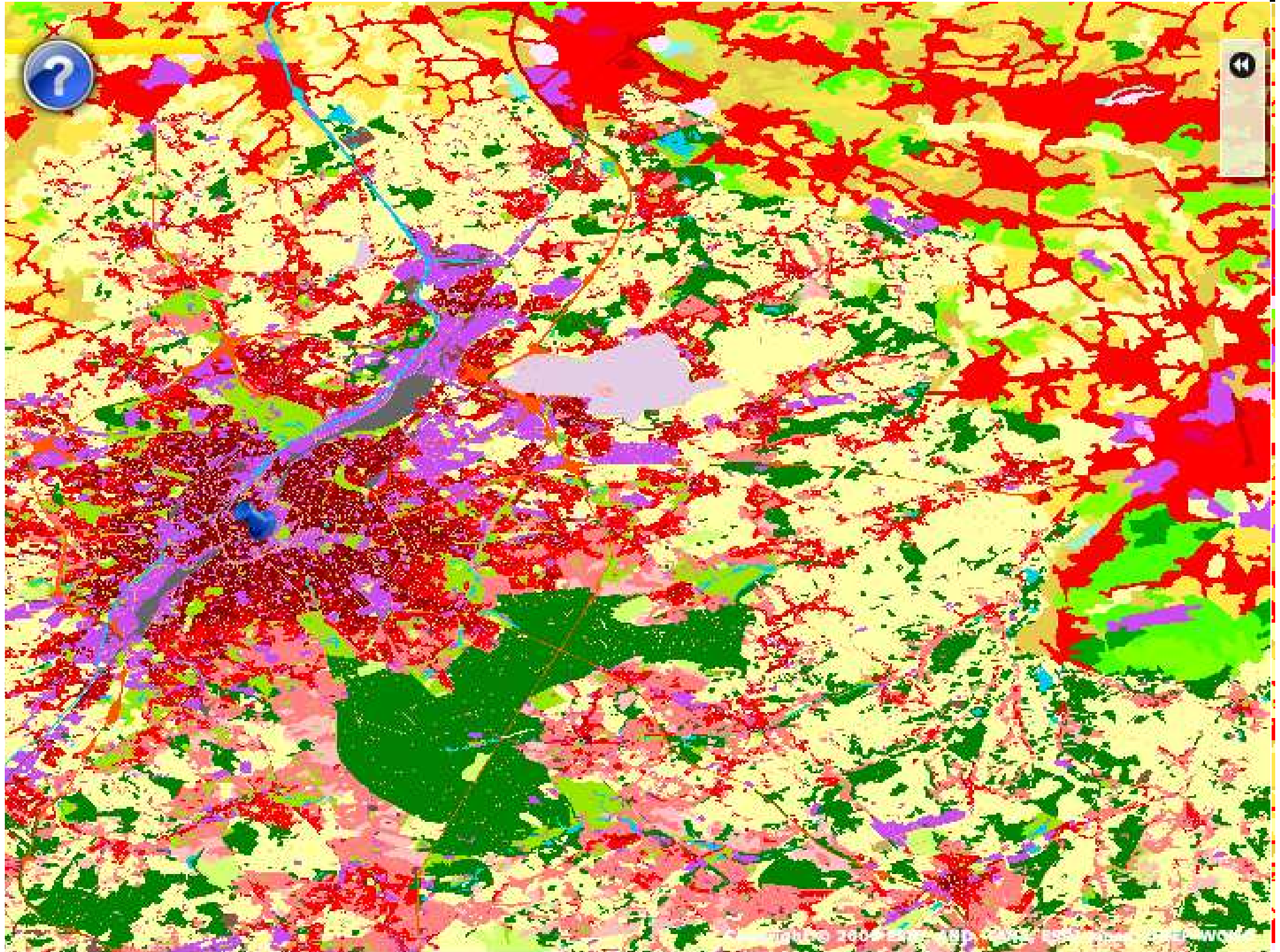


# GMES Urban Atlas

Data as of October 2010



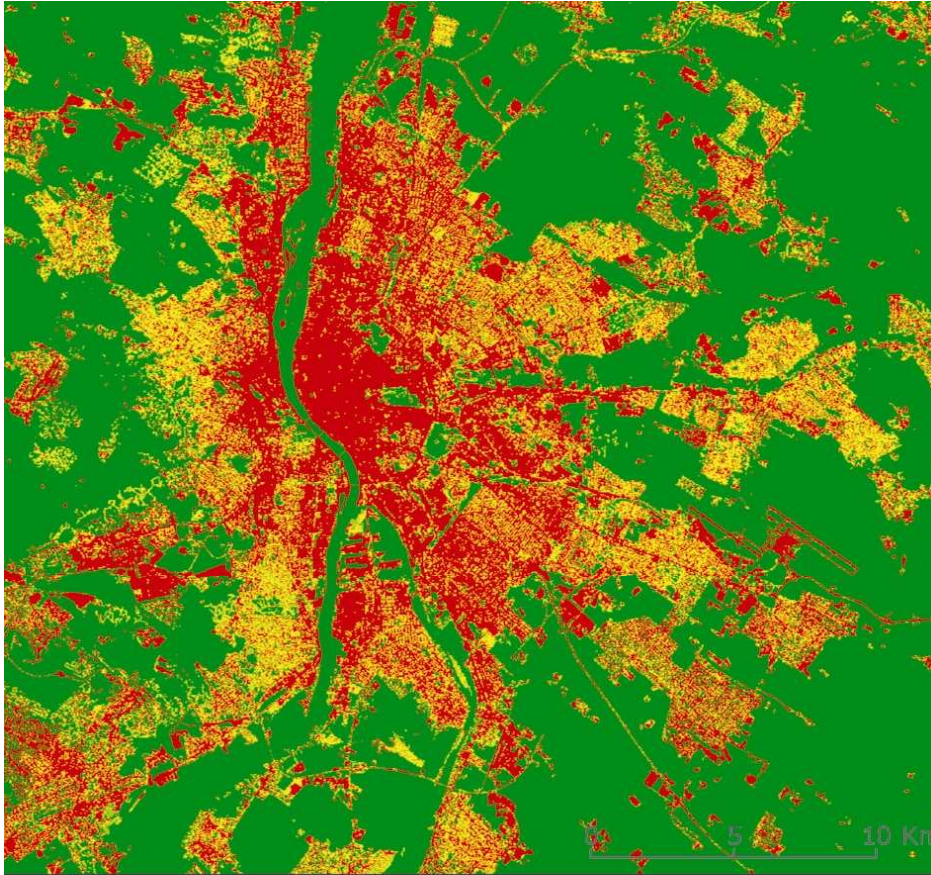






# Nature

need for urban green areas

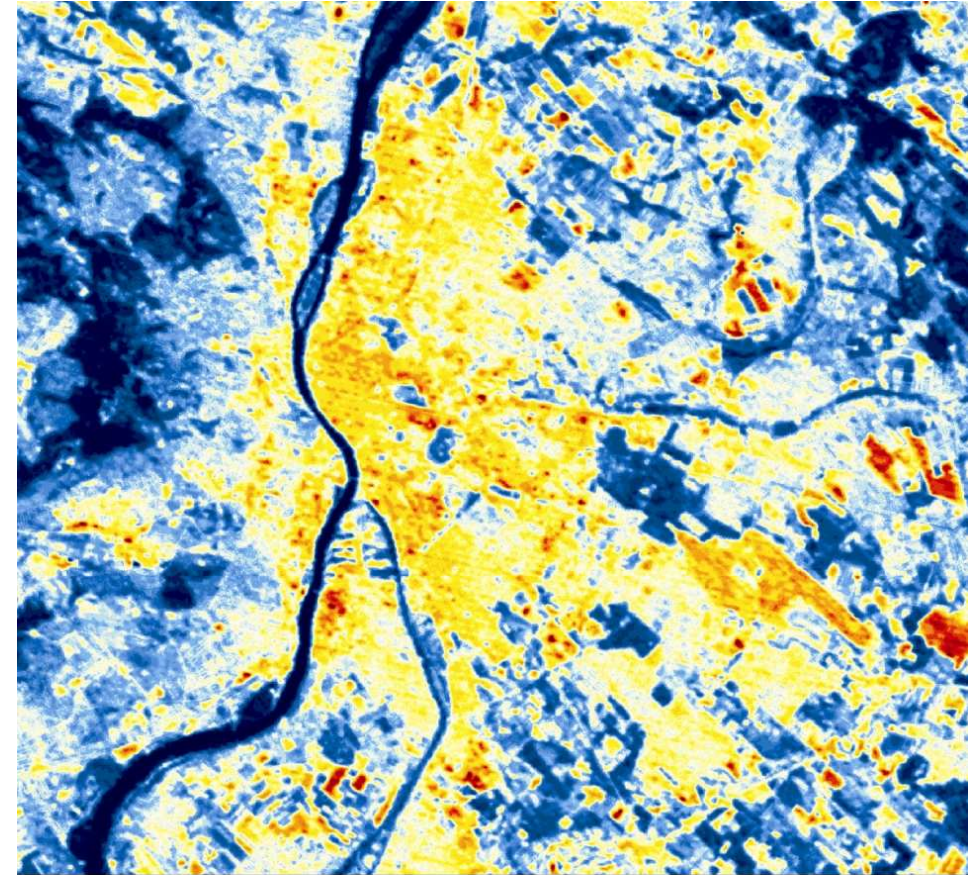


**Degree of soil sealing (impermeability) of Budapest**

Degree of soil sealing [%]



0 30 50 80 100



**Surface temperature of Budapest, 1 August 2005, 9:30 CET**

Temperature (°C)



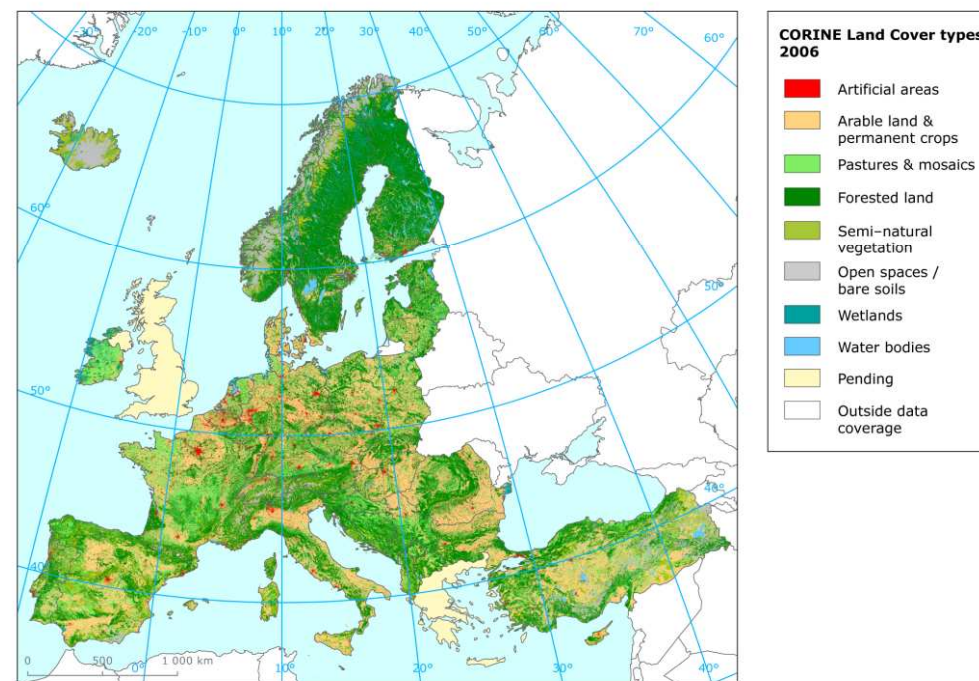
≤ 15 16 19 22 25 28 31 34 35 36 37 40 43 ≥ 45



Level 1	Level 2	Level 3	
1. Artificial surfaces			
	1.1 Urban fabric	1.1.1 Continuous Urban Fabric 1.1.2 Discontinuous Urban Fabric	
	1.2 Industrial, commercial and transport units	1.2.1 Industrial Or Commercial Units	
		1.2.2 Road and Rail Networks and Associated Land	
		1.2.3 Port Areas	
		1.2.4 Airport	
	1.3 Mines, dump and construction sites	1.3.1 Mineral Extraction Sites	
		1.3.2 Dump Sites	
		1.3.3 Construction Sites	
	1.4 Artificial non-agricultural vegetated areas	1.4.1 Green Urban Areas	
		1.4.2 Sport And Leisure Facilities	
2. Agricultural areas			
	2.1 Arable Land	2.1.1 Non-Irrigated Arable Land	
		2.1.2 Permanently Irrigated Land	
		2.1.3 Rice Fields	
	2.2 Permanent Crops	2.2.1 Vineyards	
		2.2.2 Fruit Trees And Berry Plantations	
		2.2.3 Olive Groves	
	2.3 Pastures	2.3.1 Pastures	
	2.4 Heterogeneous agricultural areas	2.4.1 Annual Crops Associated With Permanent Crops	
		2.4.2 Complex Cultivation Patterns	
		2.4.3 Land Principally Occupied By Agriculture, With Significant Areas Of Natural Vegetation	
		2.4.4 Agro-Forestry Areas	
	3. Forests and semi-natural areas		
		3.1 Forests	3.1.1 Broad-Leaved Forest
3.1.2 Coniferous Forest			
3.1.3 Mixed Forest			
3.2 Shrub and/or herbaceous vegetation associations		3.2.1 Natural Grassland	
		3.2.2 Moors And Heathland	
		3.2.3 Sclerophyllous Vegetation	
		3.2.4 Transitional Woodland-Shrub	
3.3 Open spaces with little or no vegetation		3.3.1 Beaches, Dunes, And Sand Plains	
		3.3.2 Bare Rock	
		3.3.3 Sparsely Vegetated Areas	
		3.3.4 Burnt Areas	
		3.3.5 Glaciers and perpetual snow	
4. Wetlands			
	4.1 Inland wetlands	4.1.1 Inland Marshes	
		4.1.2 Peat bogs	
	4.2 Coastal wetlands	4.2.1 Salt-Marshes	
		4.2.2 Salines	
		4.2.3 Intertidal flats	
5. Water bodies			
	5.1. Inland waters	5.1.1 Water courses	
		5.1.2 Water bodies	
	5.2 Coastal waters	5.2.1 Coastal lagoons	
		5.2.2 Estuaries	

# CORINE Land Cover data

44 classes, 36 countries with 2000-2006 change data,  
Free access, 100 m grid or polygons (min 25 ha)

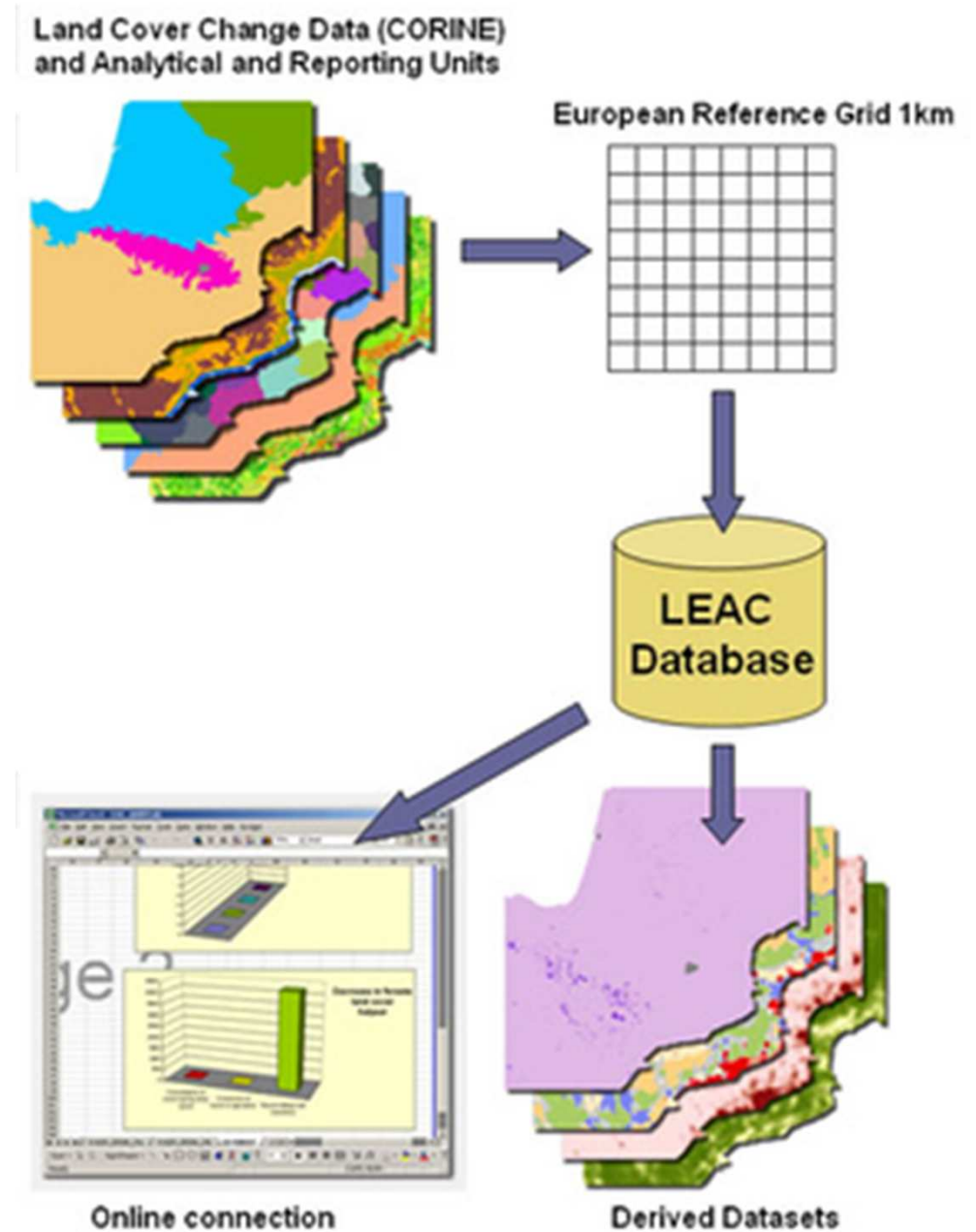


# Concept: Land and Ecosystem Accounting (LEAC)

## Corine Land Cover:

1990-2000-2006

Next CLC 2012



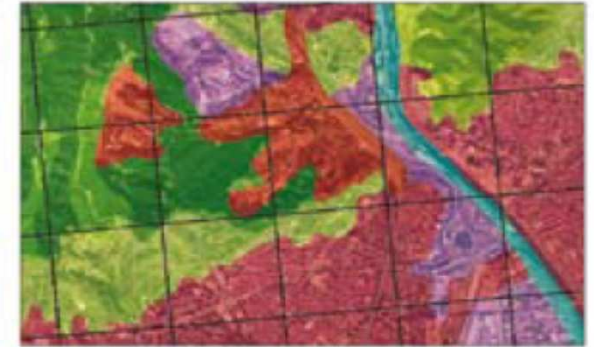
# The approach used to generate the land accounting record for stock



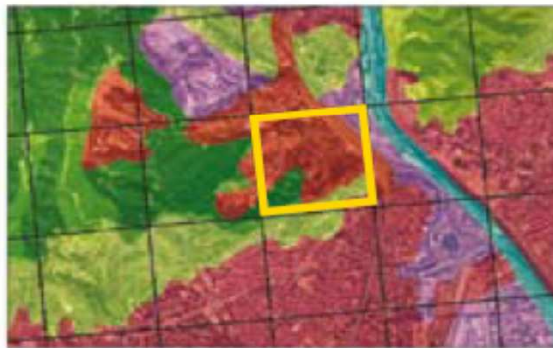
Step 1: The raw image data are interpreted for a land cover map



Step 2: Interpreted CLC map for 1990 and 2000

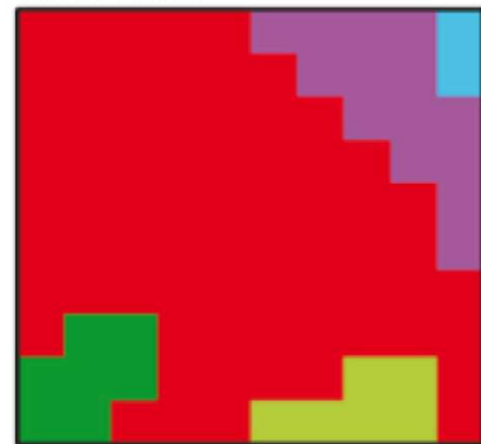


Step 3: Superimposition of the 1 km x 1 km accounting grid



Step 4: Location of an individual record for the LEAC database

K1000 E3666

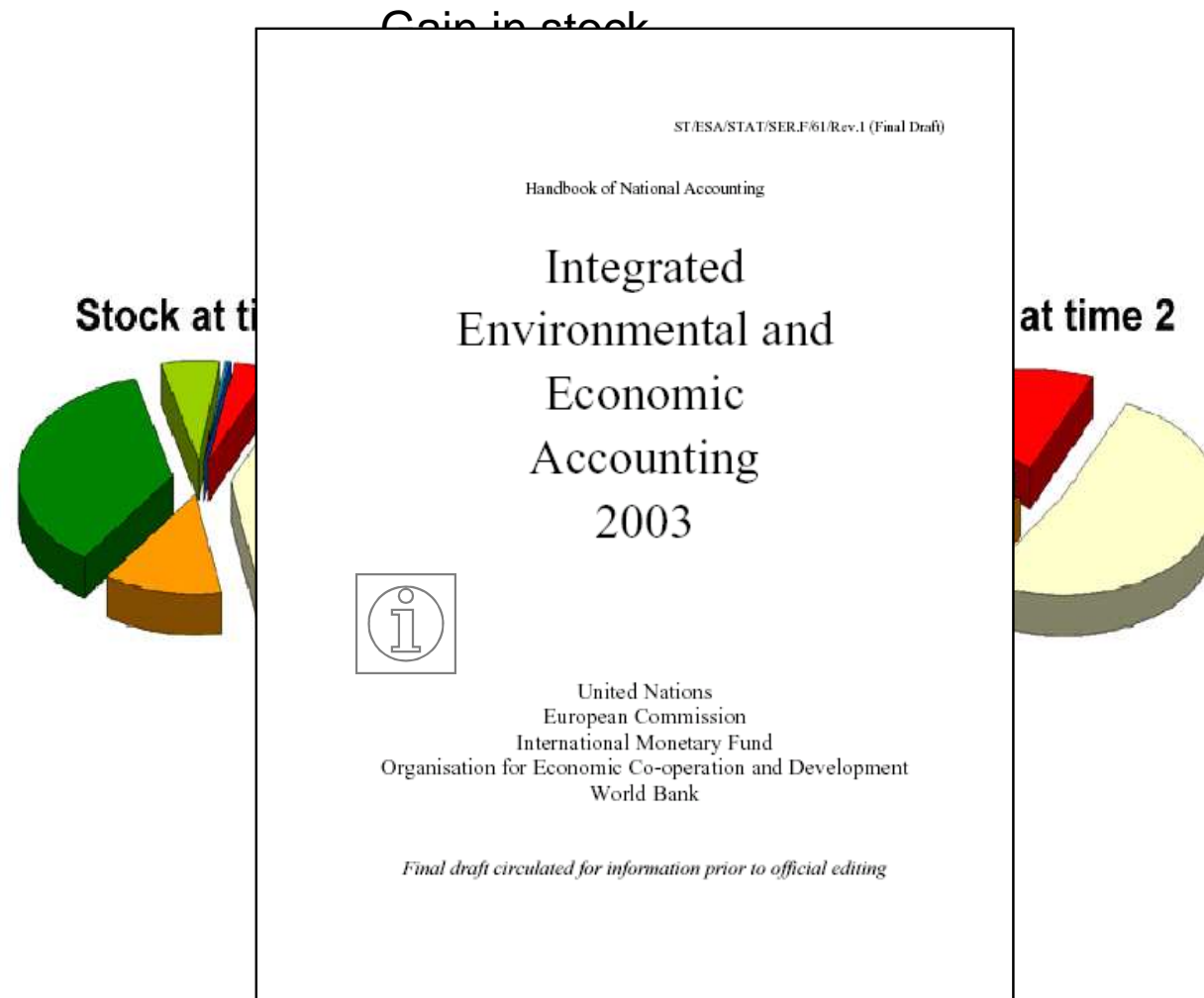


- Discontinuous urban fabric
- Industrial or commercial units
- Coniferous forest
- Schlerophyllous vegetation
- Water courses

Step 5: The underlying 100 m raster used for stock calculation for the selected record

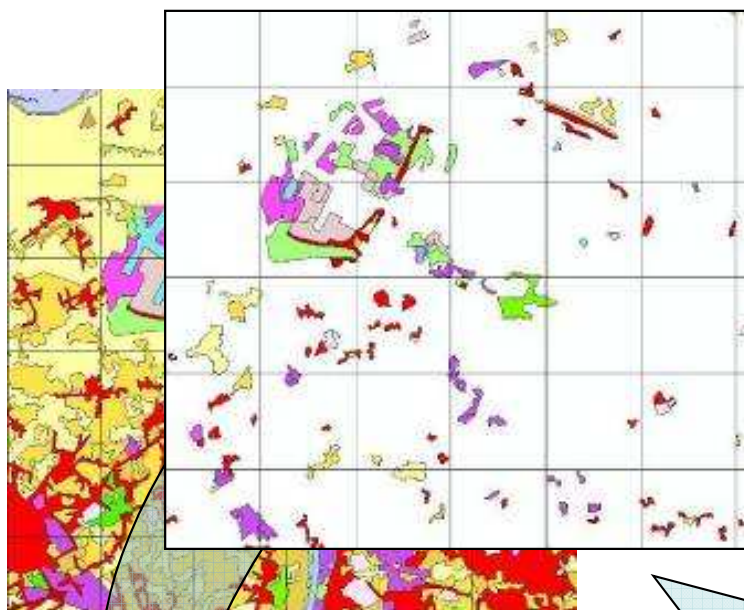


# Accounting conceptual model applied to land accounts



Land cover change 1990-2000 and/or 2000-2006 are first converted to a grid (below, 1x1 km)

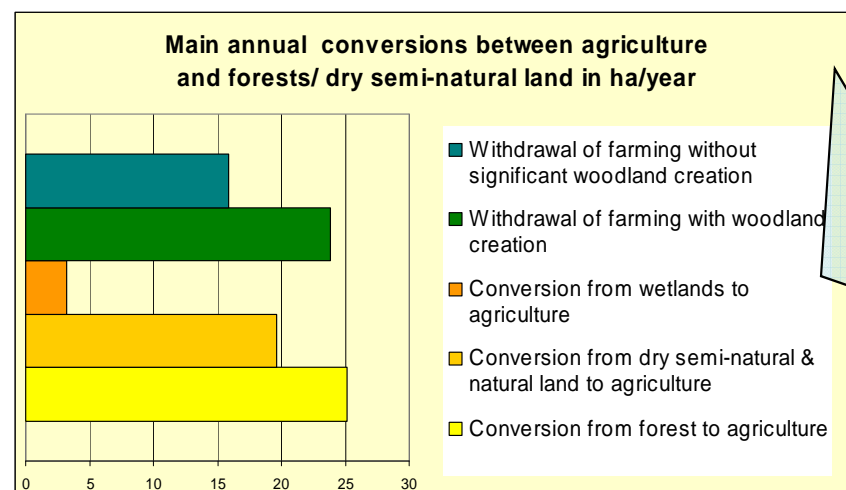
# Land cover change accounts: from maps to statistics



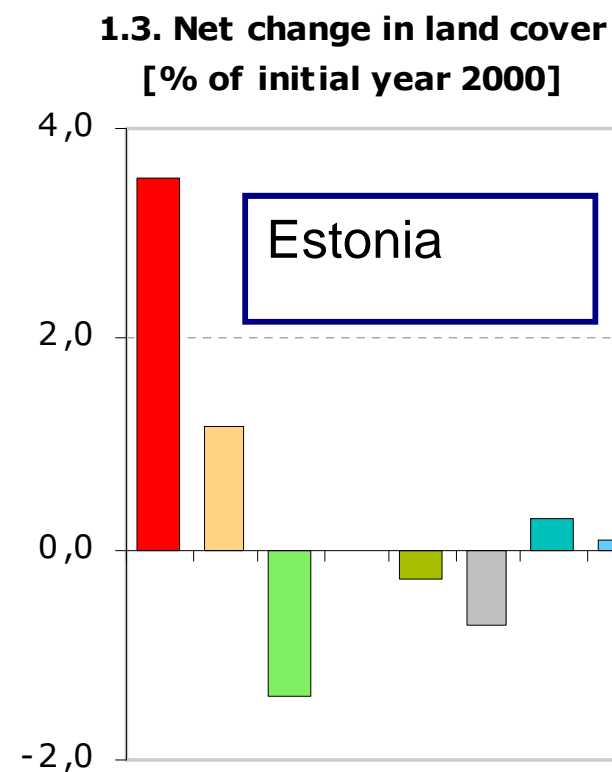
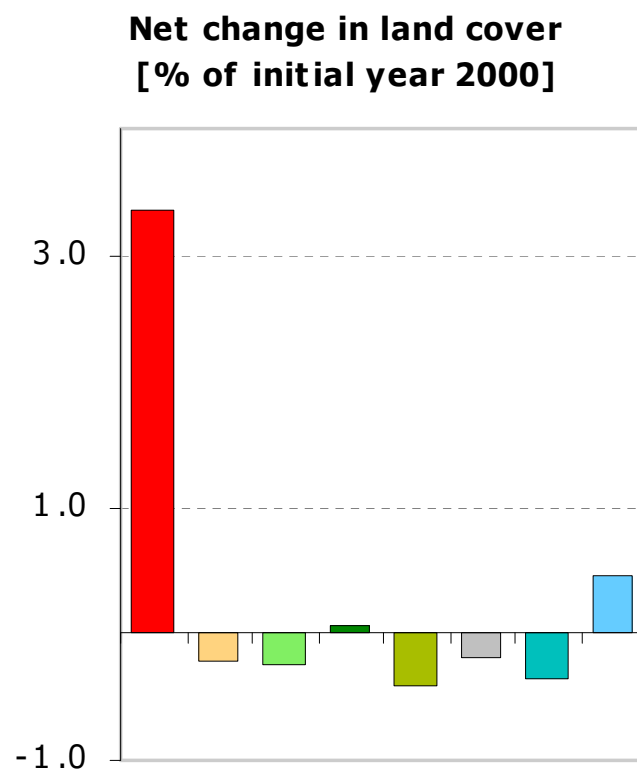
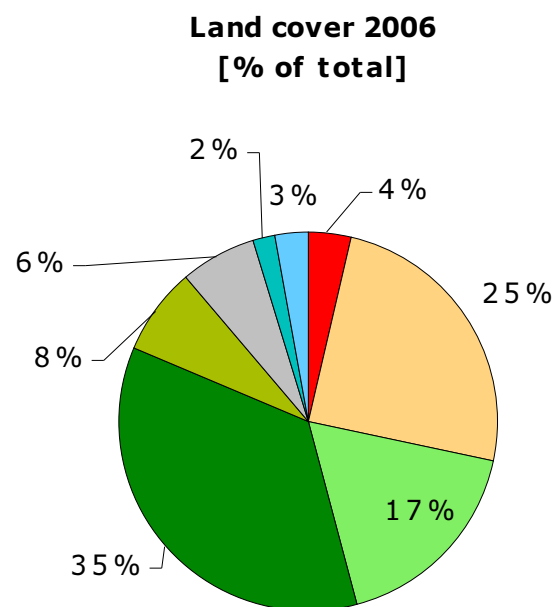
- LCF1 Urban land management
- LCF2 Urban residential sprawl
- LCF3 Sprawl of economic sites and infrastructures
- LCF4 Agriculture internal conversions
- LCF5 Conversion from other land cover to agriculture
- LCF6 Withdrawal of farming
- LCF7 Forests creation and management
- LCF8 Water bodies creation and management
- LCF9 Changes due to natural & multiple causes

	132	143	141	142	211	212	213	221	222	223
	Quaternaries	Construction	Green urban areas	Sport and leisure facilities	Non-irrigated arable land	Permanently irrigated land	Rice fields	Vineyards	Permanent crops and berry plantations	Olive groves
243 Land principally occupied by agriculture with significant areas of natural vegetation	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture
244 Agro-forestry areas	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture
311 Broad-leaved forest	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture
312 Coniferous forest	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture
313 Mixed forest	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture
321 Natural grassland	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture
322 Moors and heathland	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture	Conversion of forest to agriculture

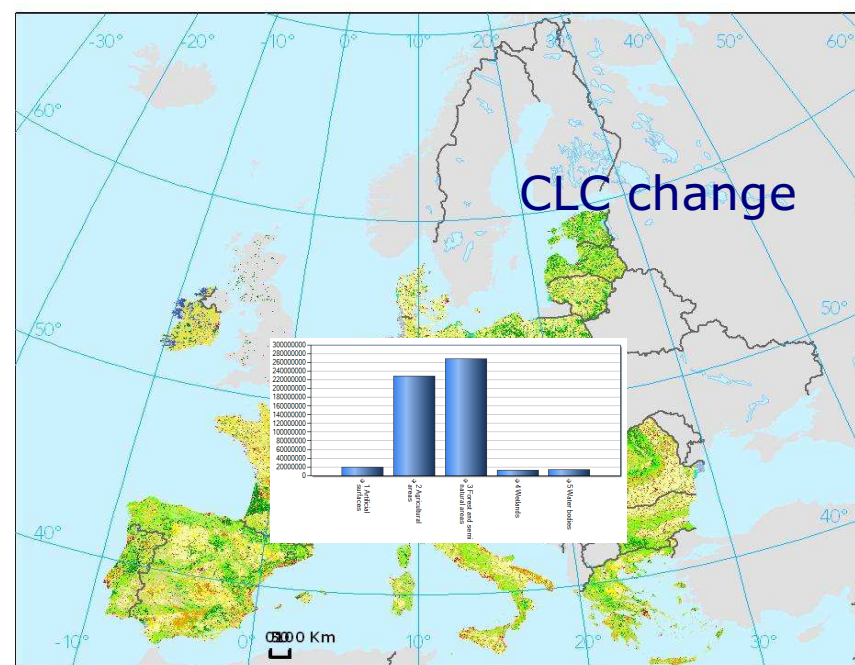
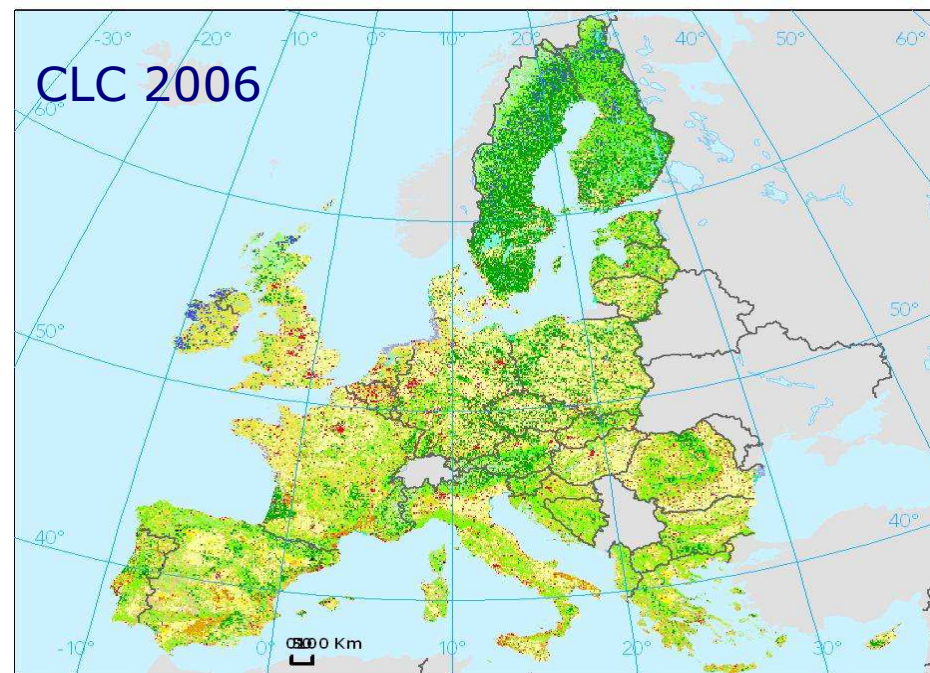
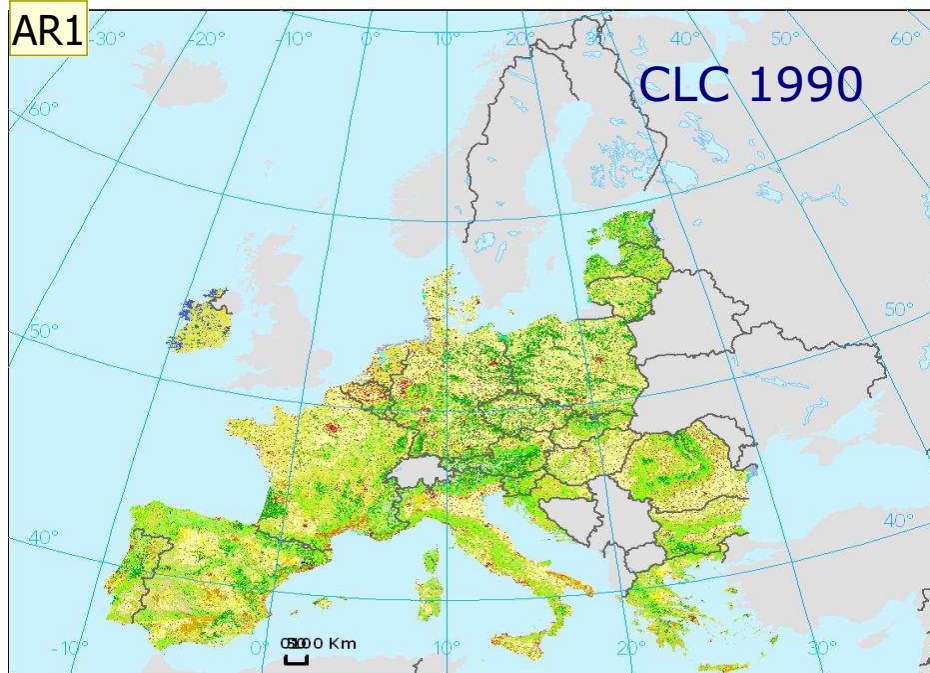
Individual changes are grouped by land cover flows that describe land use processes



# Indicators for Europe



- Artificial areas
- Arable land & permanent crops
- Pastures & mosaics
- Forested land
- Semi-natural vegetation
- Open spaces/ bare soils
- Wetlands
- Water bodies



## Slide 22

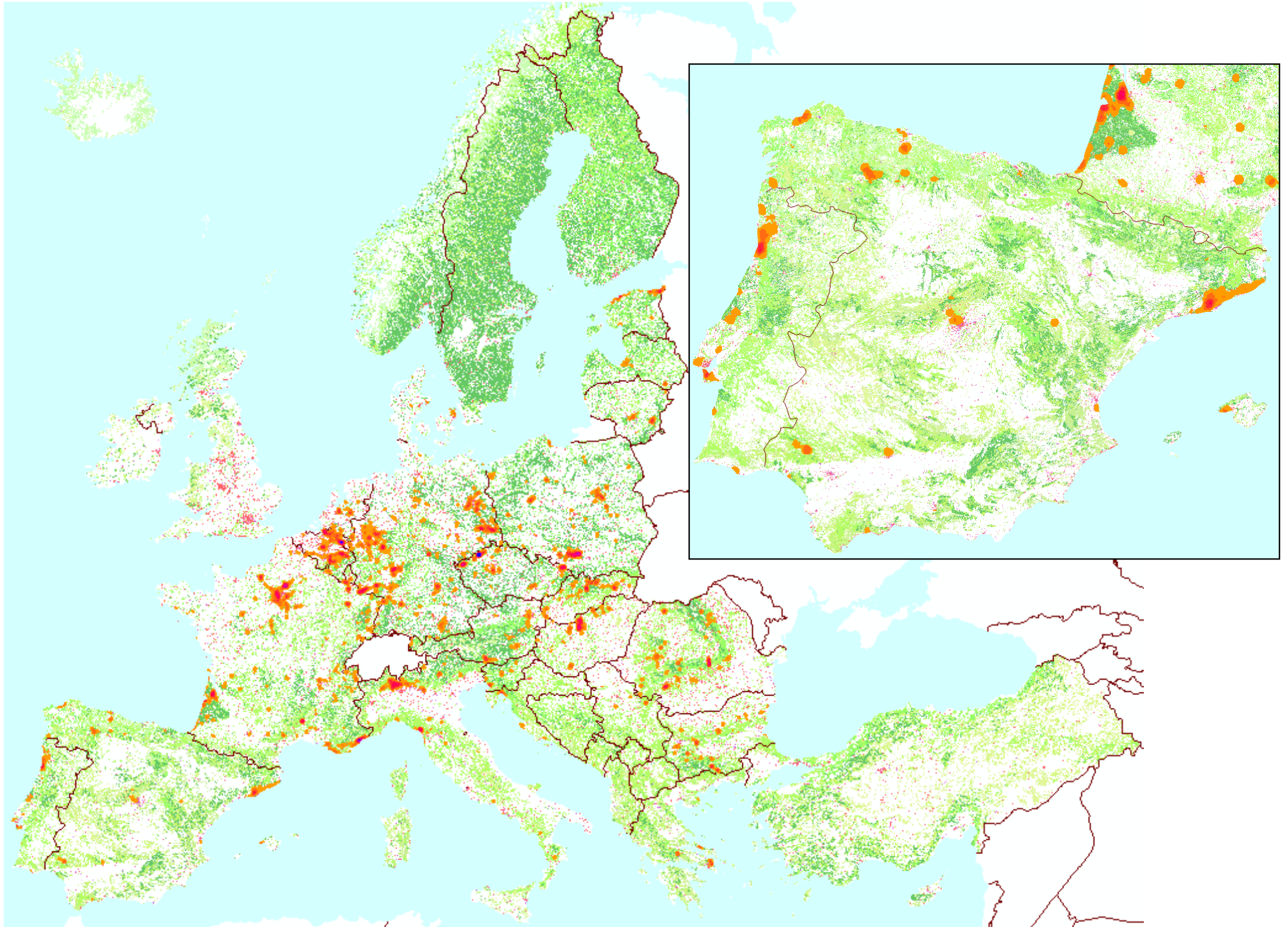
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**AR1**

LEAC tool is more presented in the country profiles part, as in my opinion it might be more interesting to see the country level and not the global picture.  
romanowicz; 12.04.2006

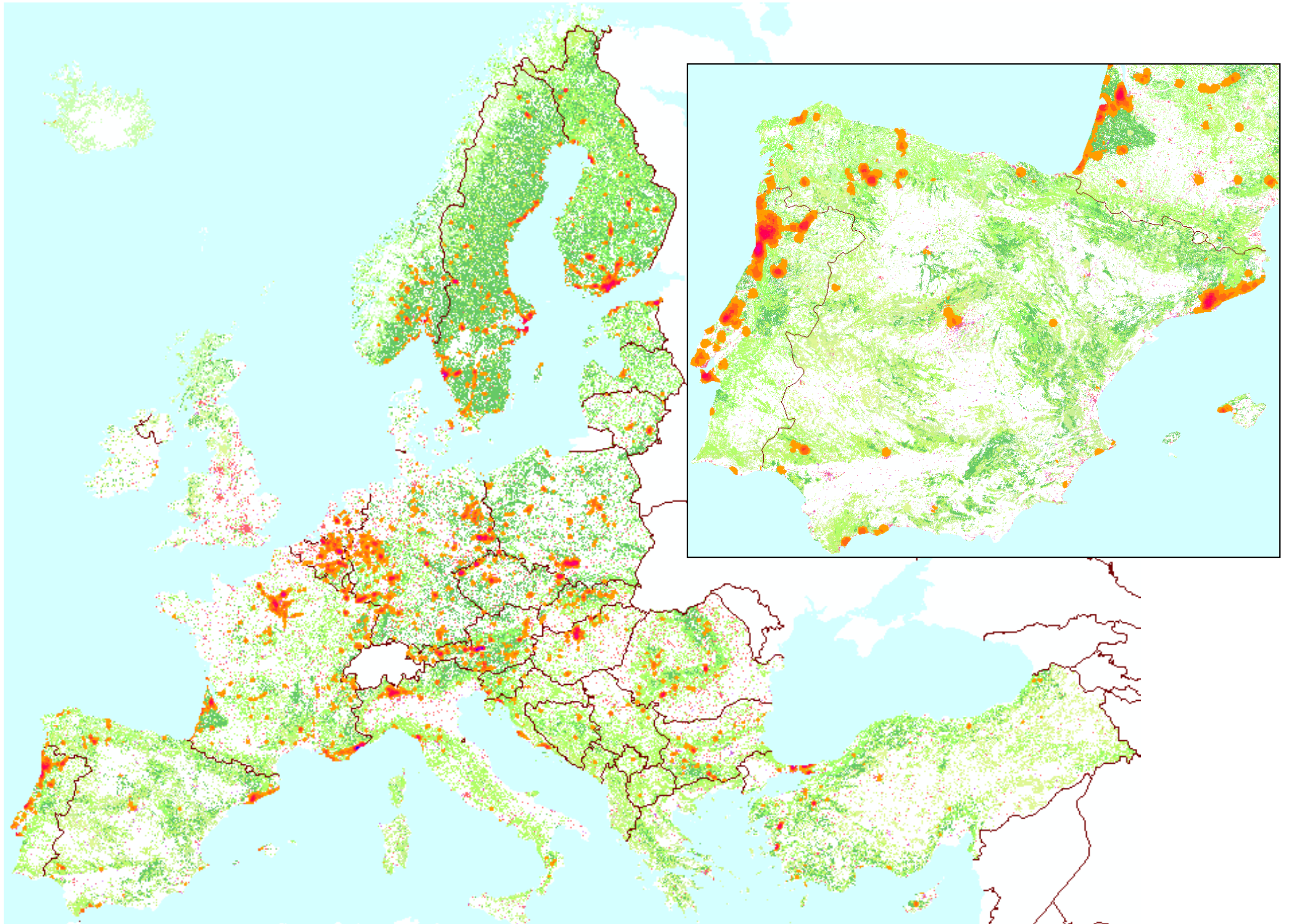


## Forest\_Urban Ecotones – Hotspots 1990

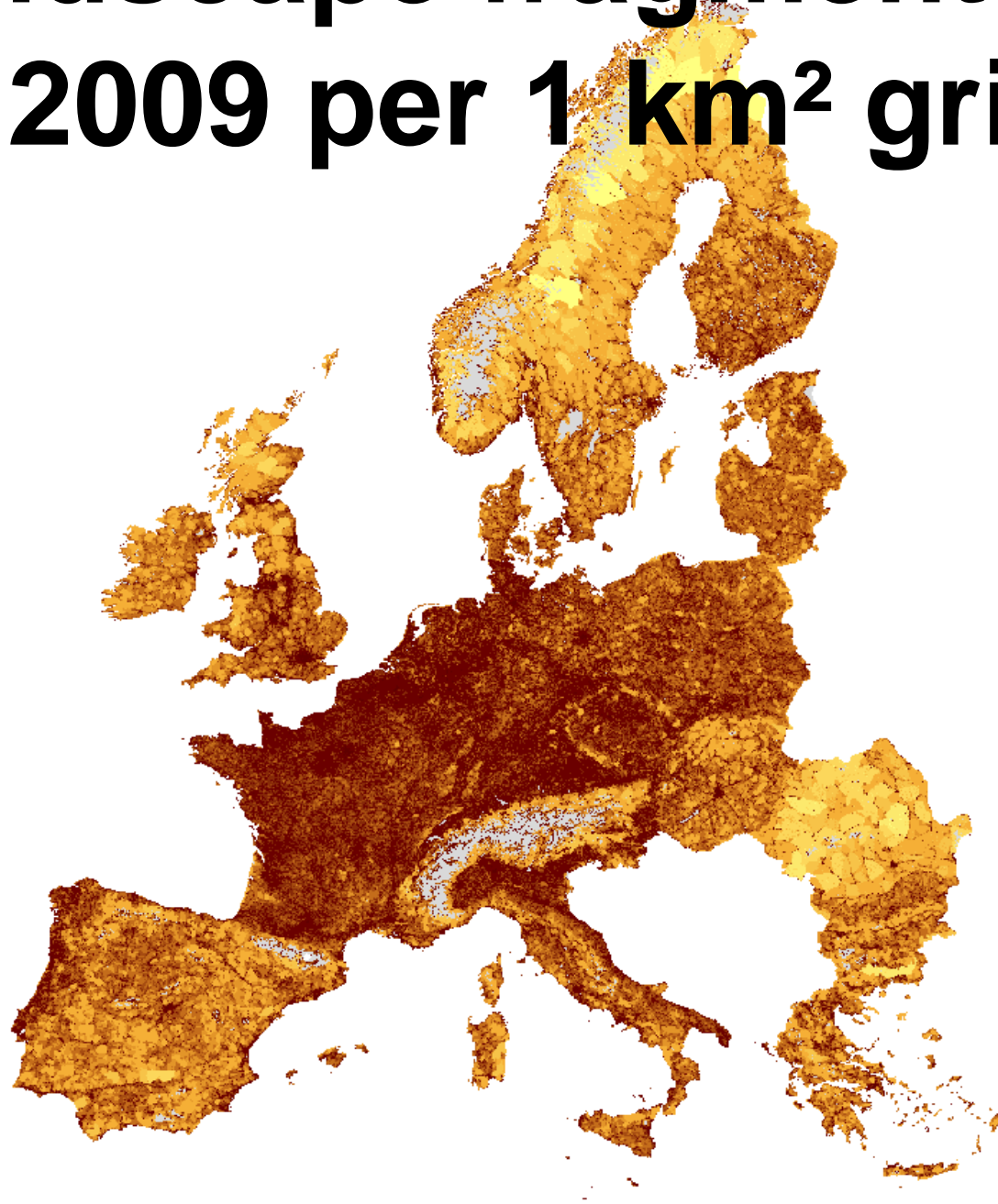


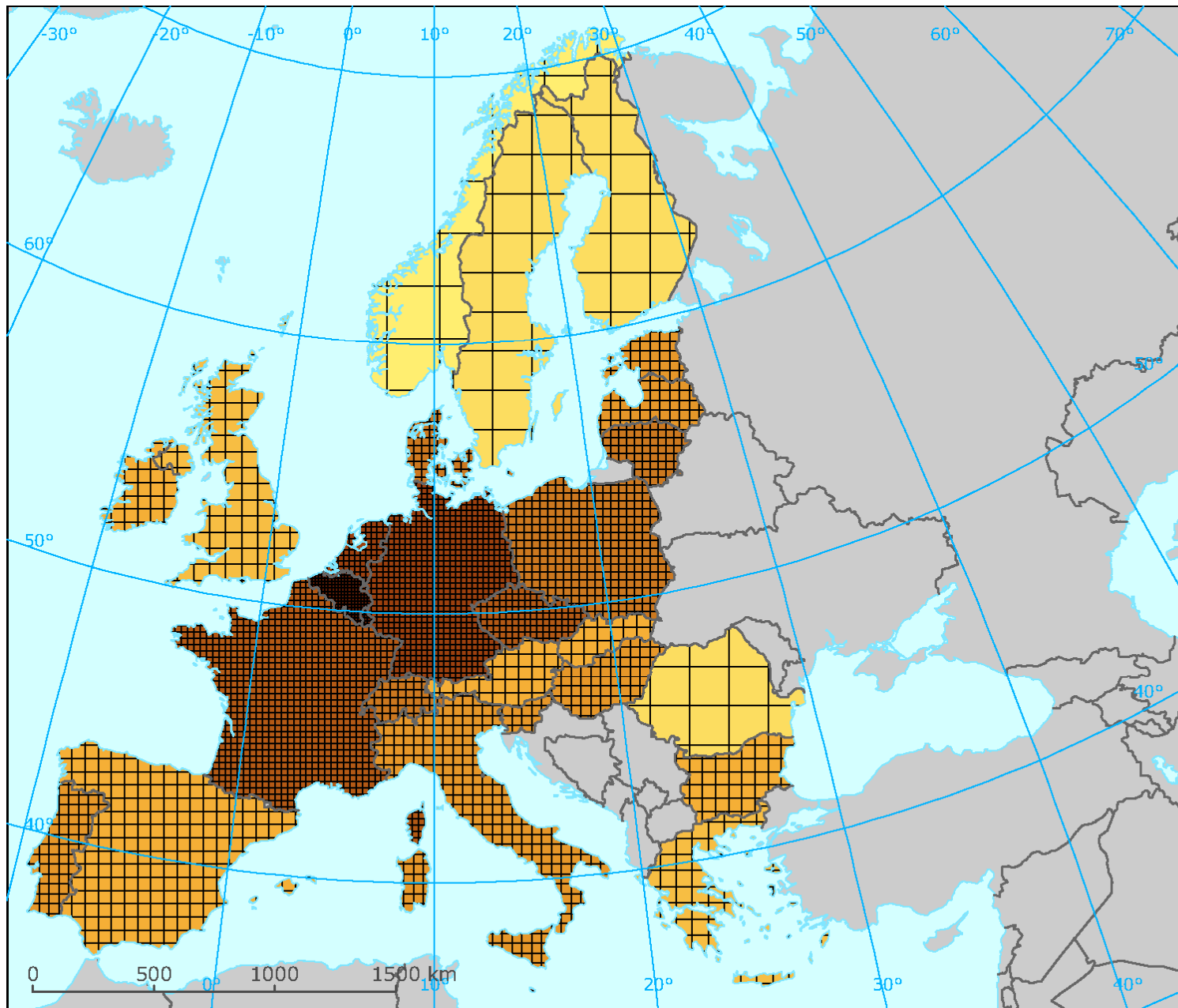


## Forest\_Urban Ecotones – Hotspots 2006



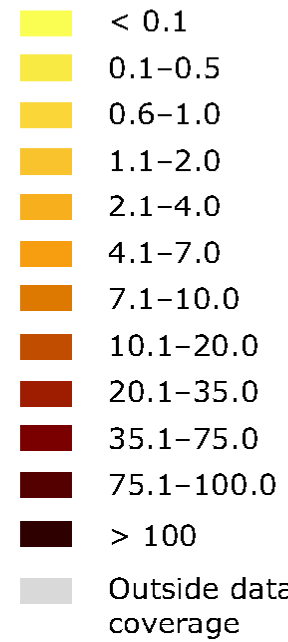
# **Landscape fragmentation 2009 per 1 km<sup>2</sup> grid**





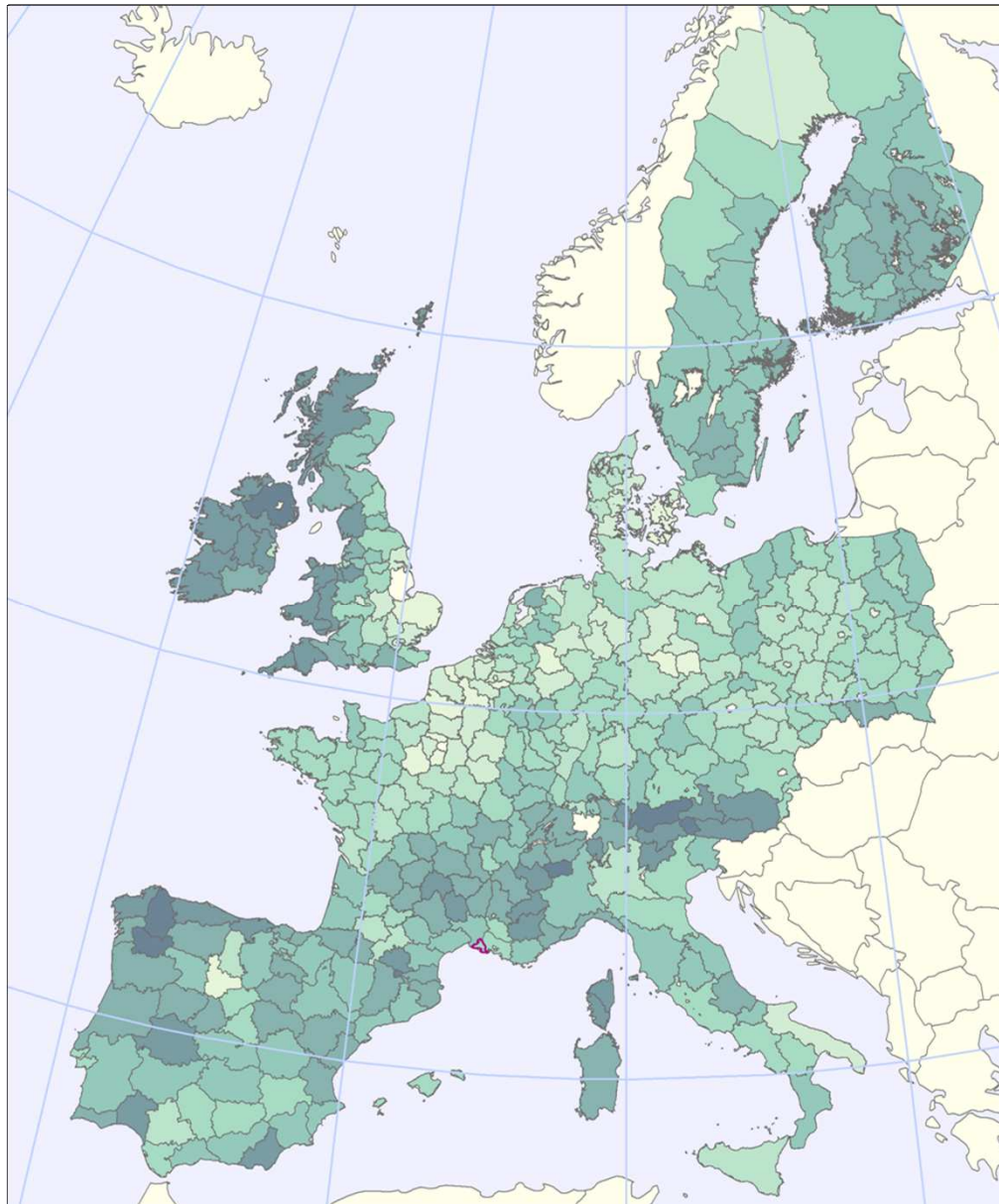
### Landscape fragmentation per country (2009)

Number of meshes per  
1 000 km<sup>2</sup> ( $s_{\text{eff}}$ )





# Land Index: Landscape Ecological Potential



Corine land cover map  
(CLC is derived from  
satellite images)

Green Landscape Index  
(derived from CLC)

Nature Value (*Naturilis*,  
derived from Natura2000  
designated areas)

Fragmentation (*Effective  
Mesh Size (MEFF)* derived  
from *TeleAtlas Roads* and  
CLC)

**Landscape Ecological  
Potential (LEP) 2000**, by 1km<sup>2</sup>  
grid cell

LEP 2000 by NUTS 2/3



# WISE

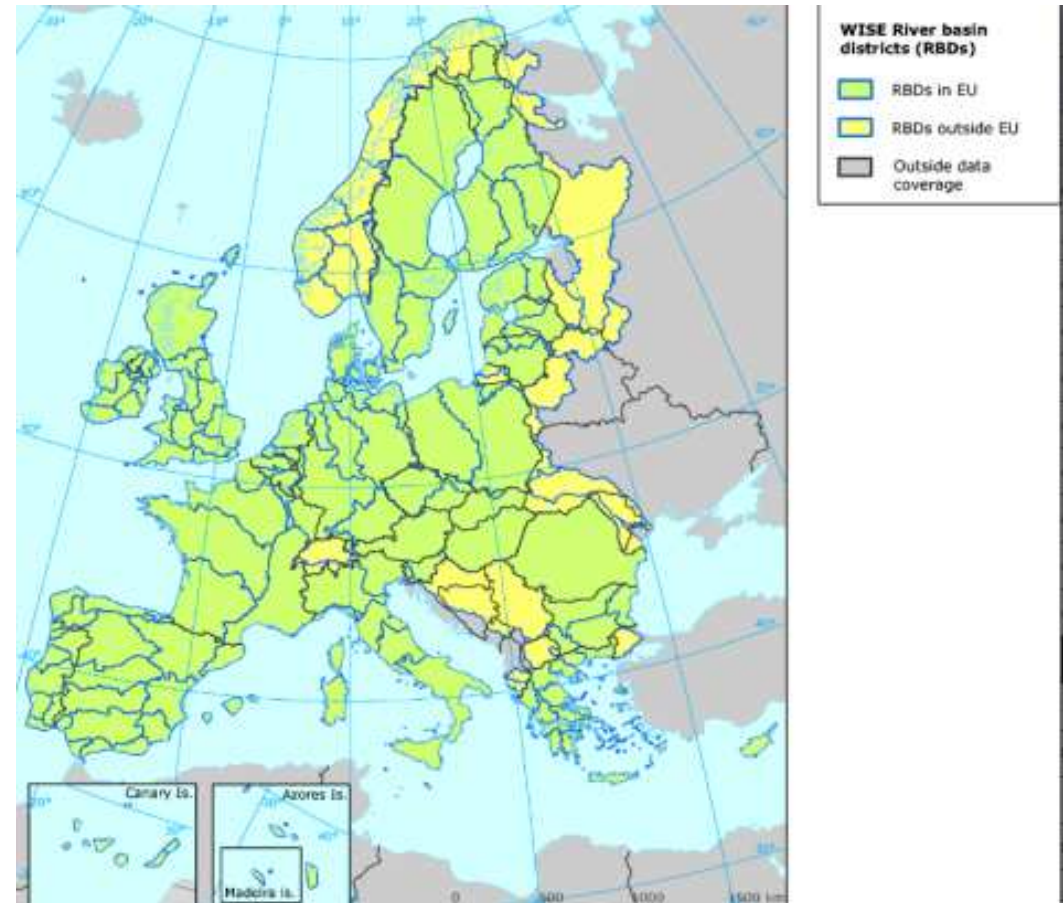
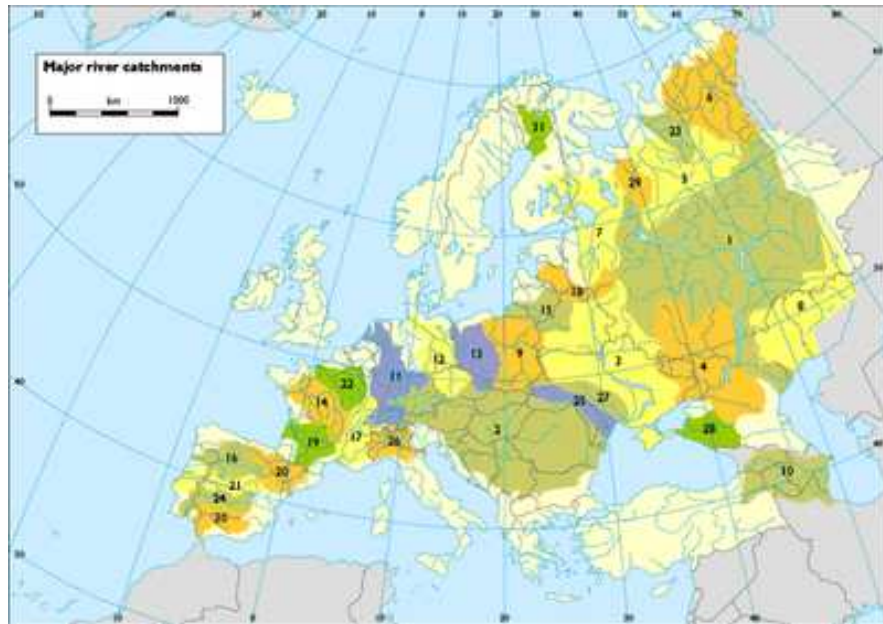
WATER INFORMATION  
SYSTEM FOR EUROPE



<http://www.eea.europa.eu/themes/water/dc>

<http://water.europa.eu/en/welcome>

# Water lines, River Basin Districts, Water Accounts



<http://www.eea.europa.eu/data-and-maps/figures/wise-river-basin-districts-rbds>

<http://www.eea.europa.eu/themes/water/european-waters>

# Spatial mapping of air quality for European

**Spatial mapping of air quality  
for European scale assessment**



**ETC/ACC Technical Paper 2006/6  
March 2007**

*Jan Horálek, Bruce Denby, Peter de Smet, Frank de Leeuw,  
Pavel Kurfürst, Rob Swart, Twan van Noije*



**European Topic Centre  
on Air and Climate Change**

The European Topic Centre on Air and Climate Change (ETC/ACC)  
is a consortium of European institutes under contract of the European Environmental Agency  
RIVM UBA-B UBA-V IIASA NILU ABAT AUTH CHMI DNMI NTUA OKO IEP TNO UEA



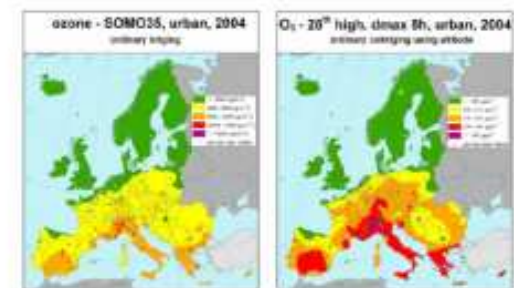
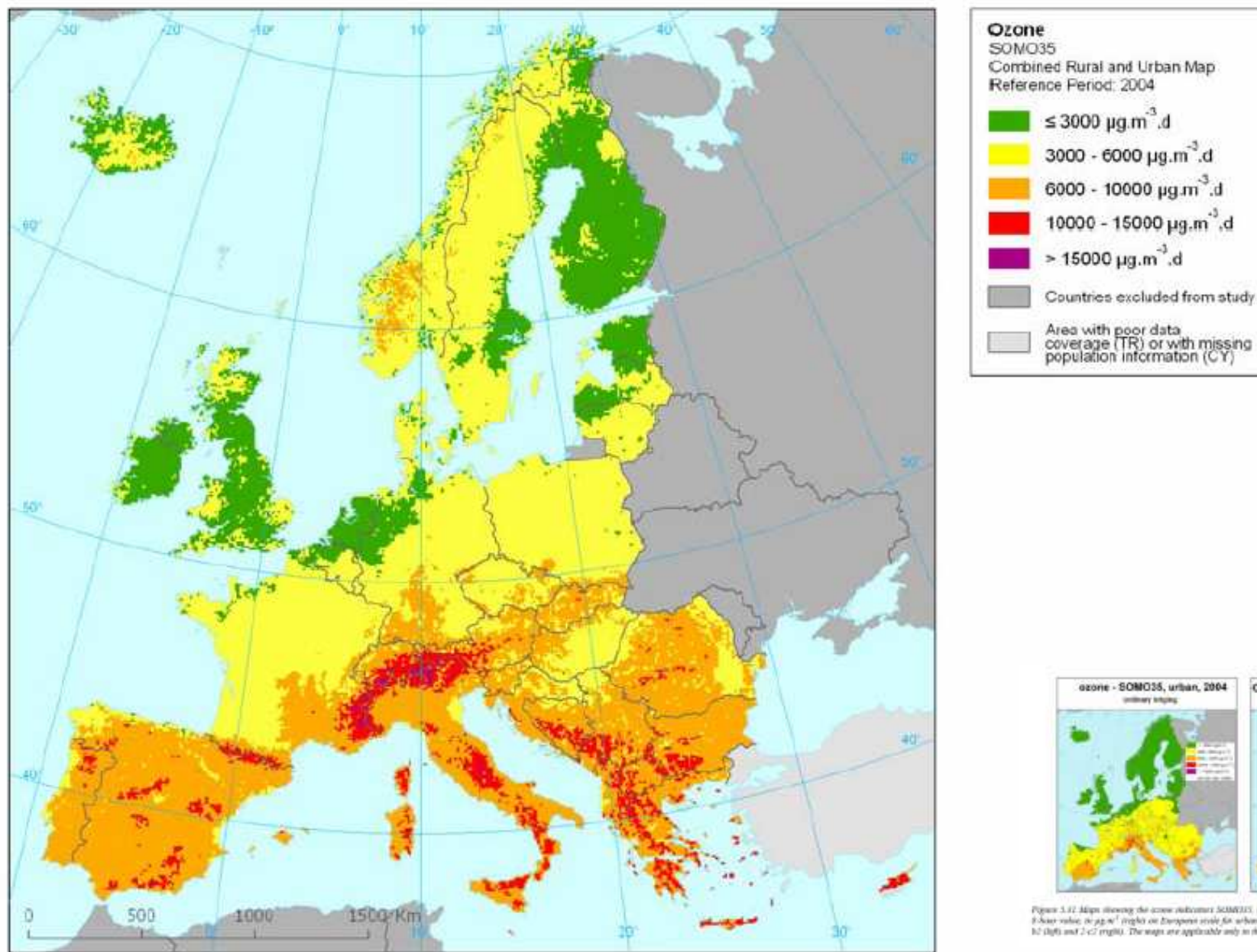
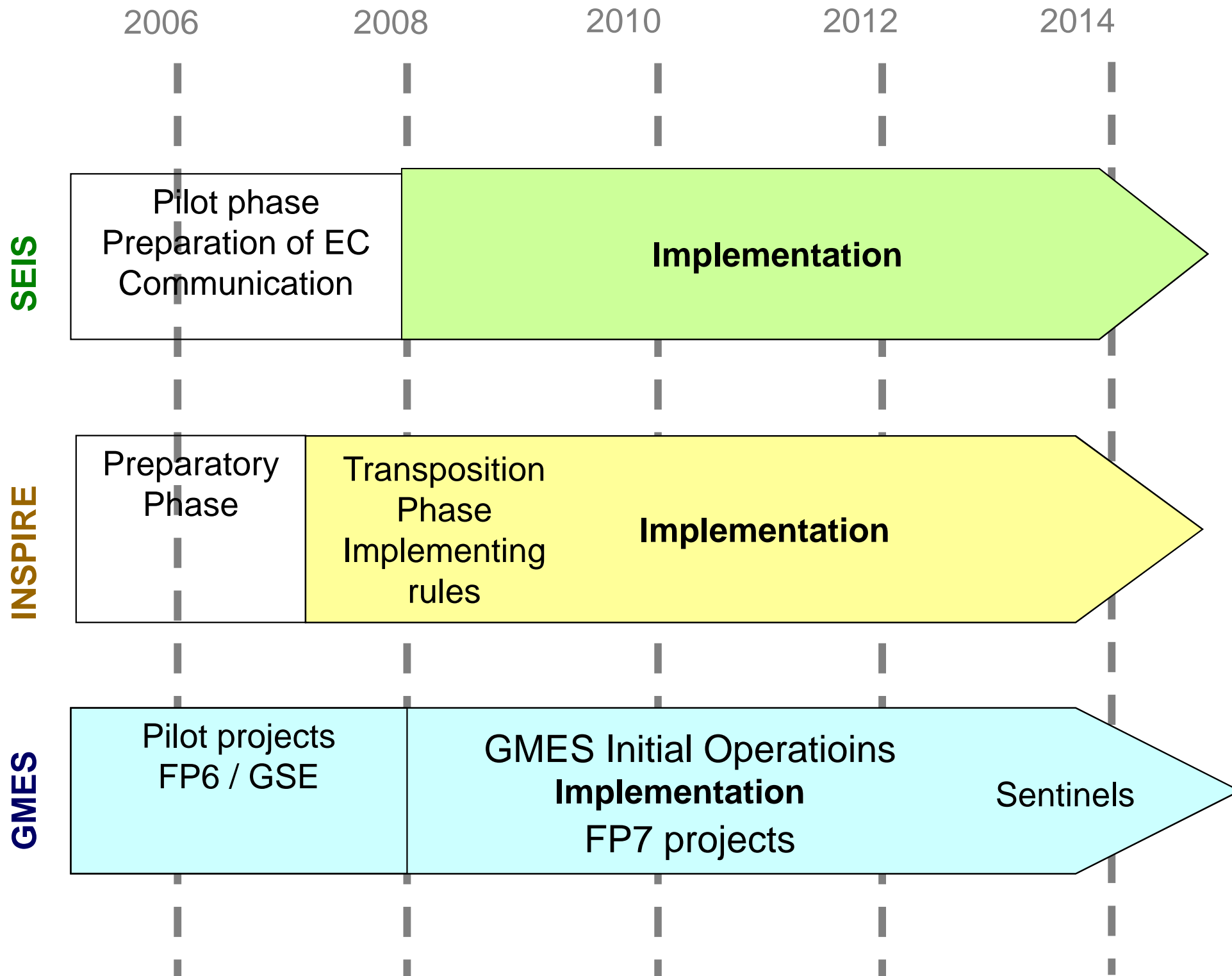


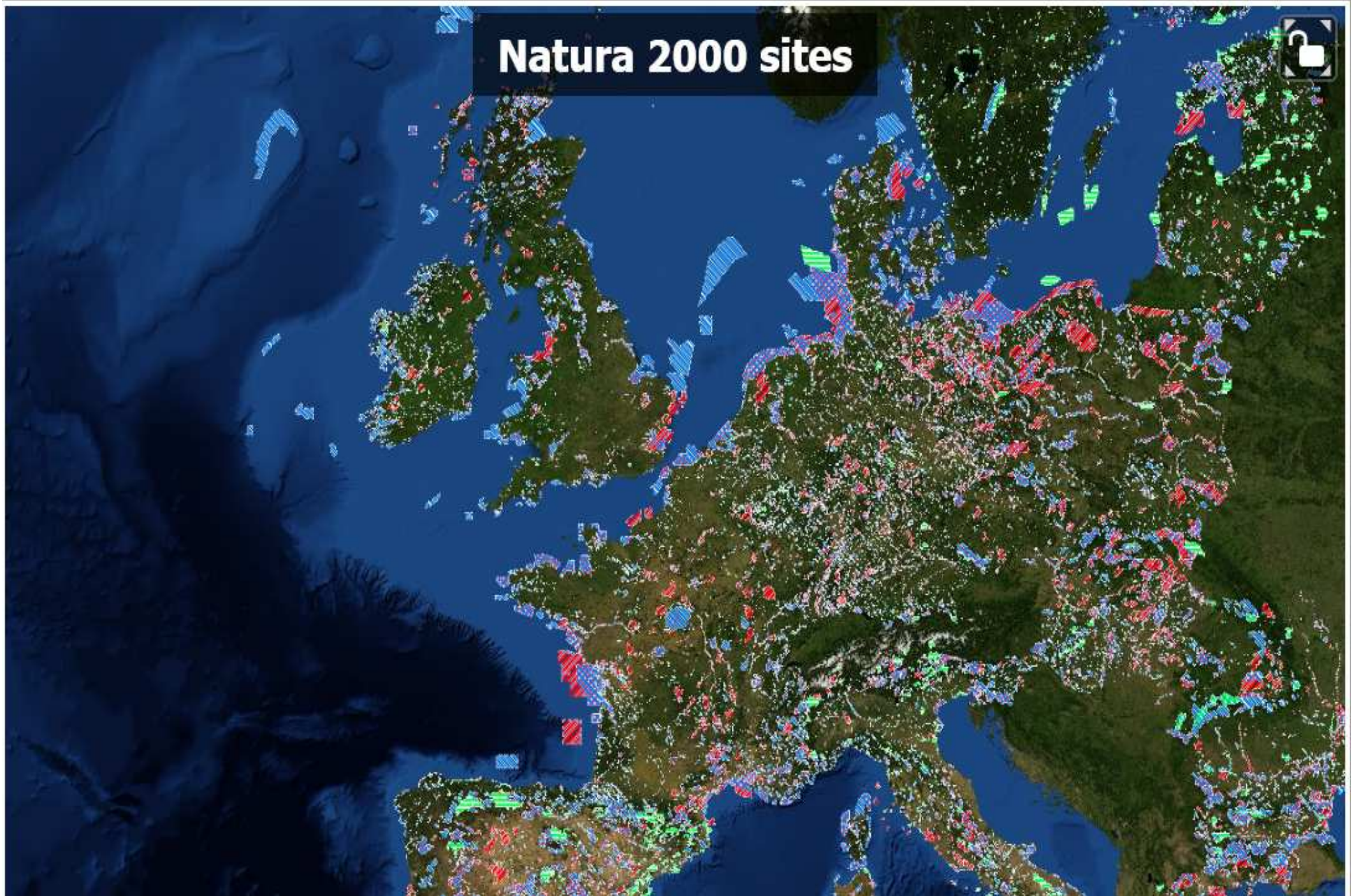
Figure 3.12 Maps showing the ozone indicator SOMO35, in  $\mu\text{g m}^{-3}.\text{days}$  (left) and 10<sup>th</sup> highest maximum daily 8-hour value, in  $\mu\text{g m}^{-3}$  (right) on European scale for urban areas in 2004 as a result of interpolation method 2: b2 (left) and 2-c2 (right). The maps are applicable only to the urban areas.

Figure 8.4 Ozone concentrations expressed as SOMO35, unit:  $\mu\text{g.m}^{-3}.\text{day}$ .





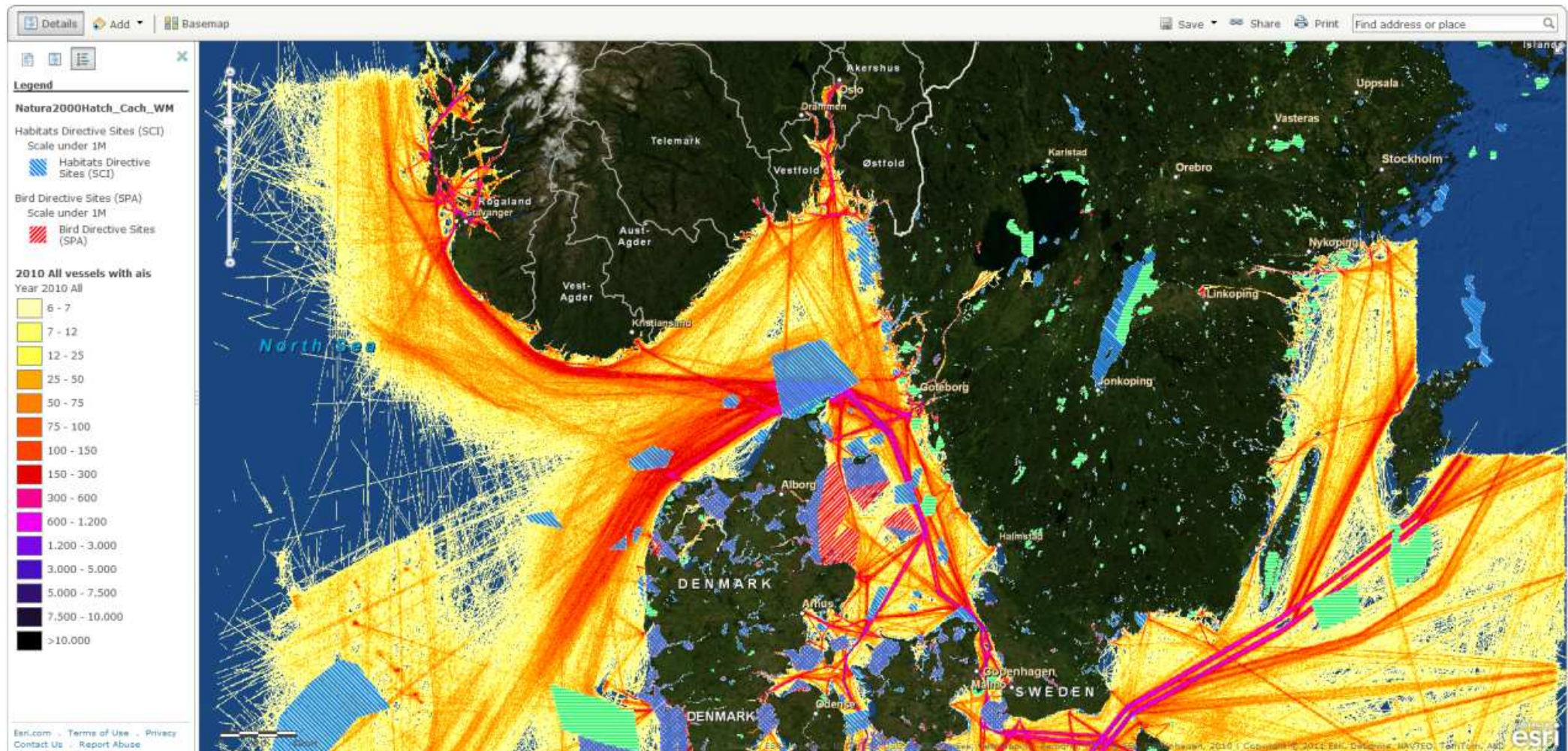
# Natura 2000 sites



Source: ArcGIS.com service



**Example:** Overlaying an EEA map of Natura 2000 protected areas in Europe with a map of high shipping activity at sea. The result is showing that the highest volume of traffic is going right through protected areas.



# ...and developments of new functionalities, services and applications







# Tänan kuulamast!

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<http://www.eea.europa.eu>