

# Copernicus Land Monitoring Service

**Tobias LANGANKE**

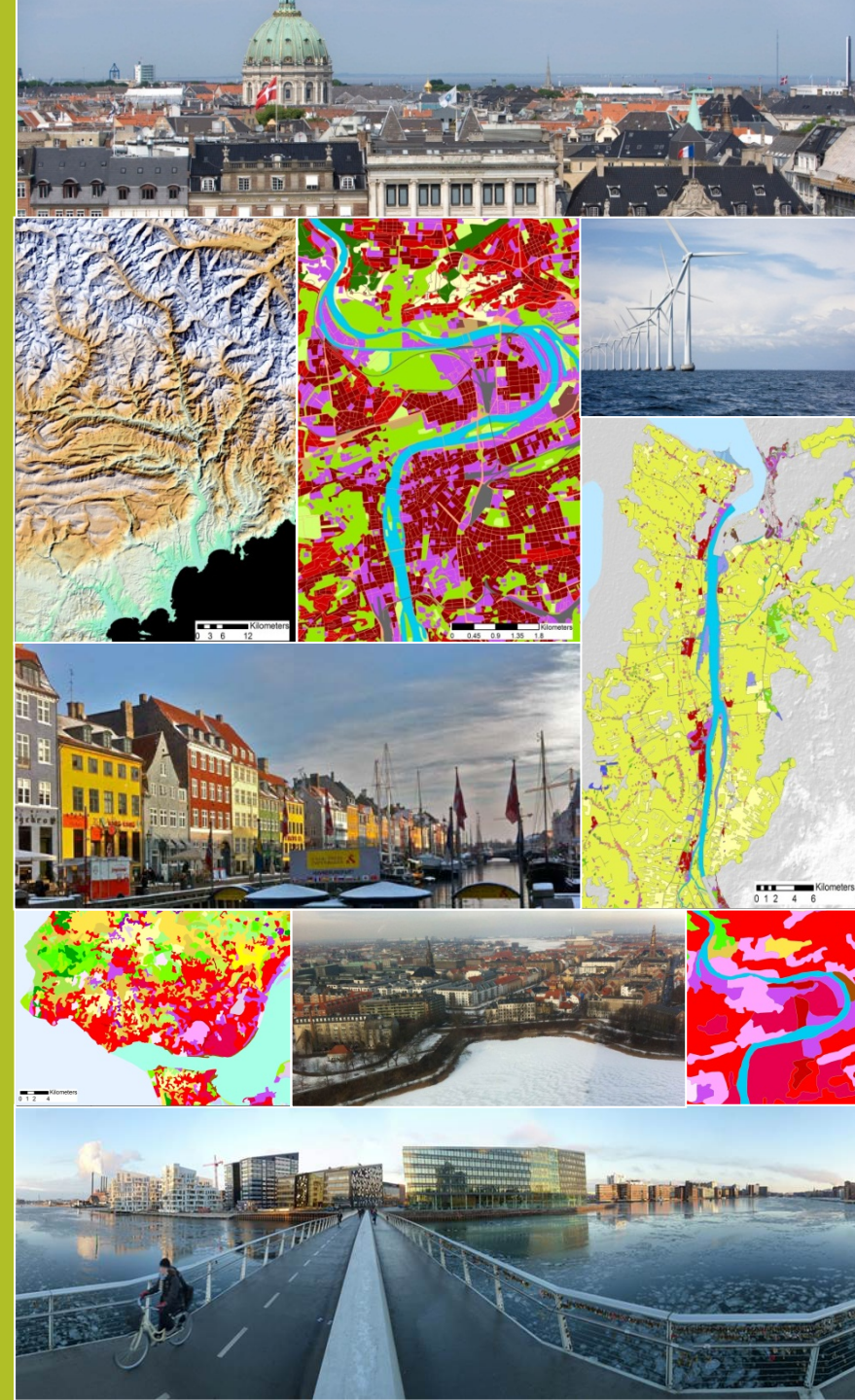
Project manager, Copernicus  
land services

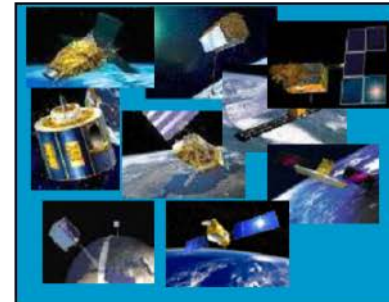
European Environment Agency

*Fachworkshop: Die Herausforderung:  
Deutschland Monitoring  
Nationales Forum fuer Fernerkundung  
und Copernicus 2015, 3-5 November,  
Berlin*



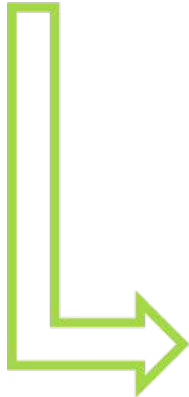
European Environment Agency





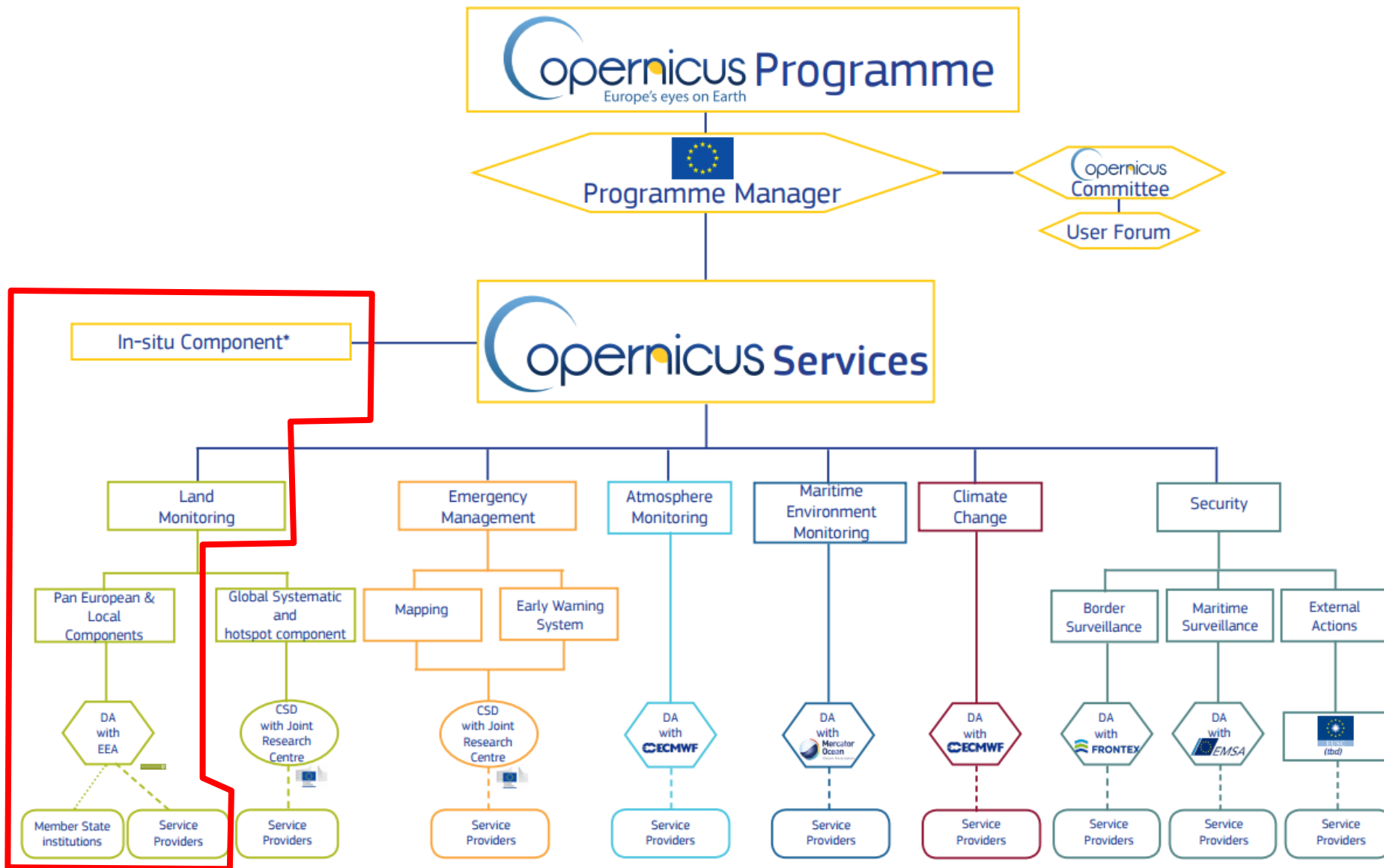
6 services use Earth Observation data to make...

contributing missions



...added-value products

# Copernicus @ EEA

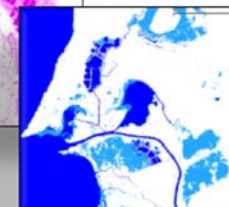
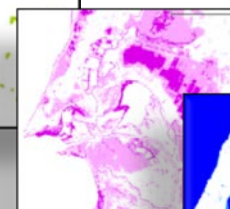
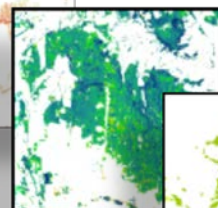
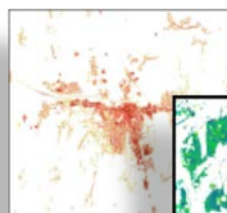


# “Take-home message” aus Sicht des Landdienstes

- Chance: In Deutschland **aktiv Nutzungsmöglichkeiten** für Produkte aus dem Copernicus Landdienst **erkunden** und **dokumentieren**:
  - Neue **“hotspot” Produkte** (riparian zones, urban atlas, Natura 2000)
  - **Synergistische** und **kreative Nutzung** zusammen mit **bestehenden Nationalen Daten**: added value und downstream services
  - Nutzung von Produkten für die es **keine direkte nationale Alternative** gibt
  - Möglichkeit **Europäische Produkte** (semi-) automatisch **aus nationalen Datenbanken** zu generieren (bottom up), z.B. CLC aus LBM-DE
  - Nutzung für den internationalen **Vergleich**, oder für regionale, aber **Landesüberschreitende Projekte**
- **Chance die zukuenftige Entwicklung des Landdienstes mit zu beeinflussen!** Dazu: kritisches aber konstruktives **feedback!!**

## Overview Pan-European component

- HR + VHR image mosaics + biogeophysical parameters
- Corine Land Cover
- Production of 5 thematic HRL's:
  - imperviousness,
  - forests,
  - Natural grasslands,
  - wet lands,
  - water bodies

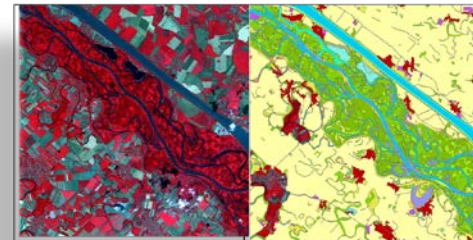


## Overview Local component

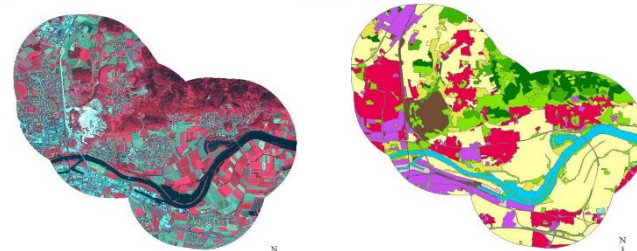
- Urban Atlas (UA)



- Riparian zones (biodiversity)

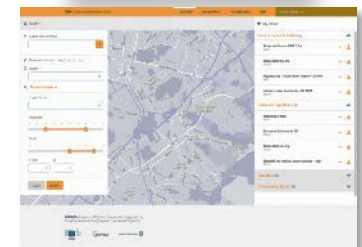


- Natura2000 (grassland rich sites)

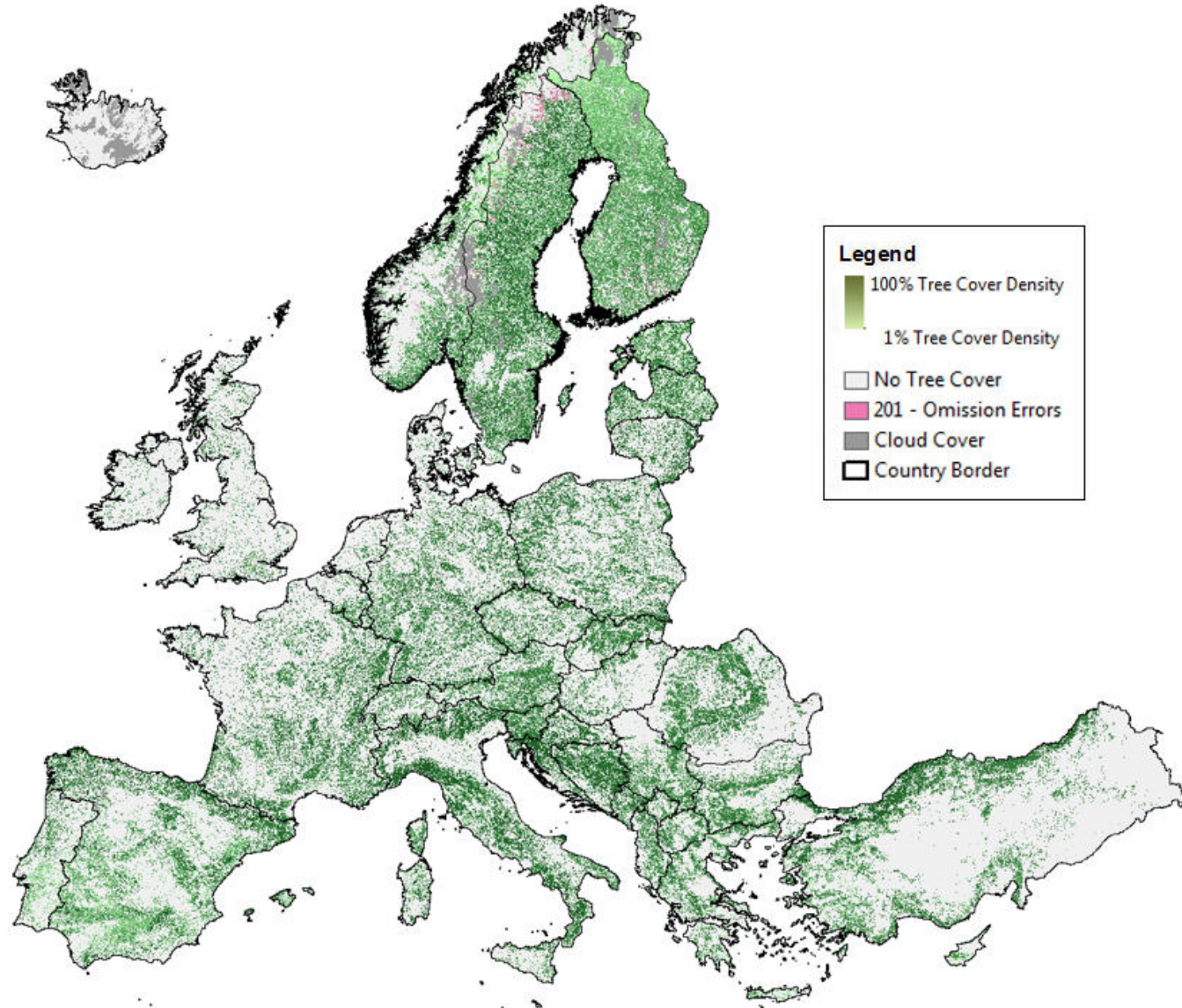


# Overview cross service in-situ coordination

- **EU-DEM:** Digital Elevation Modell with 30 metre spatial resolution. It is a hybrid product based on SRTM and ASTER GDEM data. Upgrade ongoing
- **EU-Hydro:** river network and a drainage model with catchments and drainage lines derived from EU-DEM
- **CORDA** (Copernicus Reference Data Access): single entry-point node for Copernicus service operators to facilitate quick and easy access to geospatial reference data



# HRL Forest: pan-European result

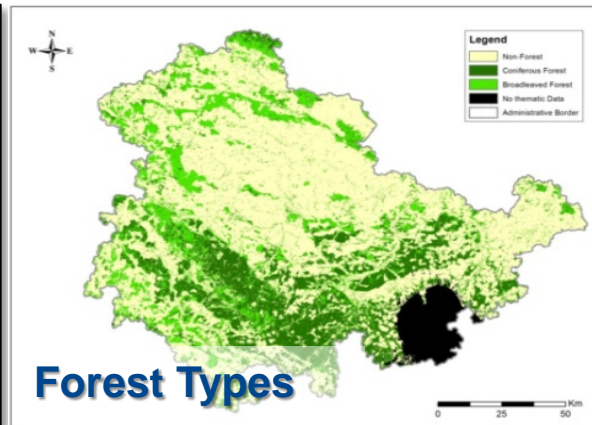
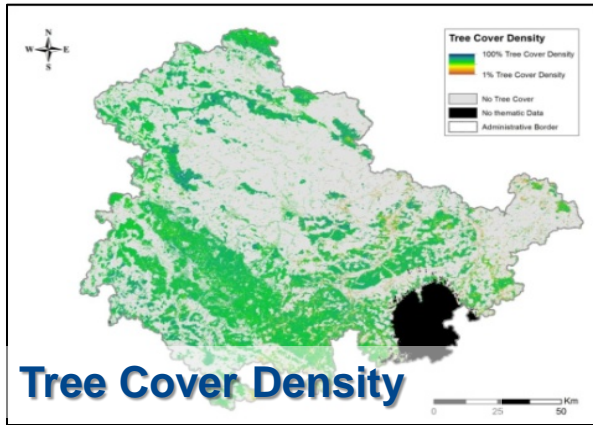




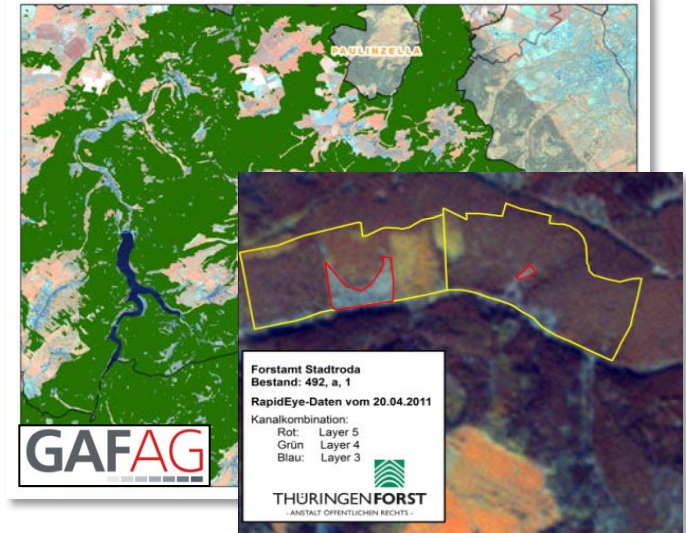
# Application examples: regional refinement

Examples: GAF AG

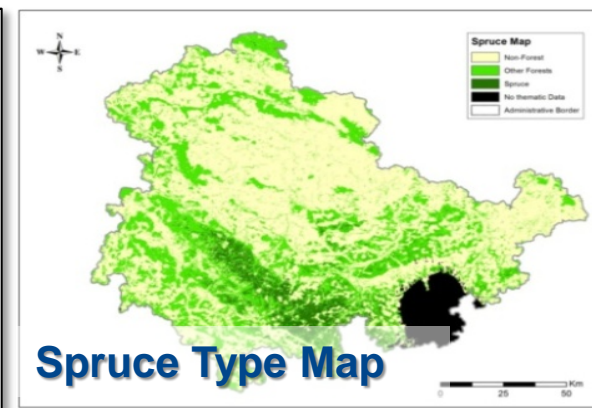
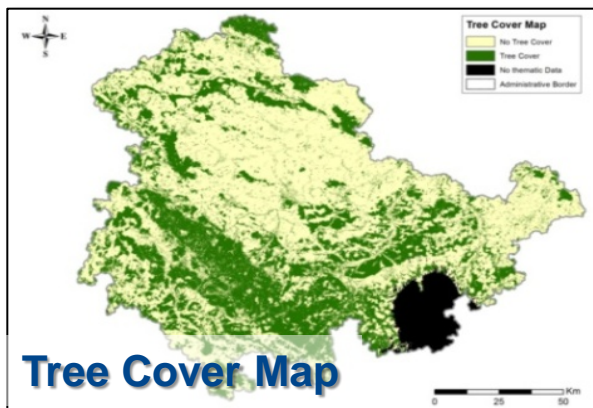
## HR Forest Layer:



## Snow damages, Thuringia, Winter 2011



## Derived layers:

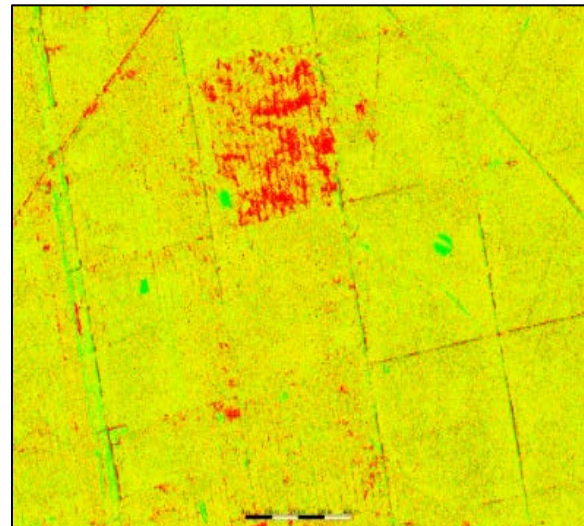


# Application examples: change/damage assessment

Monitoring of Storm Damages in NRT

Monitoring of Insect Damage

Examples: GAF AG

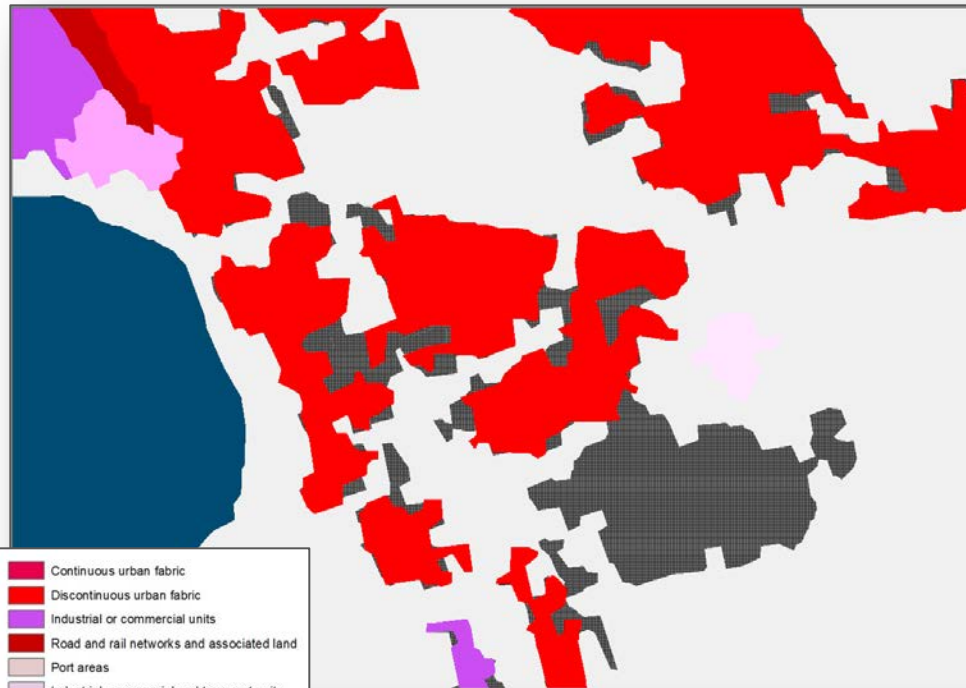


# Imperviousness: The Copernicus solution

## CORINE Land Cover

44 thematic classes

Minimum mapping unit: 25ha + 5ha change



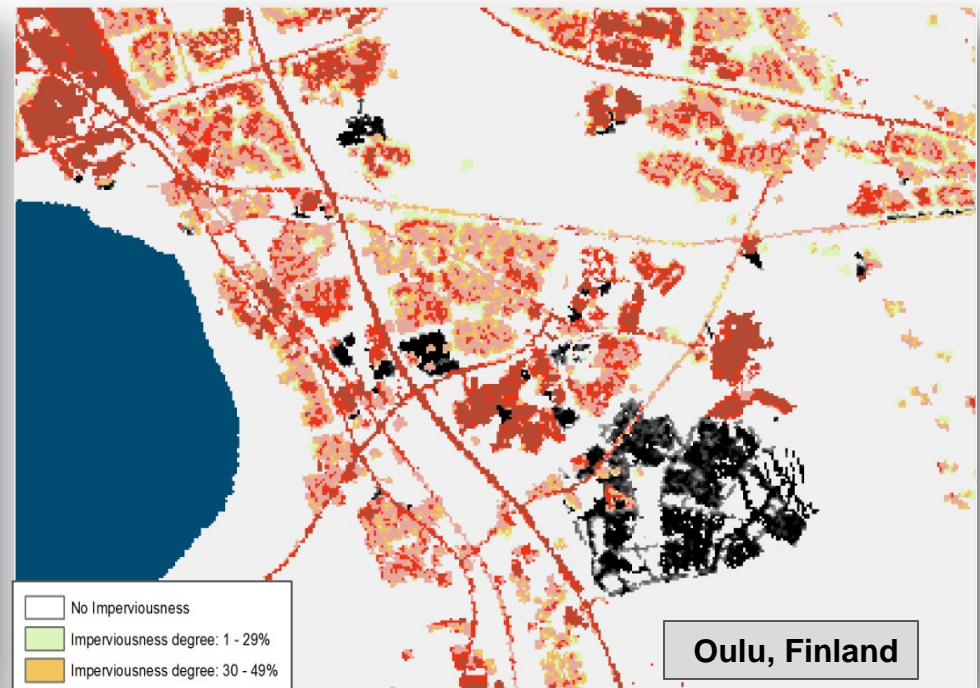
Source: European Environment Agency;

- Continuous urban fabric
- Discontinuous urban fabric
- Industrial or commercial units
- Road and rail networks and associated land
- Port areas
- Industrial, commercial and transport units
- Mineral extraction sites
- Dump sites
- Construction sites
- Green urban areas
- Water
- New Built-up areas 2006 - 2012

## HRL Imperviousness

Continuous degree of imperviousness 0-100%

Resolution: 20m (intermediate) / 100m (final)

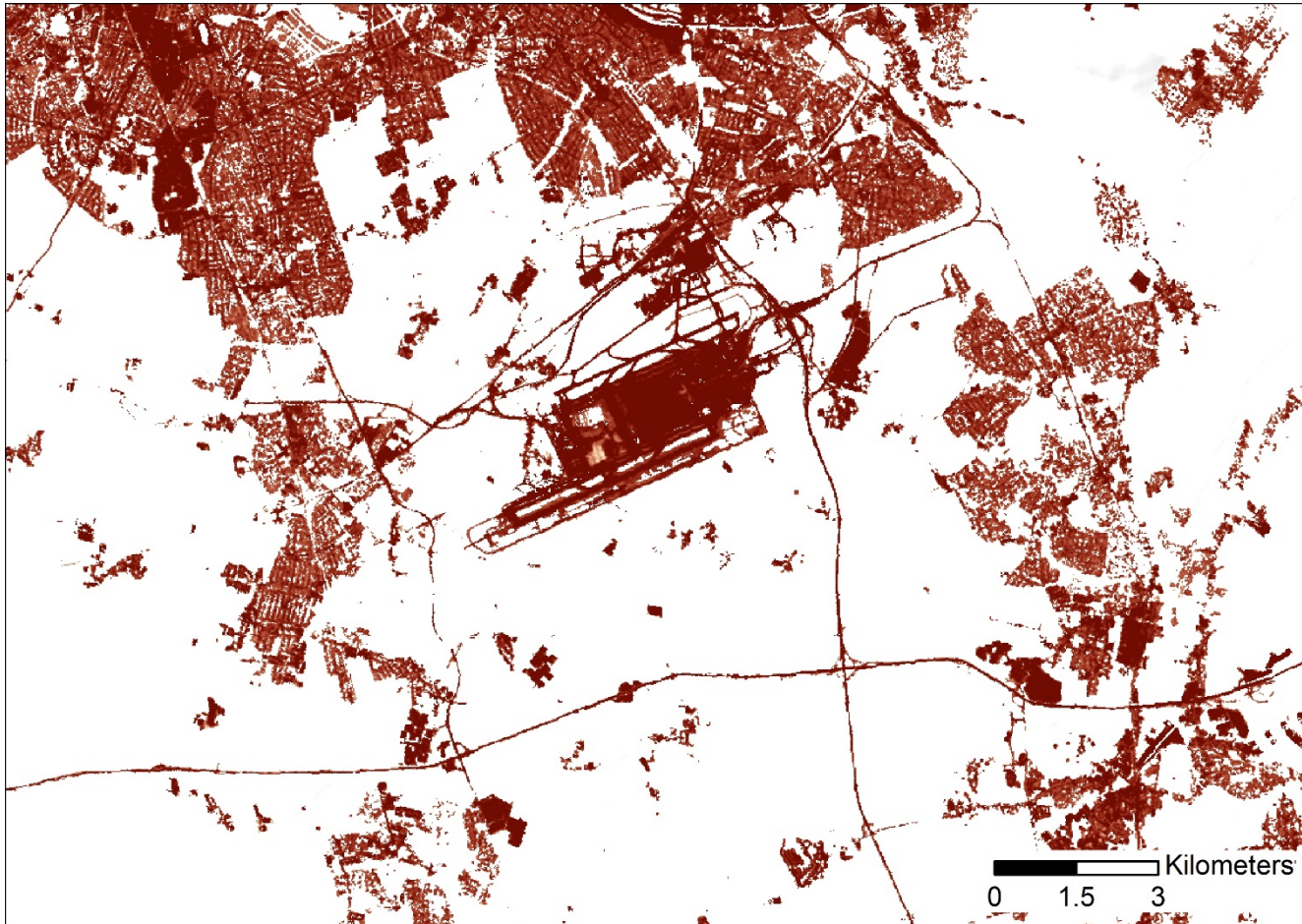


Source: European Environment Agency; Data produced by GeoVille GmbH

- No Imperviousness
- Imperviousness degree: 1 - 29%
- Imperviousness degree: 30 - 49%
- Imperviousness degree: 50 - 79%
- Imperviousness degree: 80 - 99%
- Imperviousness degree: 100%
- New Built-up areas 2006 - 2012

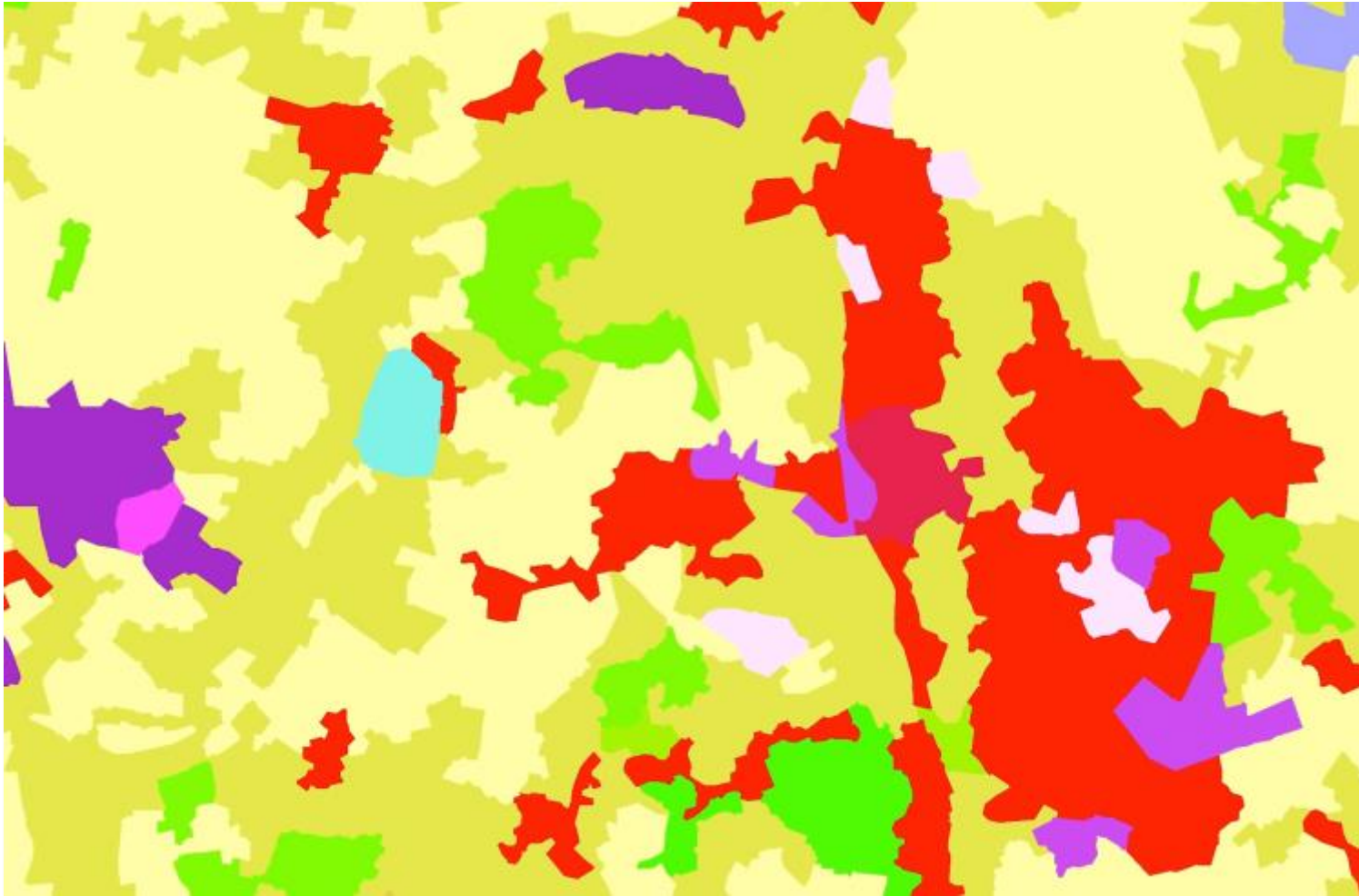
**Examples:  
GeoVille**

# Imperviousness – mapping where and how cities are expanding

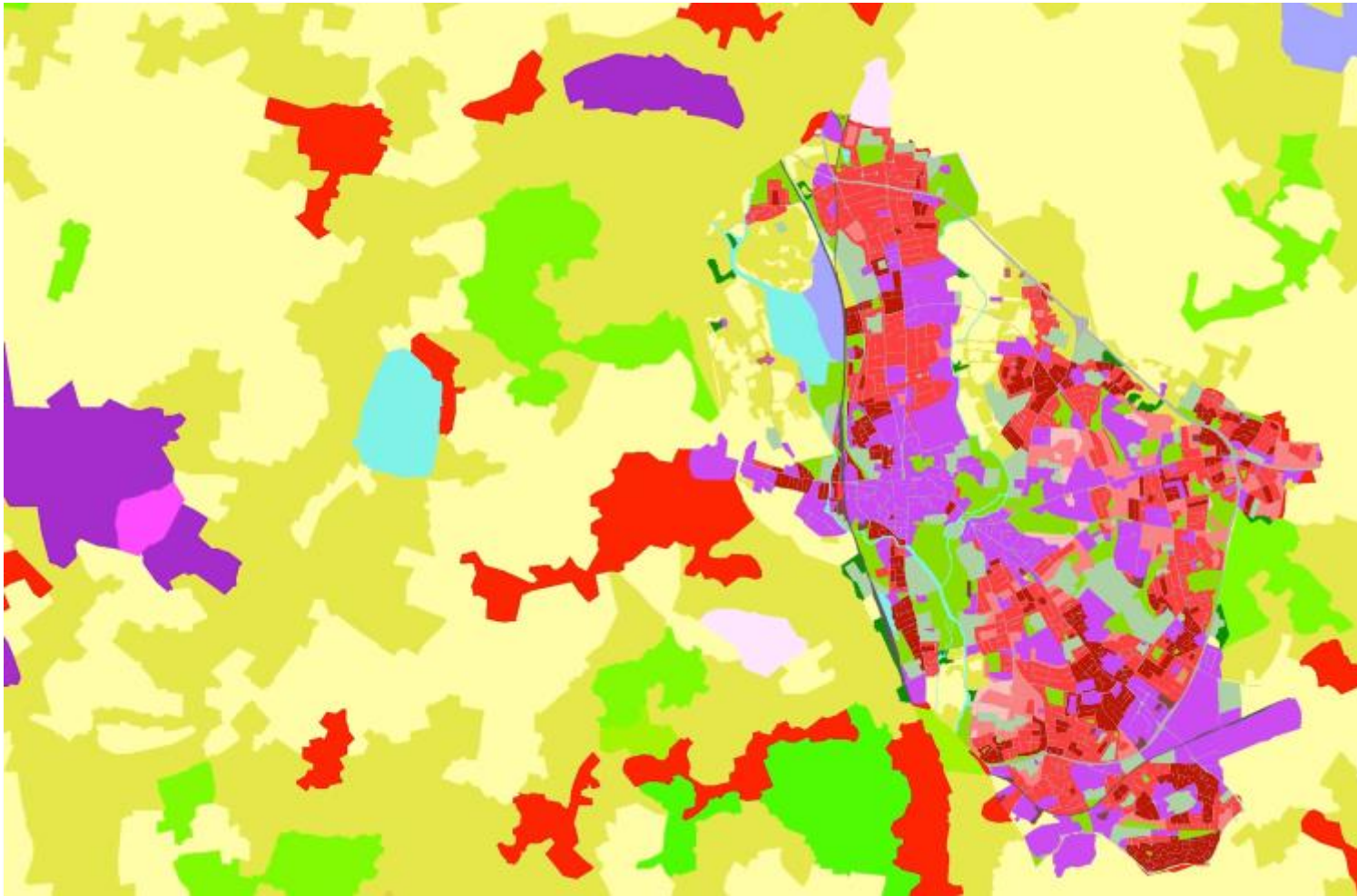


**Berlin Brandenburg  
Airport: 2006-2012**

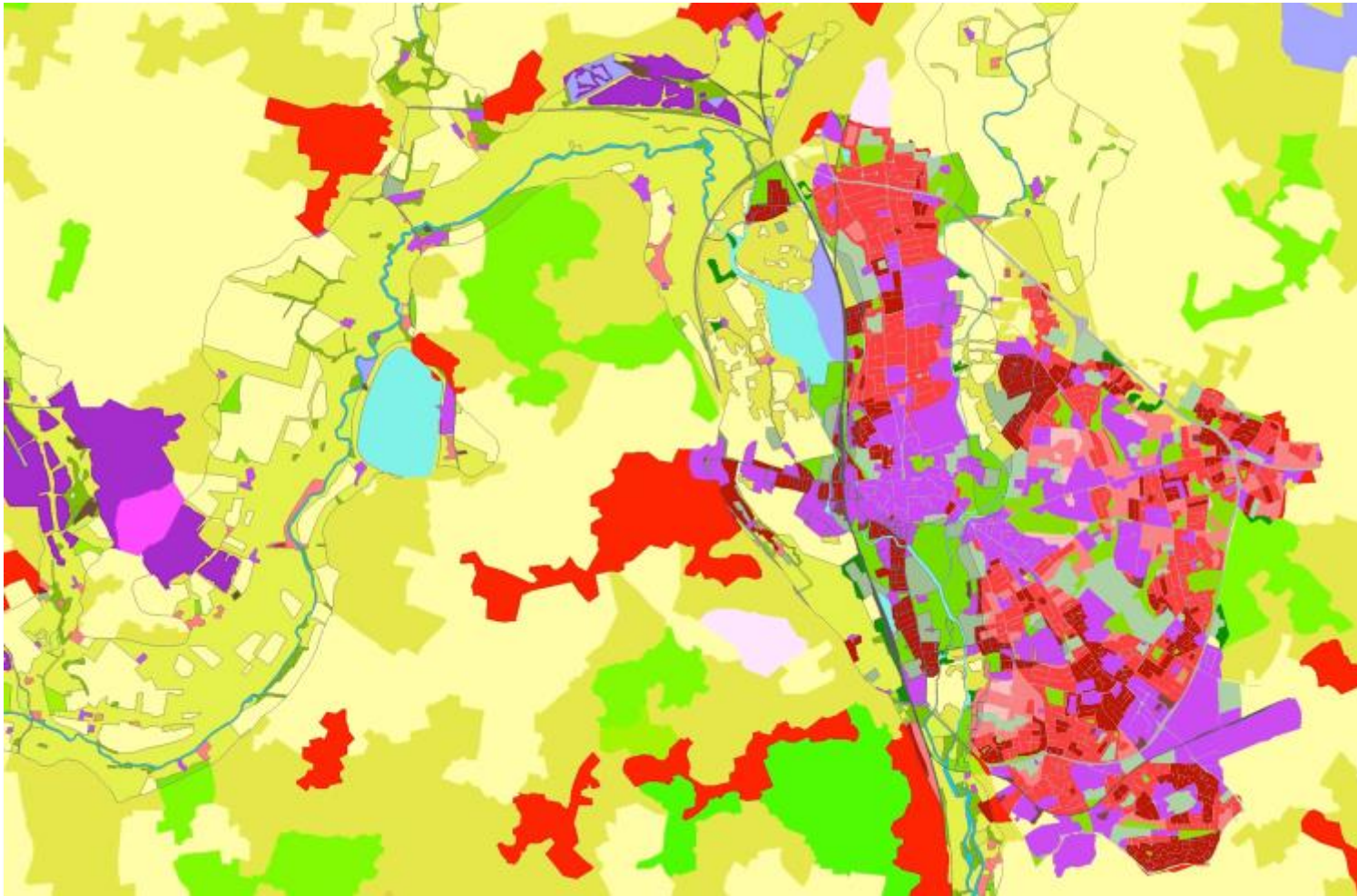
# Example Oxford: Coherence in nomenclatures: CLC



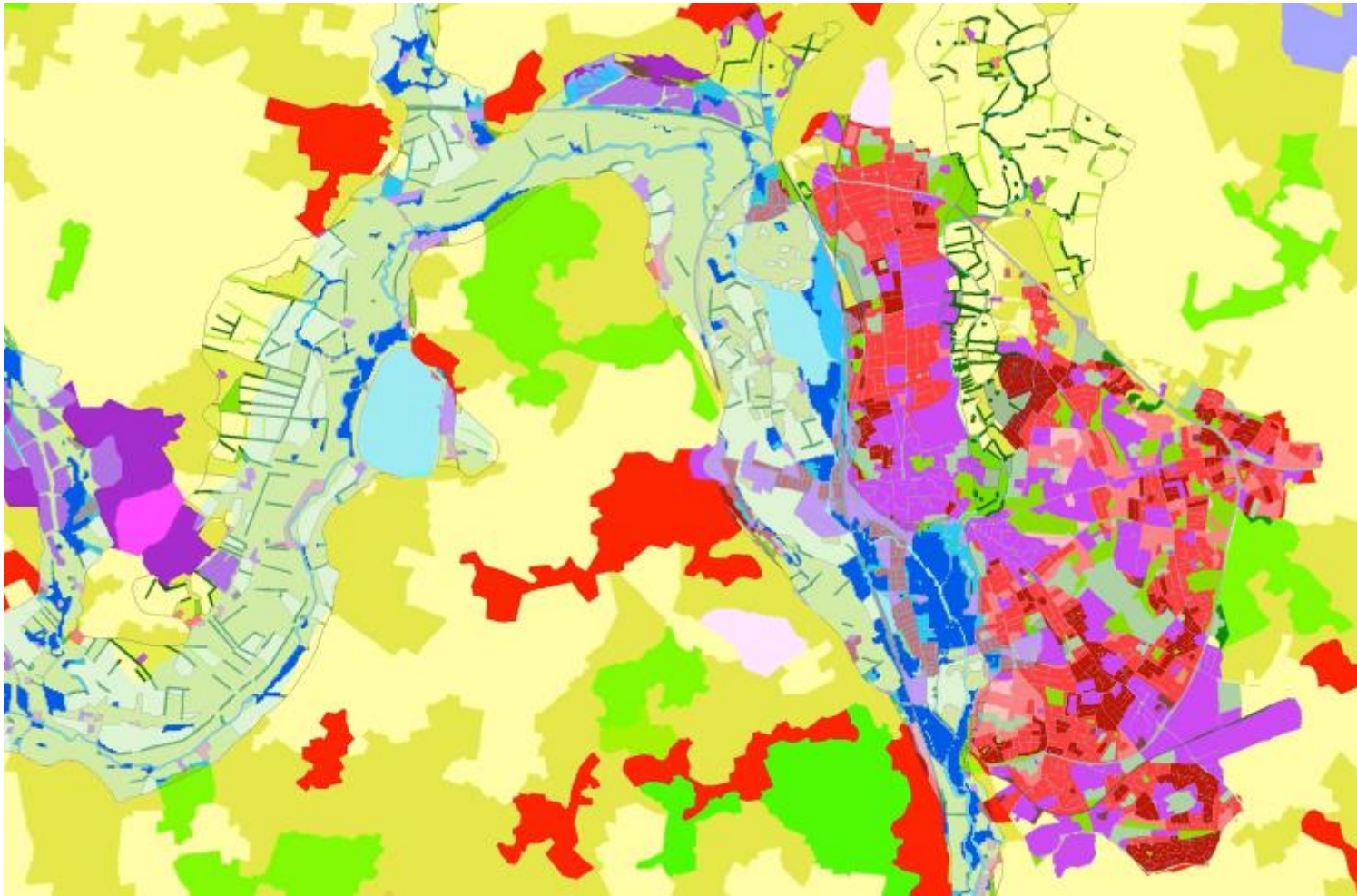
# Coherence in nomenclatures: CLC + UA



# Coherence in nomenclatures: CLC + UA + RZ

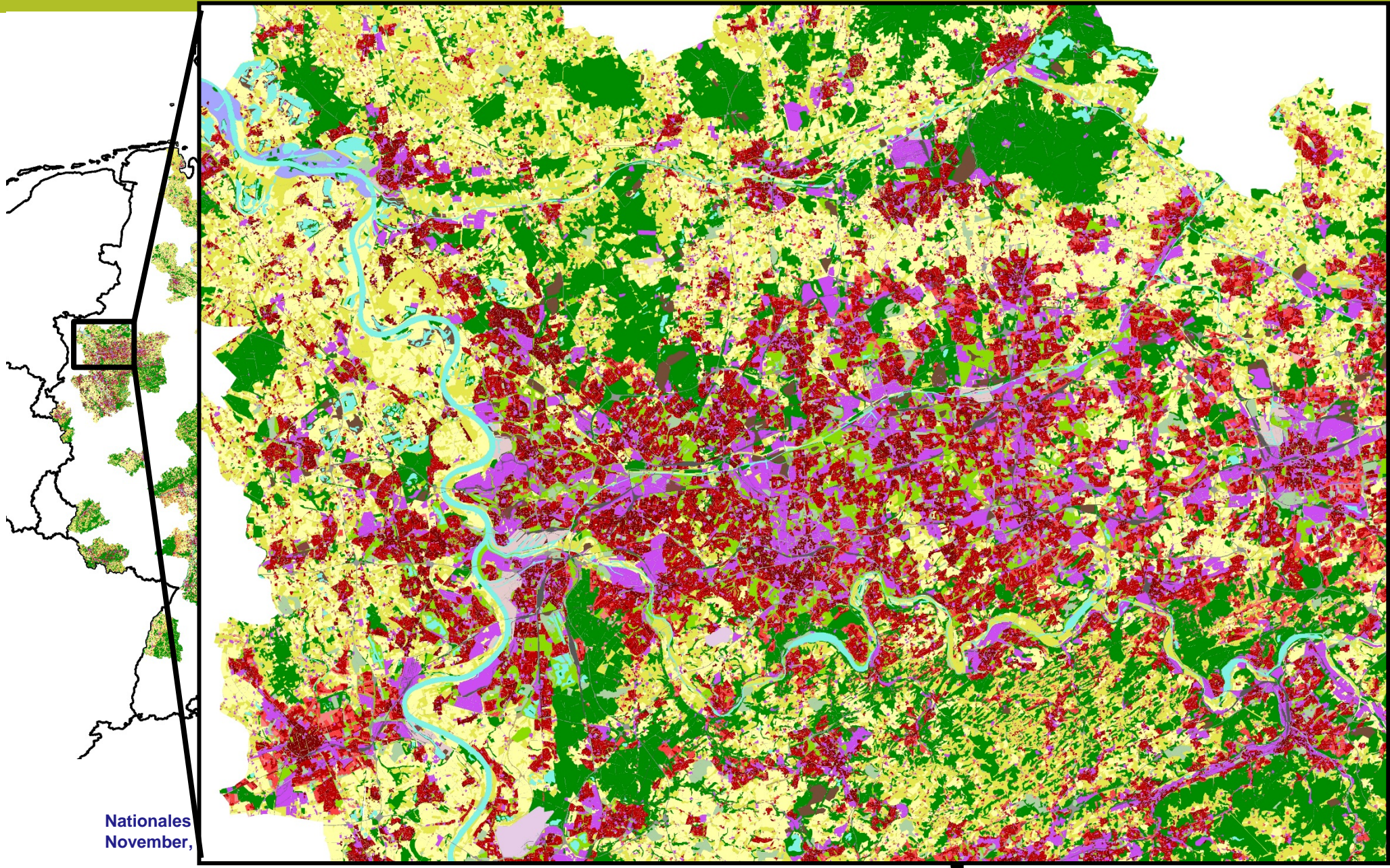


# Coherence in nomenclatures: CLC + UA + RZ + GLEs + RZ extents





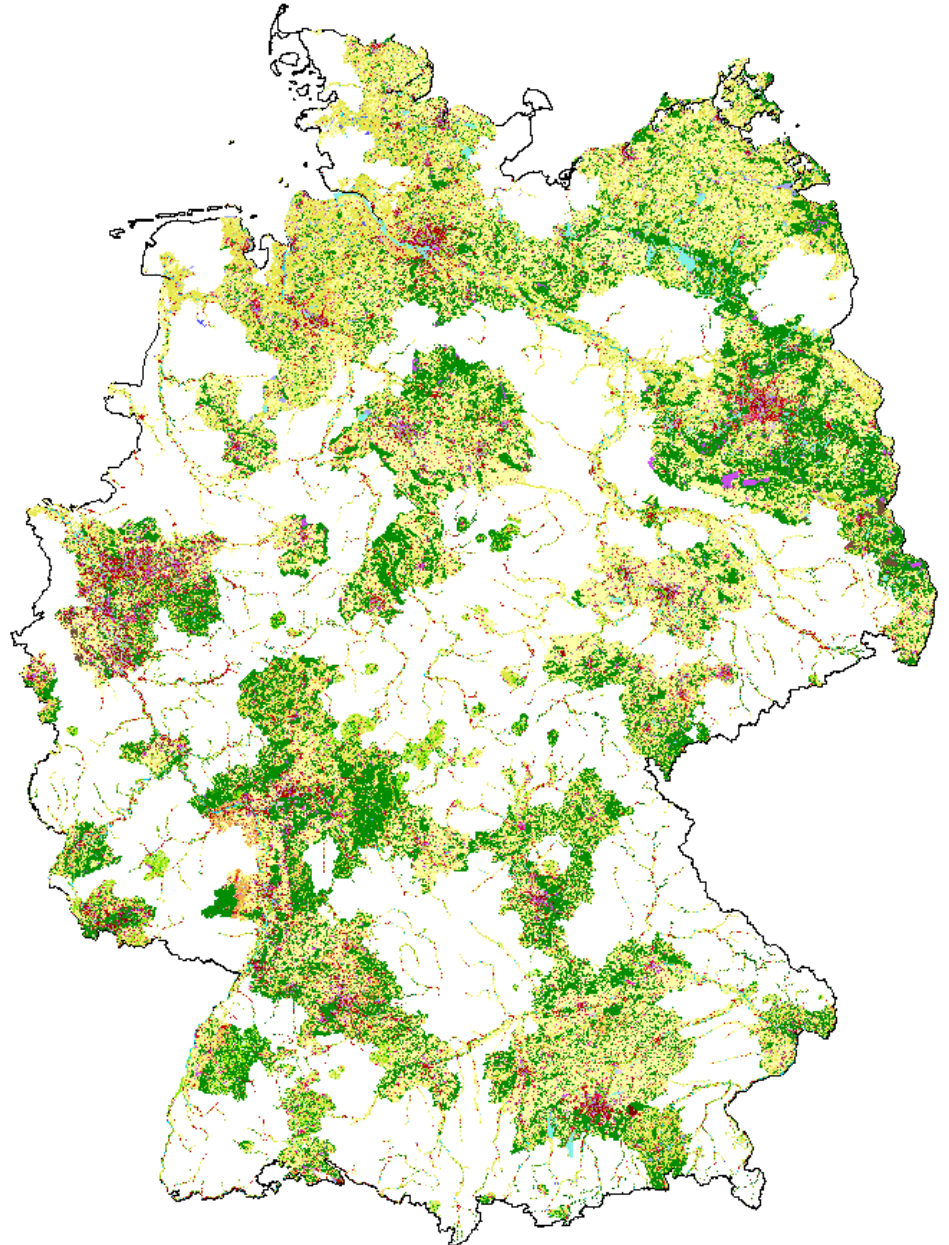
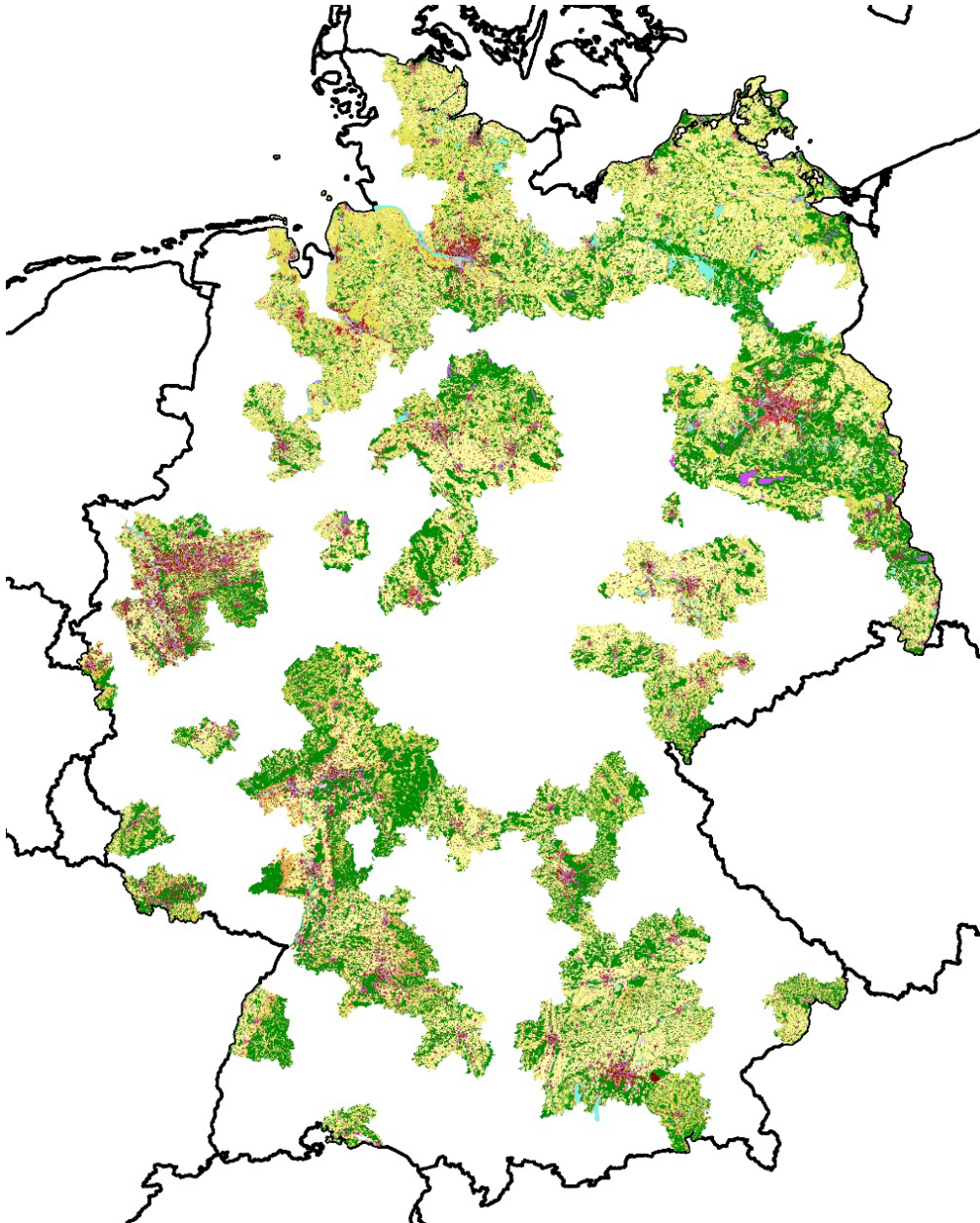
# Urban Atlas 2012 – status DE



Nationales  
November,

Urban Atlas 2012 (current status)

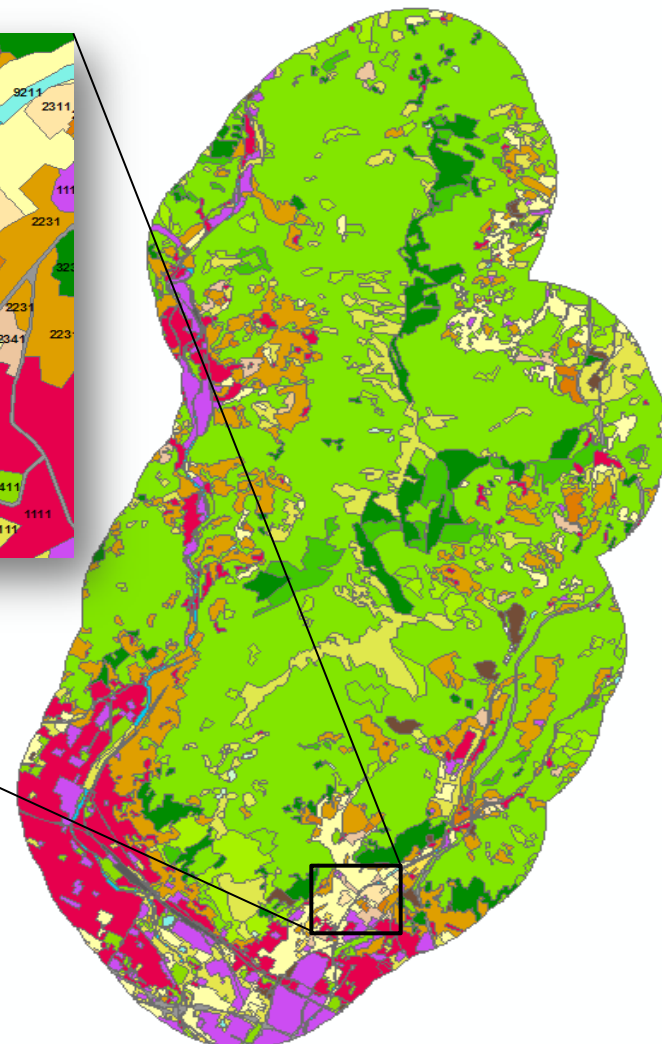
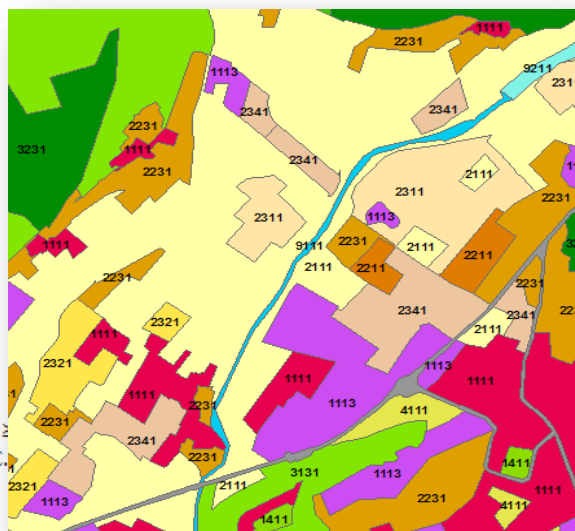
Urban Atlas 2012 + Riparian zones



# Natura 2000 - Status Layer 2006/2012

- 1.1.1.1 Urban fabric (predominantly public and private units)
- 1.1.1.3 Industrial, commercial and military units
- 1.2.1.1 Road networks and associated land
- 1.2.1.2 Railways and associated land
- 1.2.1.3 Port areas
- 1.2.1.4 Airports
- 1.3.1.1 Mineral extraction, dump and construction sites
- 1.3.2.1 Land without current use
- 1.4.1.1 Green urban areas and leisure facilities
- 2.1.1.1 Arable irrigated and non-irrigated land
- 2.1.2.1 Greenhouses
- 2.2.1.1 Vineyards
- 2.2.2.1 Fruit trees and berry plantations
- 2.2.3.1 Olive groves
- 2.3.1.1 Annual crops associated with permanent crops
- 2.3.2.1 Complex cultivation patterns
- 2.3.3.1 Land principally occupied by agriculture with significant areas
- 2.3.4.1 Agro-forestry
- 3.0.0.0 Urban Atlas: Woodlands
- 3.1.1.1 Broadleaved swamp forest
- 3.1.2.1 Broadleaved swamp forest
- 3.1.3.1 Other natural semi-natural broadleaved swamp forest
- 3.1.4.1 Broadleaved evergreen forest
- 3.1.5.1 Highly artificial broadleaved swamp forest
- 3.2.2.1 Coniferous swamp forest
- 3.2.3.1 Other natural semi-natural coniferous swamp forest
- 3.2.4.1 Highly artificial coniferous swamp forest
- 3.3.2.1 Mixed swamp forest
- 3.3.3.1 Other natural semi-natural mixed swamp forest
- 3.3.4.1 Highly artificial mixed swamp forest
- 3.4.1.1 Transitional woodland
- 3.4.1.2 Lines of trees and scrub
- 3.5.1.1 Damaged forest

## N2K Site IT5150001



- 4.0.0.0 Urban Atlas: Grassland
- 4.1.1.1 Managed grassland
- 4.2.1.1 Semi-natural grassland with trees (T.C.D.)
- 4.2.1.2 Semi-natural grassland without trees (T.C.D.)
- 4.2.2.1 Alpine and sub-alpine natural grassland
- 5.0.0.0 Urban Atlas: Heathland and scrub
- 5.1.1.1 Heathlands and Moorlands
- 5.1.1.2 Other scrub land
- 5.2.1.1 Sclerophyllous vegetation
- 6.1.1.1 Sparsely vegetated area
- 6.2.1.1 Beaches
- 6.2.1.2 Dunes
- 6.2.1.3 River banks
- 6.2.2.1 Bare rocks and rock detritus
- 6.2.2.2 Burnt areas (except burnt pastures)
- 6.2.2.3 Glaciers and perpetual snow
- 7.0.0.0 Urban Atlas: Wetland
- 7.1.1.1 Inland freshwater marshes
- 7.1.2.1 Inland saline marshes
- 7.2.1.1 Exploited peat bog
- 7.2.1.2 Unexploited peat bog
- 8.1.1.1 Salt marshes
- 8.1.1.2 Salines
- 8.1.2.1 Intertidal flats
- 8.2.2.1 Estuaries
- 9.0.0.0 Urban Atlas: Rivers and lakes
- 9.1.1.1 Interconnected running water courses
- 9.1.1.3 Highly modified natural water courses and canals
- 9.1.2.1 Separated water bodies belonging to the river system (connected to the river system)
- 9.2.1.1 Natural water bodies
- 9.2.1.2 Ponds and lakes with completely man-made structure
- 9.2.1.3 Intensively managed fish ponds
- 9.2.1.4 Standing water bodies of industrial sites
- 10.1.1.1 Marine (other)

# Copernicus Land: ensuring continuity

- **CLC and CLCC:**
  - continued every 6 year; next run: 2018
  - evolving methodology: bringing EAGLE matrix model to an operational status
- **HRLs:**
  - continued every 3 years, next runs: 2015, 2018
  - from 2015: exploring working with yearly incremental updates
  - content: repetition and improvement of existing 5 HRLs
  - Re-analysis imperviousness
- **Local component:**
  - continuation of Urban Atlas: 2015, 2018
  - Riparian zones: 2012, 2018

# Copernicus Land: short term new & extended services

- **New HRLs:**
  - pan-European green linear elements
  - improve grassland product
- **New (elements in) local components:**
  - **Urban Atlas:**
    - inclusion of 3rd dimension
    - extension to EEA39
  - **Riparian Zones:**
    - extension upstream Strahler level 3?
  - **Natura2000 monitoring**
    - Second series of sites, TBD by DG ENV
  - **Coastal zone monitoring**
    - cooperation with Copernicus marine service
    - taking stock of existing activities in MS
  - **permanent snow & ice cover monitoring**

# land.copernicus.eu

The screenshot shows the web browser interface for land.copernicus.eu. The browser's address bar displays the URL. The page title is "Copernicus Land Monitoring Services". A navigation menu includes "Home", "Global", "Pan-European", "Local", and "In-situ". A breadcrumb trail indicates "You are here: Home". The main heading is "Copernicus - The European Earth Observation Programme", accompanied by a "Print" icon. Below this heading are four small satellite imagery thumbnails. A descriptive paragraph states: "The Copernicus programme comprises satellite-borne earth observation, in-situ data and a services component that combines these in order to provide value added information essential for monitoring the earth's environment." Another paragraph explains: "The Copernicus land monitoring service provides geographical information on land cover/land use and on variables related to vegetation state and the water cycle. It supports applications in a variety of domains, such as spatial planning, forest management, water management and agriculture and consists of the above four main components." On the right side, there is a "User corner" section with a list of links: "Ask the service desk", "Contract opportunities", "Copernicus Land News", "EAGLE Working Group", "Events", "Land use cases", "Partners", "Publications", and "Technical library". Below this is a "Partners" section featuring the logos of the European Commission and the European Environment Agency (EEA). A blue-bordered box highlights a navigation bar with the following elements: "Map View", "Metadata", "Download", "Legenda", and "Web services".

**Data download and view: [land.copernicus.eu](http://land.copernicus.eu)**  
**Questions and feedback: [tobias.langanke@eea.europa.eu](mailto:tobias.langanke@eea.europa.eu)**



# Kernthese aus Sicht des Landdienstes

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