



Land Monitoring

CLMS products and services: the offer to EU policies

Copernicus Global Land Monitoring
User Conference

Toulouse 23 October 2018

hans.dufourmont@eea.europa.eu





Land
Monitoring

Copernicus Land Monitoring Service (CLMS)



Systematic Biophysical Monitoring



Land Cover & Land Use mapping



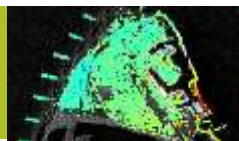
Thematic hotspot mapping



Imagery & Reference data



Ground Motion service





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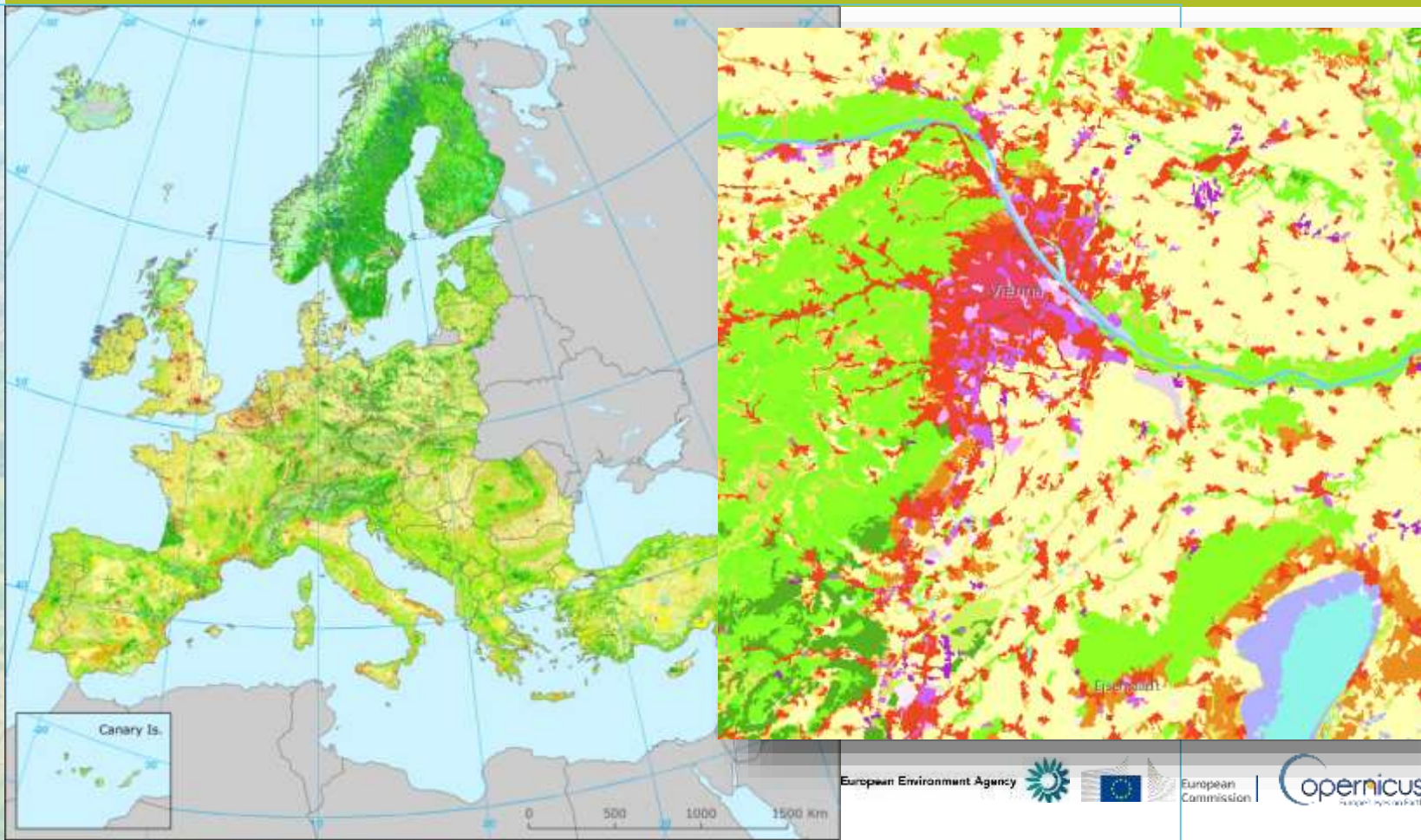
Source:
Sinergise,
S3 mosaic





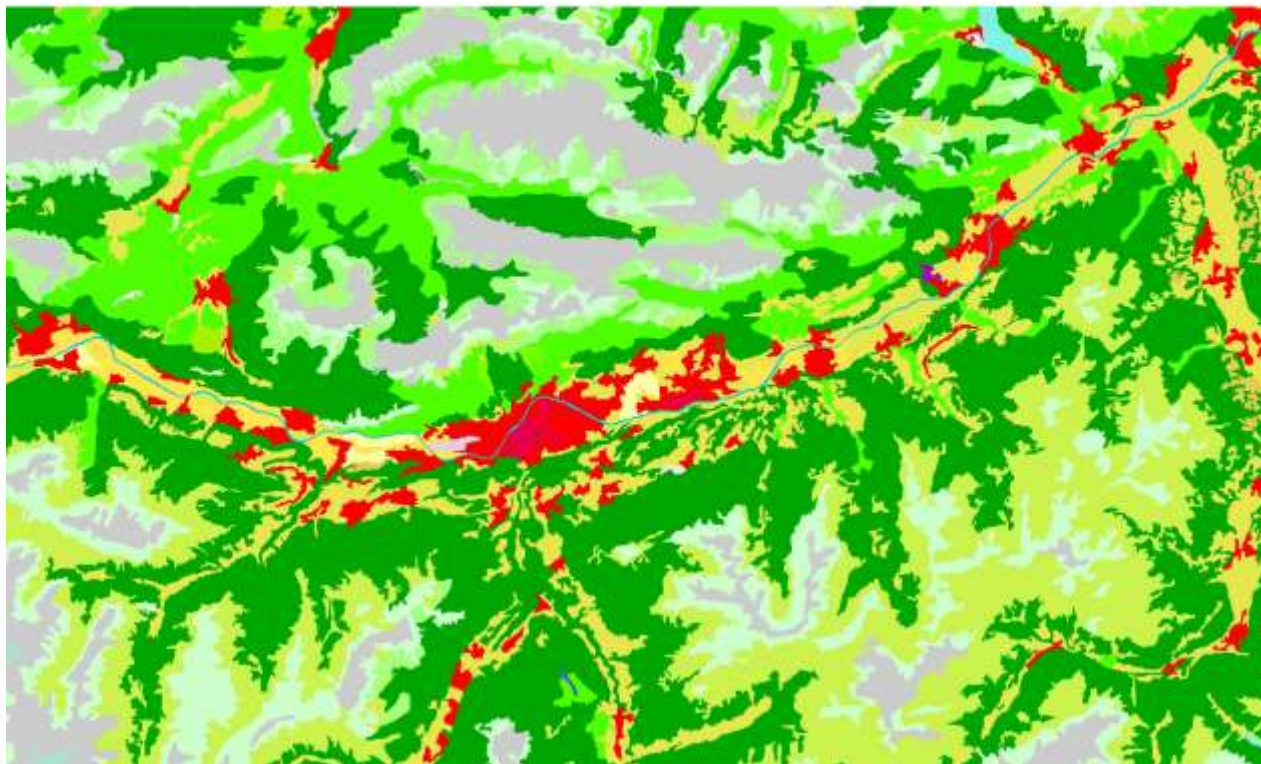
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CORINE Land Cover time series: 1990 – 2000 – 2006 – 2012 - 2018





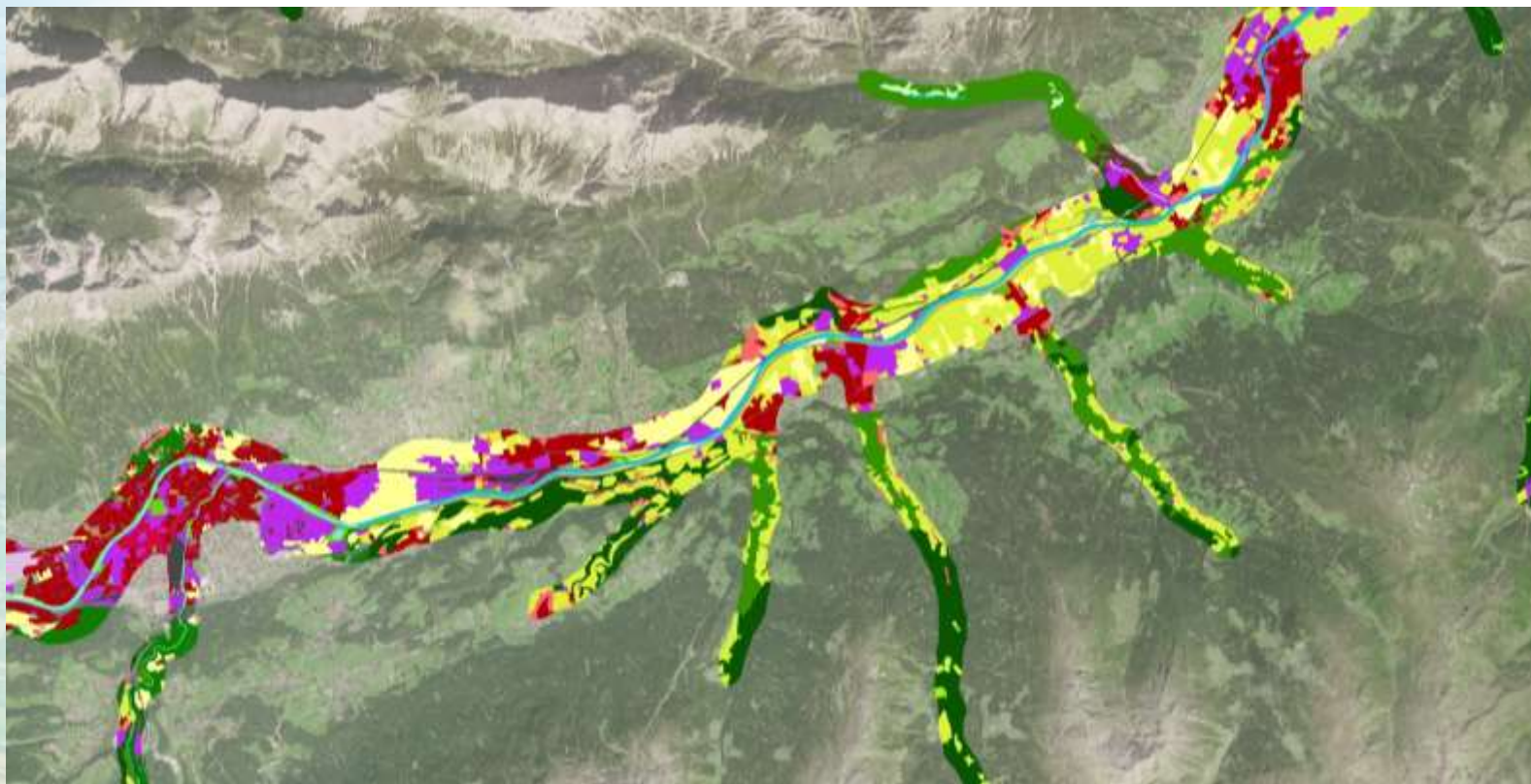
CLC 1990





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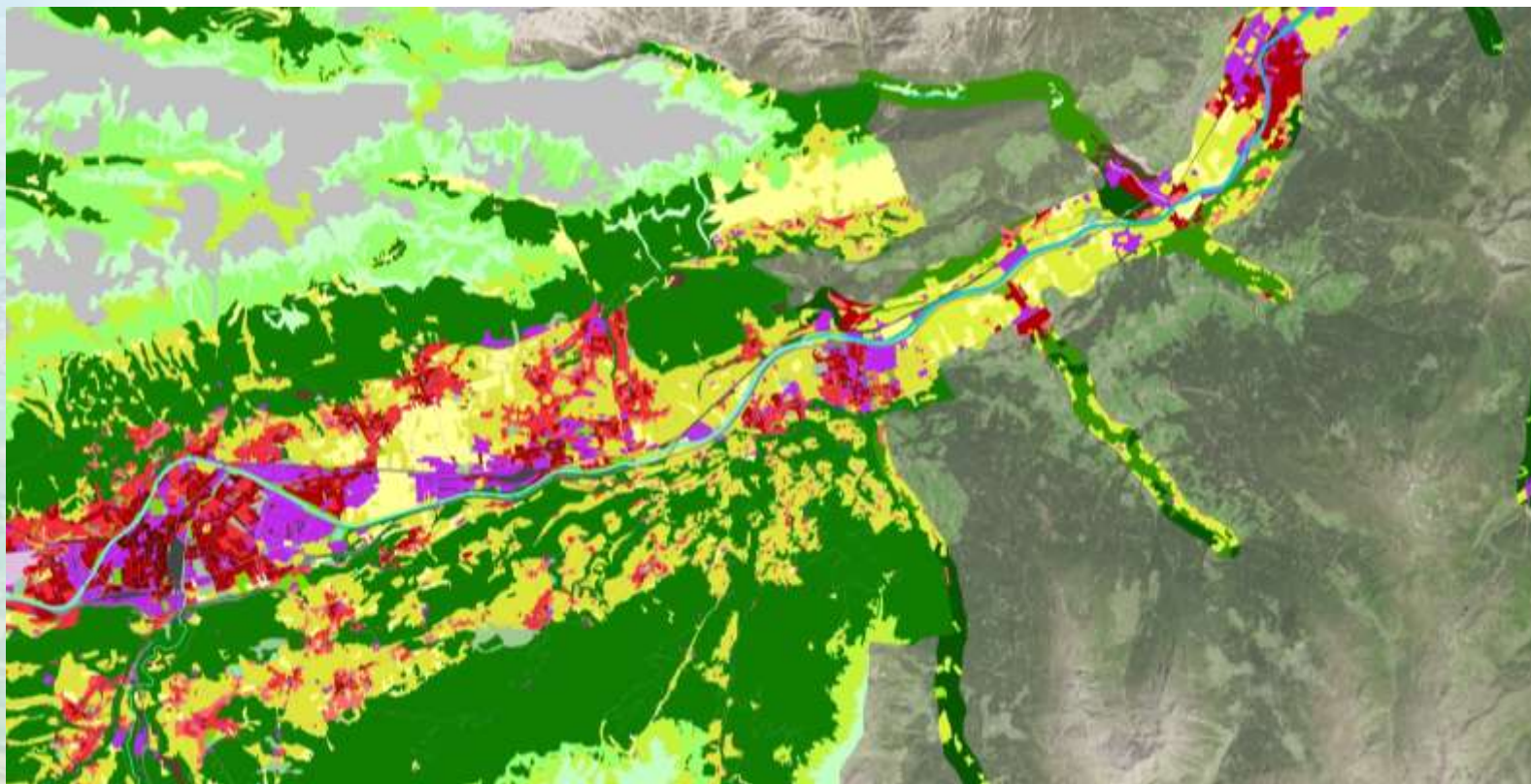
VHR + Riparian Zones





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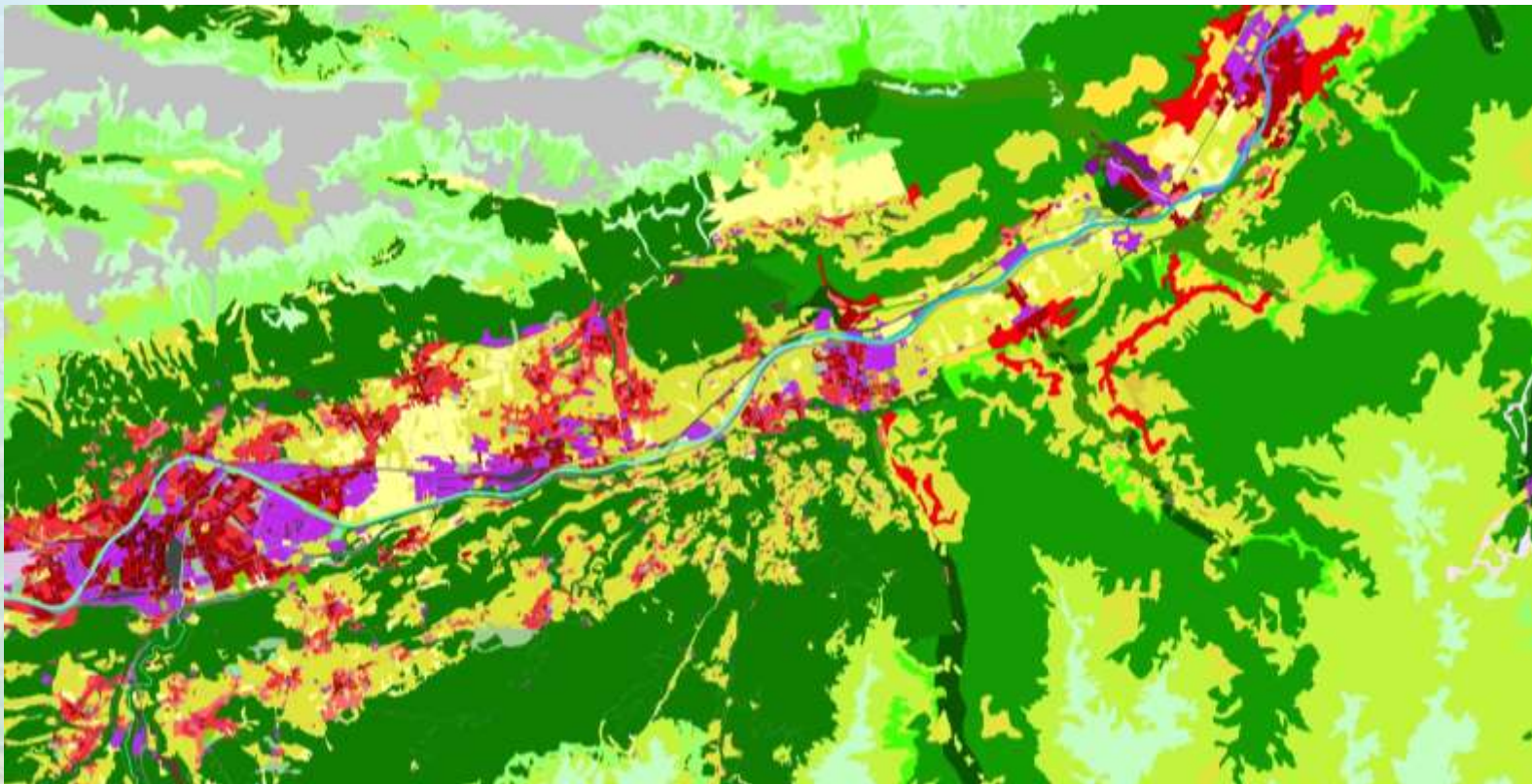
VHR + RZ + Urban Atlas





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VHR + RZ + UA + CLC





pan-European component - High Resolution Layers (HRL's)

Imperviousness and imperviousness change products

- Degree of Imperviousness and Imperviousness Change (0-100%)
- 2006-2009-2012-2015
- 20 m and 100 m

Forest

- Tree Cover Density (0-100%)
- Dominant Leaf Type
- 2012-2015
- 20 m and 100 m

Grassland

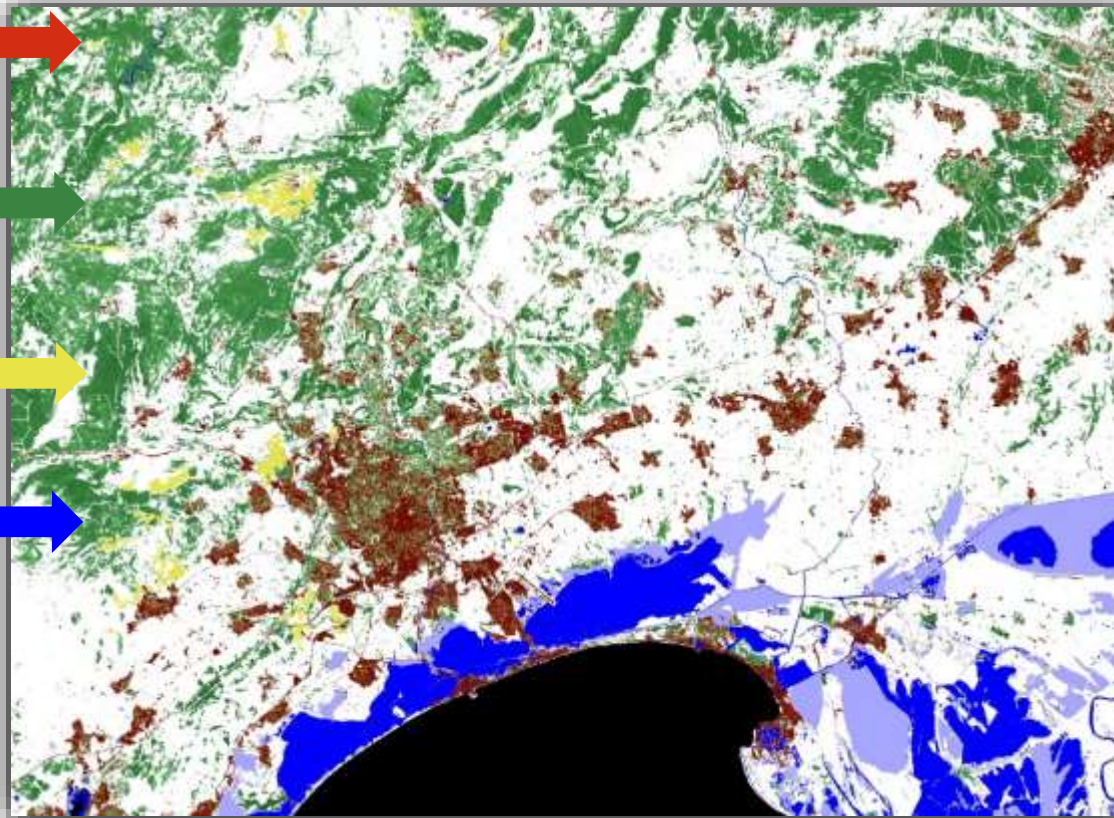
- Grassland (binary)
- 2012
- 20 m and 100 m

Water and Wetness

- Permanent/Temporary Water
- Permanent/Temporary Wetness
- Based on 2009-2016 time series

Small Woody Features

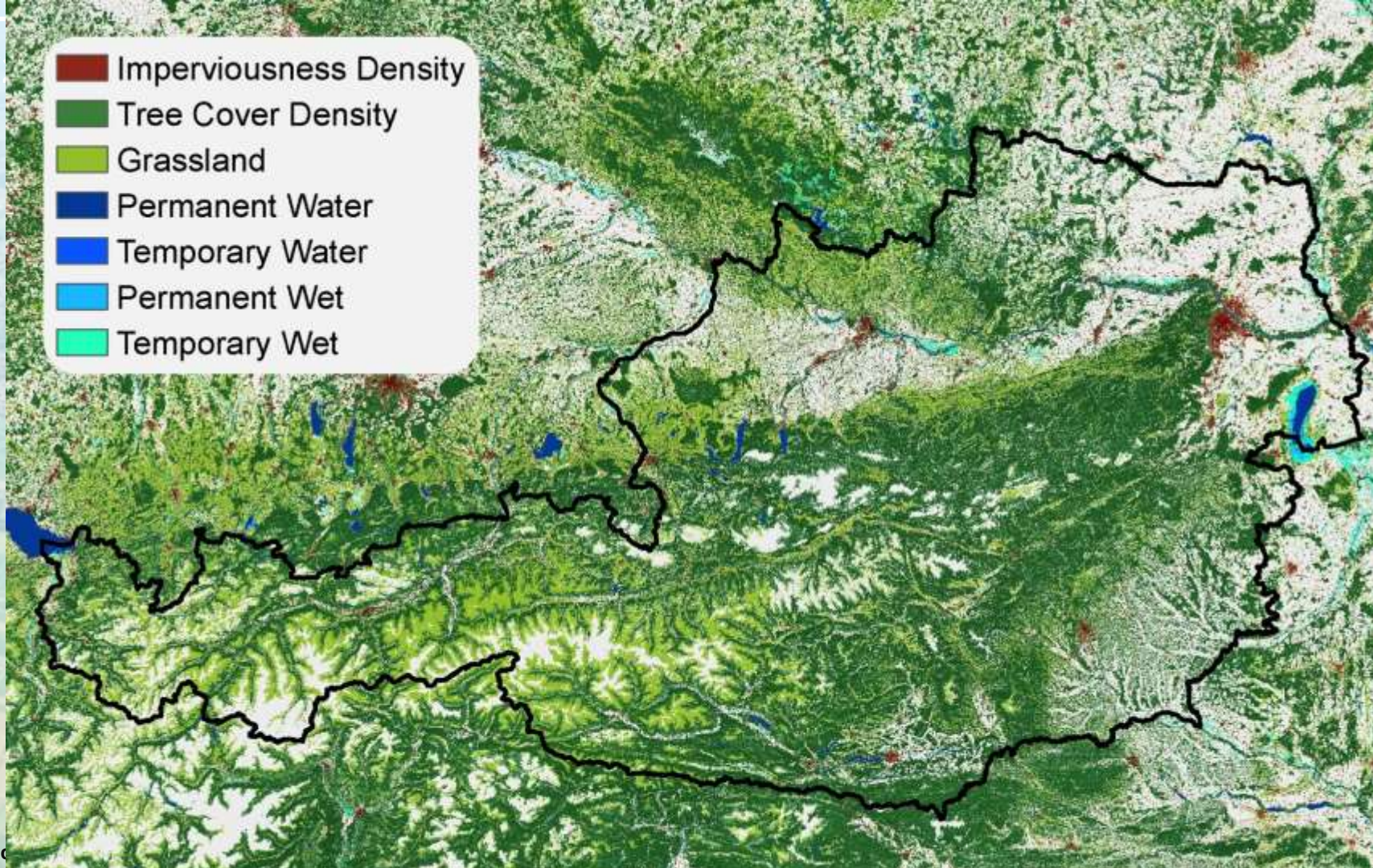
- Linear and patchy structures (binary)
- 2015





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- Imperviousness Density
- Tree Cover Density
- Grassland
- Permanent Water
- Temporary Water
- Permanent Wet
- Temporary Wet



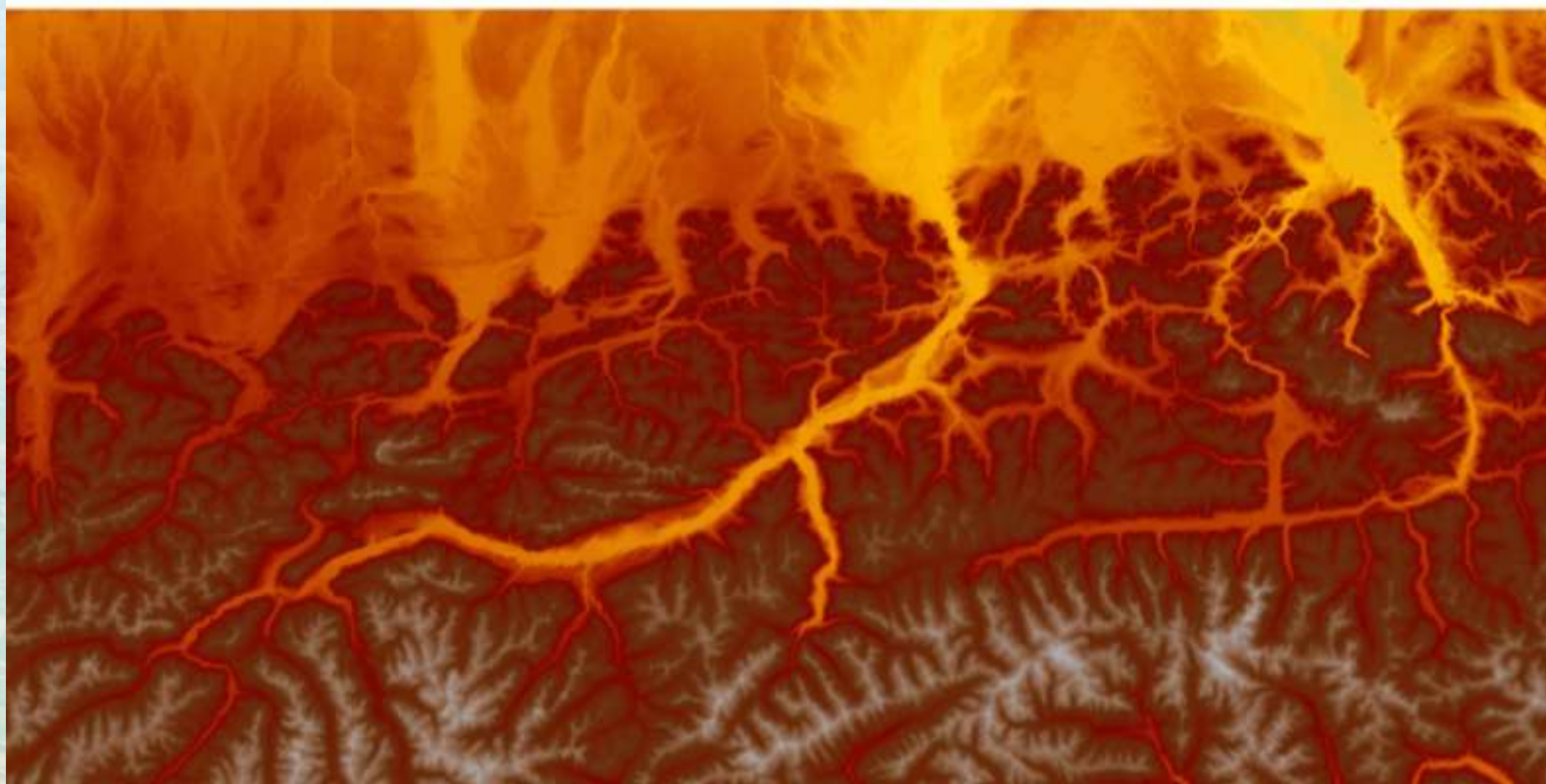
Sc



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EU-DEM

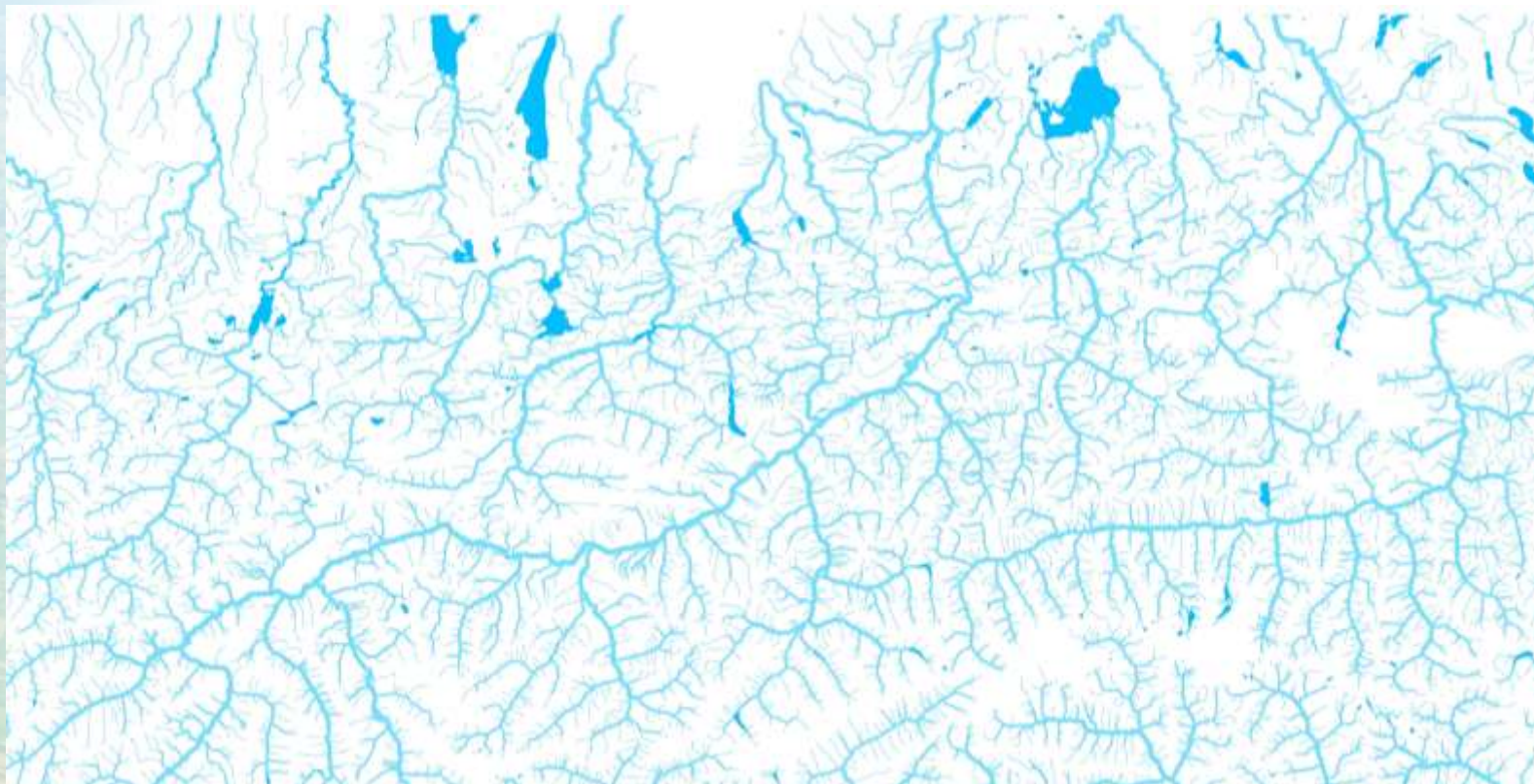
(height, shaded relief, slope, aspect, hill-shade)





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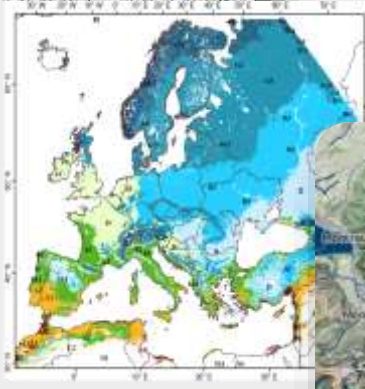
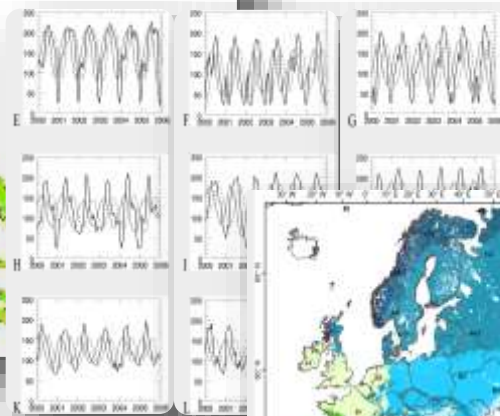
EU-DEM & EU-hydro





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New products (Coastal Zones, HR-phenology, Snow & Ice)



Extraxes:
E: Cold and wet
F: Extremely cold and moist
G: Cold and moist





Land Monitoring

Land monitoring use cases





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Addressing emerging user needs

1. Protect, conserve and enhance the EU's natural capital



2. Turn the EU into a resource-efficient, green and competitive low-carbon economy



3. Safeguard EU citizens from environment-related pressures and risks to health and wellbeing



© Keith Arkins, Environment & Me /EEA

Source: 7th Environment Action Programme 2020



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Developing a sustainable urban environment





A WALK TO THE PARK?

ASSESSING ACCESS TO GREEN AREAS IN EUROPE'S CITIES
UPDATE USING COMPLETED COPERNICUS URBAN ATLAS DATA

Hugo Peckman

Working Paper
A series of briefs to inform on regional, national and indicator results of the observatory - criteria for regional and urban plans
WP 01/2018

Independent Urban Policy



- ☺ Improved air quality
- ☺ Noise reduction and human health
- ☺ Improved climatic conditions – mitigating heat stress
- ☺ Outdoor recreation and physical activity
- ☺ More pleasant, less stressful environment
- ☺ Opportunities for employment

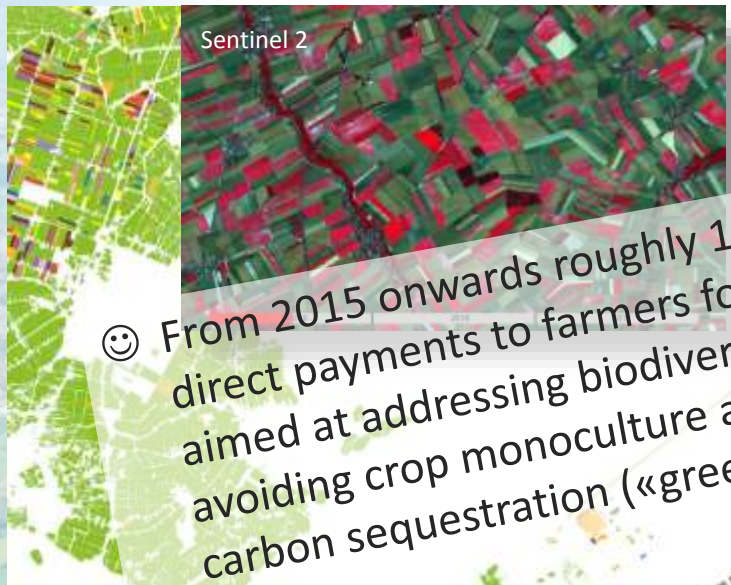


Sentinel 2 - Amsterdam



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Sustainable use of agricultural land

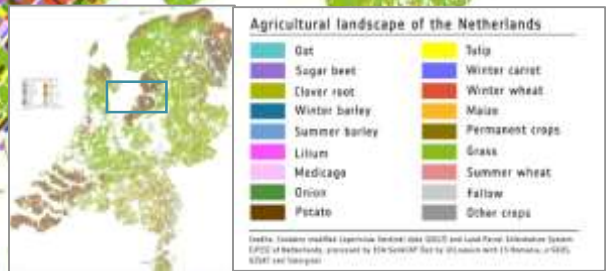


Sentinel 2

☺ From 2015 onwards roughly 12 billion€/year direct payments to farmers for practices aimed at addressing biodiversity loss, avoiding crop monoculture and securing carbon sequestration («greening»).



Smart farming



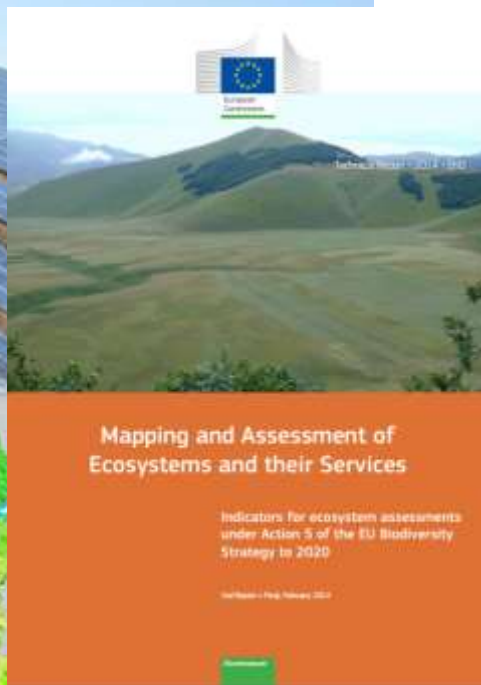
© modified Copernicus Sentinel data (2017), processed by ESA-Sen4CAP (led by UCLouvain with CS-Romania, e-GEOS, GISAT and Sinergise)



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Monitoring changes in ecosystems

😊 By 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15 % of degraded ecosystems.



Mapping and Assessment of Ecosystems and their Services

Indicators for ecosystem assessments under Action 5 of the EU Biodiversity Strategy to 2020

February 2013

European Environment Agency



European
Commission

Copernicus
support by contract



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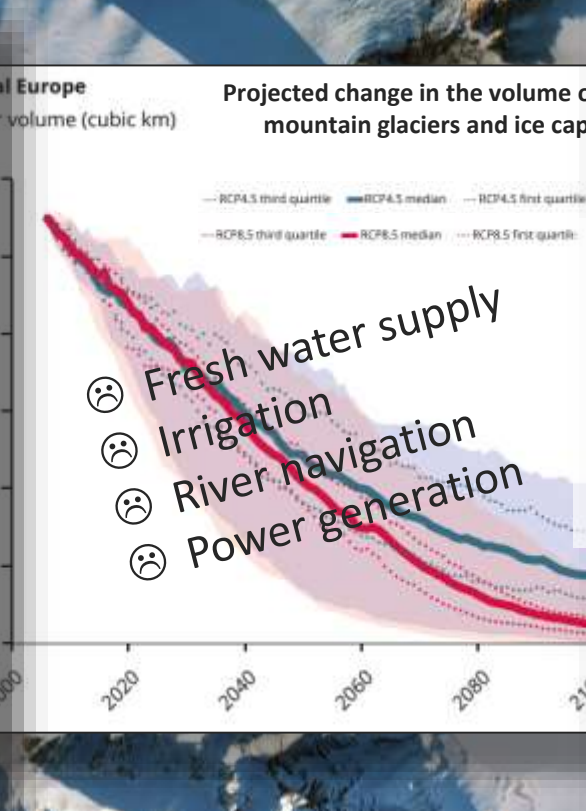
Monitoring climate change, impact and vulnerability

EEA Report | No 1/2017

Climate change, impacts and vulnerability in Europe 2016

An indicator-based report

European Environment Agency



EEA Report | No 2/2017

Financing urban adaptation to climate change

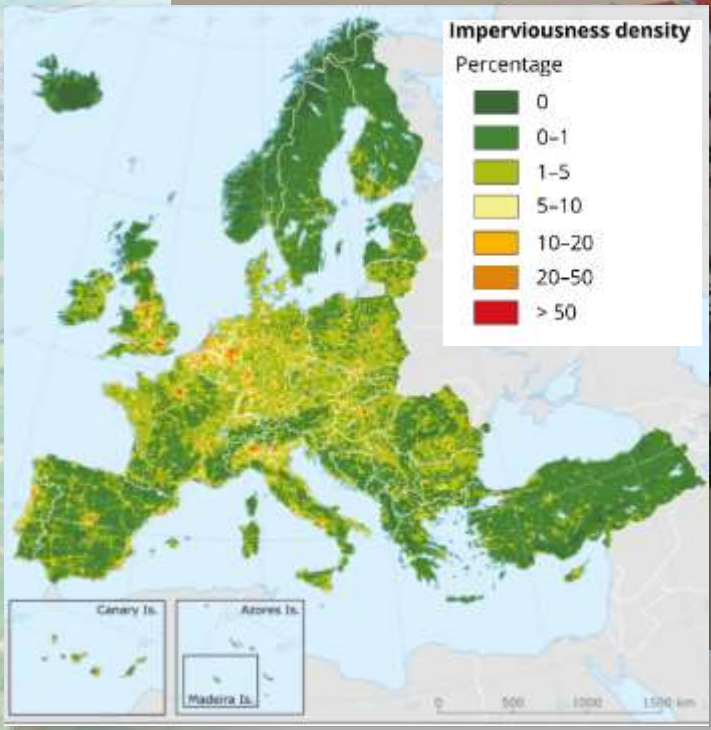
European Environment Agency

☺️ At least 20 % of all EU expenditures in the MFF2014-2020 earmarked for climate change action, for both mitigation and adaptation.



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Safeguarding citizens from risks to health and well-being



©Reuters/Wolfgang Rattay



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Supporting Integrated Coastal Zone Management



Europe is the world's primary tourism destination and tourism generates 10 % of EU GDP.





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Evolution of the service

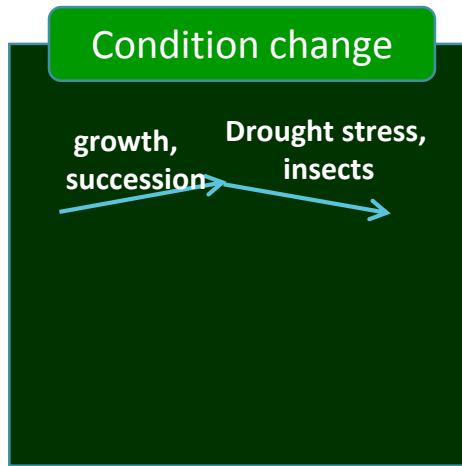
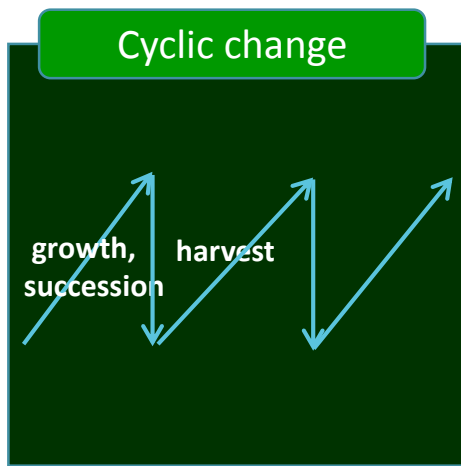
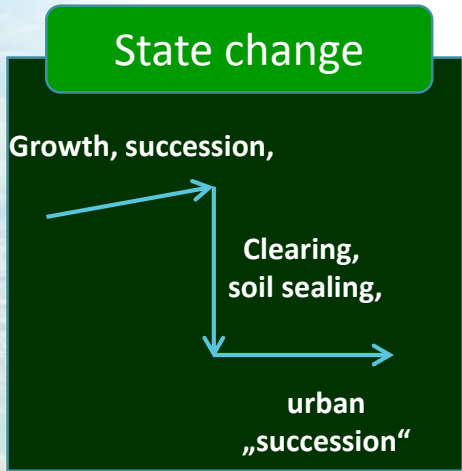
challenges and opportunities



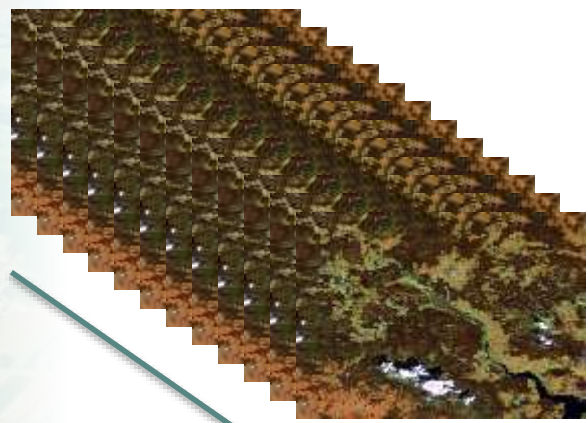


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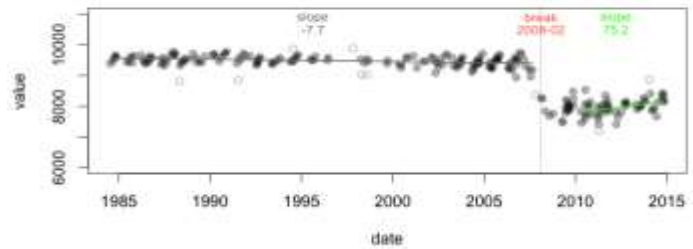
The challenge of Change Detection in Land monitoring



© Wulder, Berlin, 2014, EARSeL



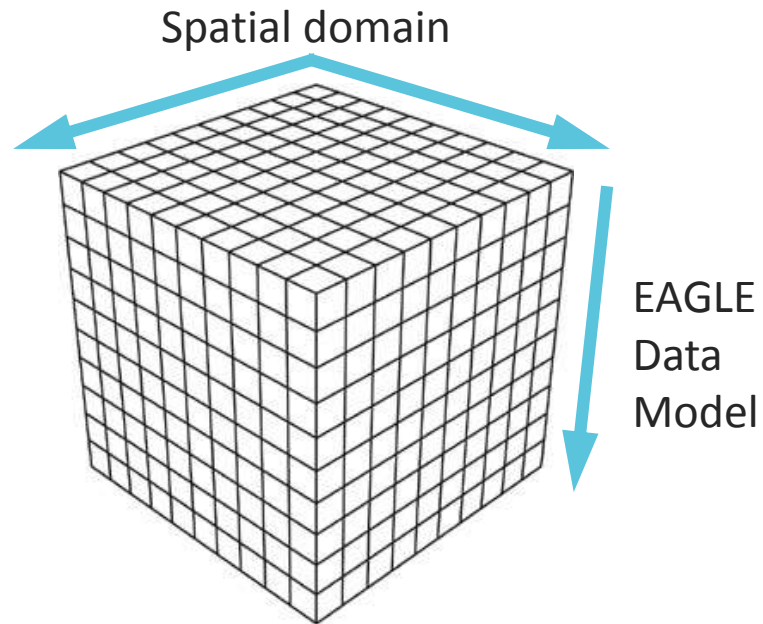
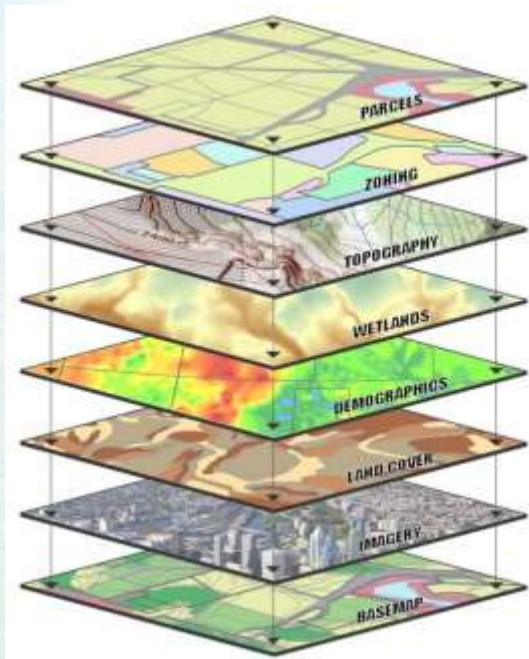
Time series analysis





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CLC+ a new concept in Land Cover / Land Use

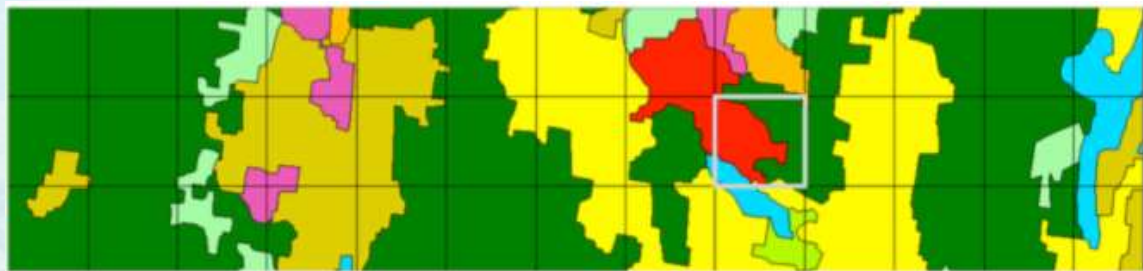


Source: CSU,
<http://heleneloyan.cikeys.com/update/gis-layers/>



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Vector, raster, grid cells



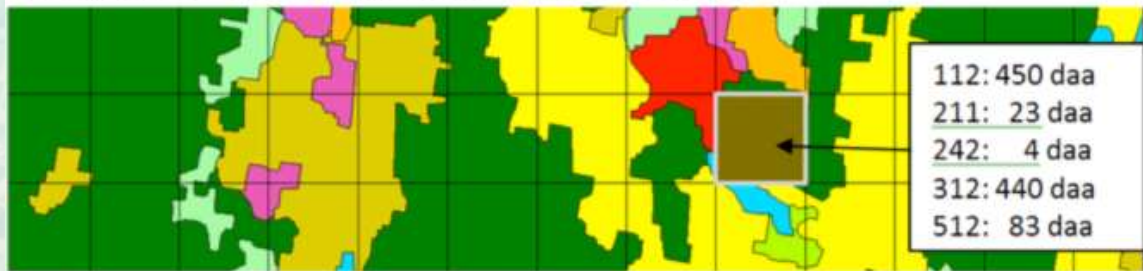
CLC with 1 km raster/grid superimposed

CLC vector



Raster representation: A single class is assigned to each pixel

Raster



Grid representation: The internal composition of the grid cell is kept as an attribute vector.

CLC-core grid,
populated with
thematic info



Land Monitoring

Land monitoring Dissemination & use





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European level dissemination activities: the Copernicus land portal

Focus on:

- Easy access to the products:
 - discover, view, WMS / download
- INSPIRE compliant metadata
- structural linkages with the open data initiatives on European and global level, in order to promote the use of the Copernicus Land products



EU Open
Data Portal

GOSS Portal



European
Commission

eurostat



European Environment Agency



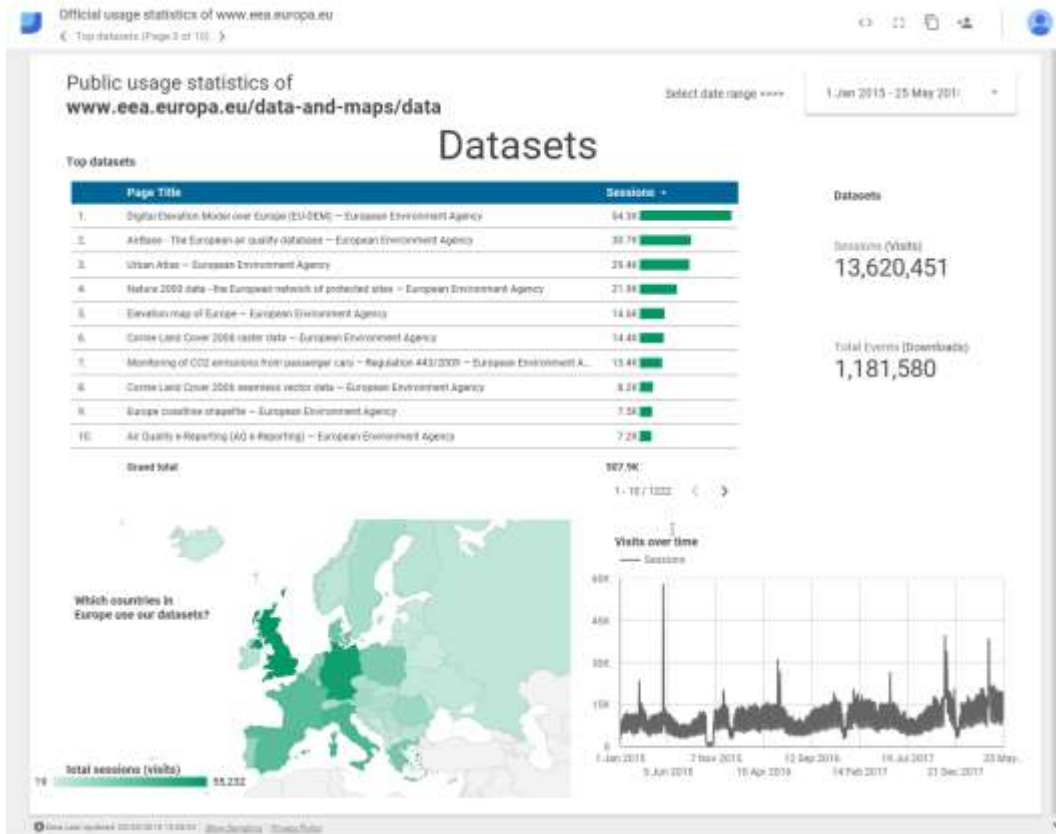
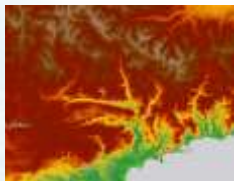
European
Commission





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4 CLMS products in the top 10 of most used EEA data 2015-2018



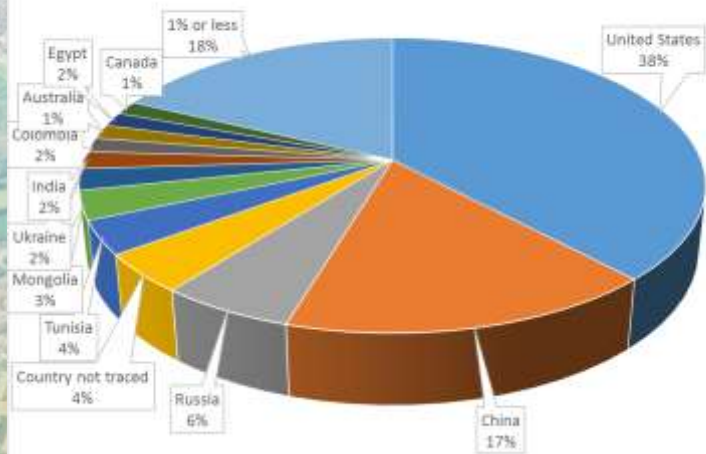


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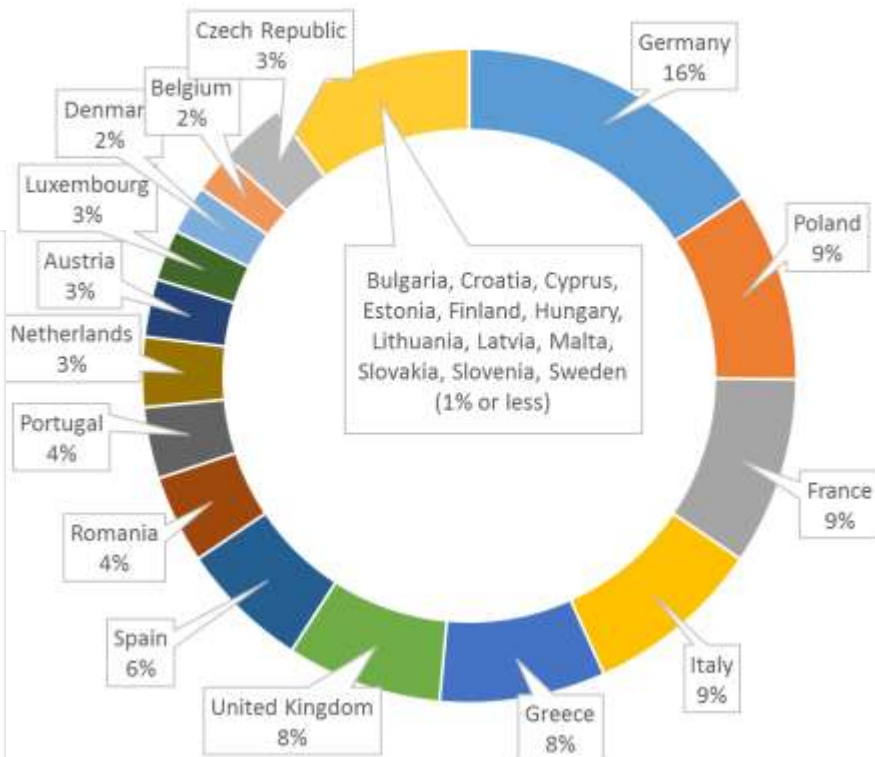
Geographical distribution of downloads in EEA39 (2015 – 2018)

EU Member States remain main users of Copernicus land products

Download statistics from countries outside EEA39



Download statistics from 2015 onwards





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Thank you

Copernicus
Europe's eyes on Earth

Copernicus Sentinel 2