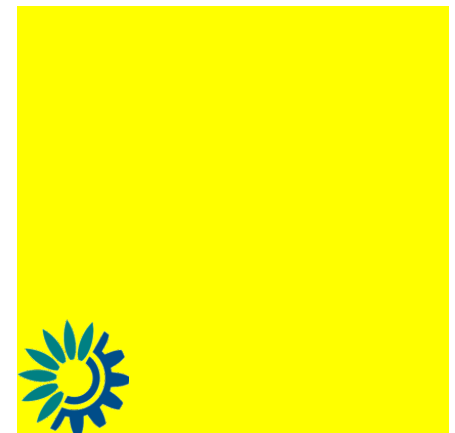
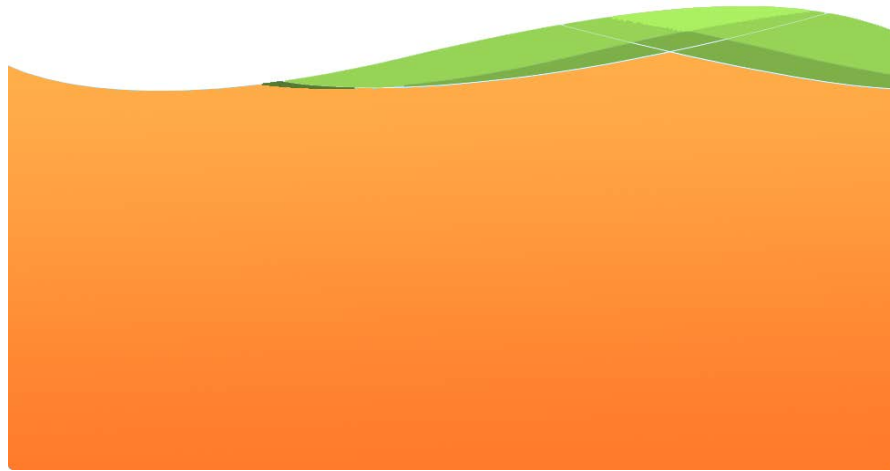


GLO-land



Mapping Water for Europe: Operational Mapping and Data Products in the context of Copernicus: EU Hydro and High Resolution Layer on Water Bodies. Status, Outline, Developments, Lessons learned

Tobias Langanke, Eugenija Schuren, Hans Dufourmont (EEA), Gedas Vaitkus (Geomatrix UAB, Lithuania)

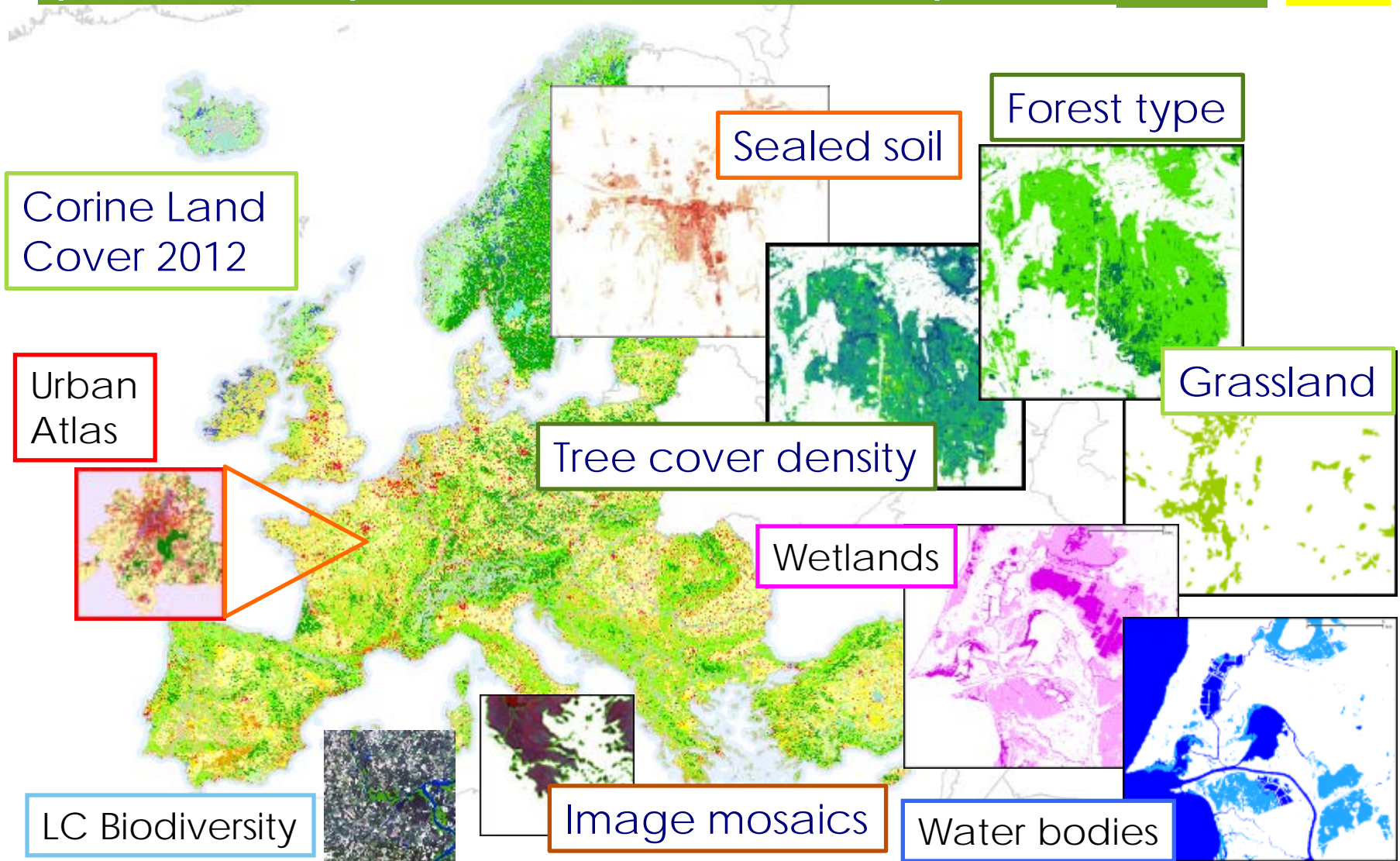
Mapping Water Bodies from Space
Conference, 18-19 March 2015,
ESA-Esrin, Frascati, Italy

Context

- EEA is producing the GMES initial operations land (GIO land) products, for the 2012 reference year, including the high resolution layer (HRL) on **permanent waterbodies**
- As part of the Copernicus land services, EEA will coordinate the production of future products, including **updates for the high resolution layers for the 2015 reference year**
- As part of the operational Copernicus phase, EEA is also managing the update of the **EU-hydro dataset**



Copernicus land service pan-European & local components



Permanent waterbodies – key specifications

- Produced for **2012 reference year** (based largely on 2012 and 2013 imagery)
- Production includes to some **extent multi-temporal imagery** with use of image 2006, 2009 and 2012 to determine the “permanency” of the waterbody
- **Extent: EEA39** (~6 Million sqkm)
- 20m and 100m spatial resolution
- Binary raster dataset (water, non-water), as 100m dataset: occurrence of water (0-100 %)

Permanent waterbodies – key specifications - continued

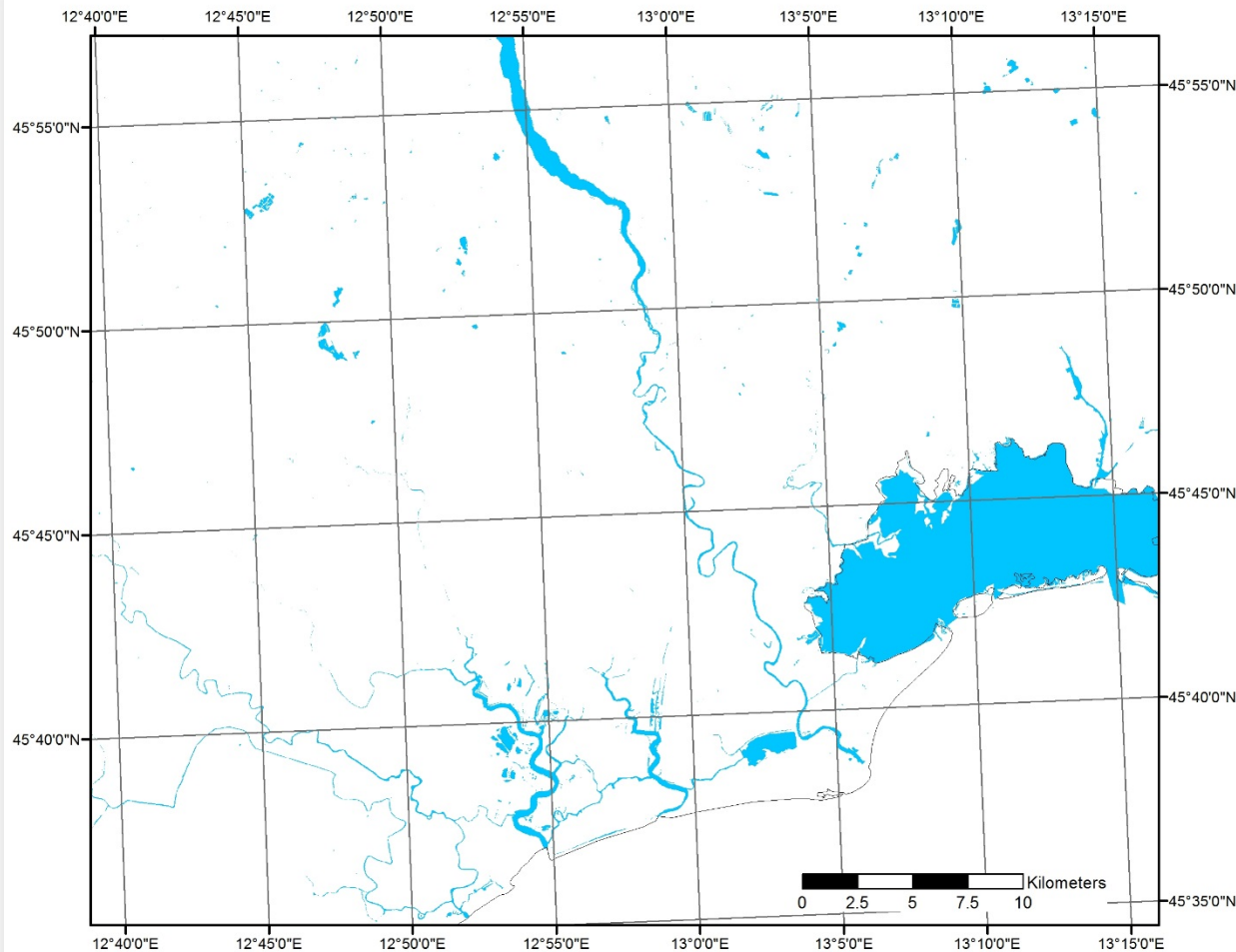
- **includes:** permanent lakes, small waterbodies such as ponds (including fish ponds), rivers, channels permanently with water, coastal water surfaces such as lagoons and estuaries
- **Not included:** sea and ocean, liquid dump sites

Permanent waterbodies – simplified production concept

- **Pre processing** of HR images and computing of **biophysical parameters**
- Creation of additional support **layers for later masking**, using imperviousness data and EU-DEM
- **Automated pixel-based classification** of all HR imagery available in COV1 and COV2 for 2006, 2009 and 2012
- Automated calculation of **statistical frequency index for water presence** (WPI) based on all available input images
- Thresholding and re-coding into **binary water product**
- Automated **clean-up and manual revision** of results

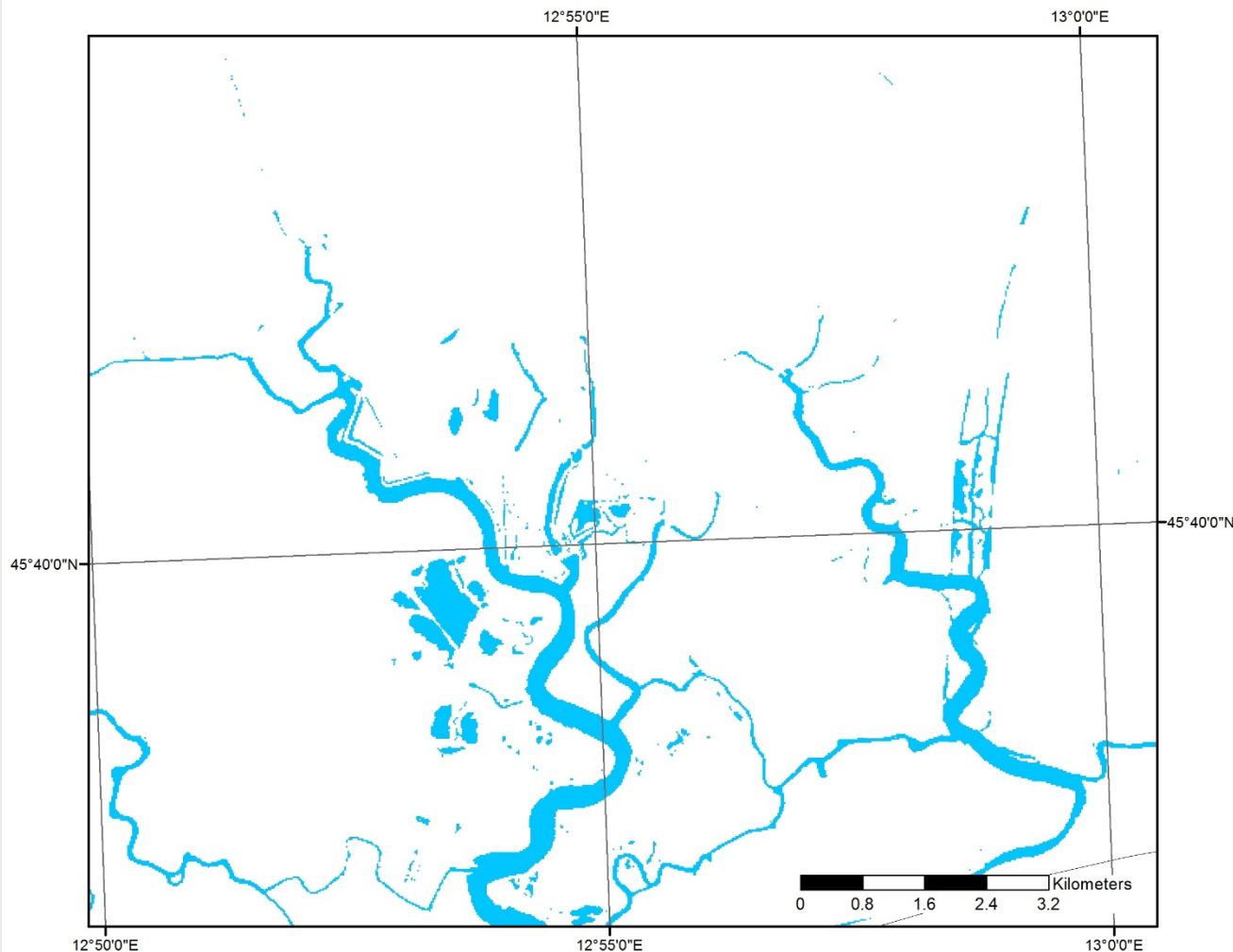


Permanent waterbodies – example (Bibione, NE Italy)





Permanent waterbodies – example (detail Bibione, NE Italy)



EU-Hydro basic facts I

- **EU-Hydro** and EU-DEM(Pan-European elevation dataset covering EEA39) jointly created during 2010 - 2012 in the context of **GMES Preparatory action for RDA (Reference Data Access) 2009** (public procurement by the EC)
- Is based on classification of Image 2006, and for all EEA39 countries provides a **river network and a drainage model with catchments and drainage lines** (derived from EU-DEM)
- Focuses on **accurate cartographic representation of surface water features and their attributes**, as well as **delineation of topologically consistent drainage networks**

EU-Hydro basic facts II

- The river network is at a 1:30.000 scale resolution for linear objects and a minimum 1:50.000 scale resolution (production scale) for derived polygons (e.g. catchments, lakes, etc.)
- drainage network is composed of
 - **polygons** representing closed catchments of lower level, extracted from EU-DEM,
 - **line vector objects** representing center-lines of drainage according to the elevation model, and
 - **point vector objects** which are nodes between the different lines (headwater, mouth, tributary...).

EU-Hydro upgrade

- For a number of reasons an **update of EU-Hydro is undertaken before general release**, with the following improvements:
 - Integration of river network (from RS) with drainage network and river network derived from EU DEM
 - Correction of topology errors in the coastline
 - Correction of geometry and network topology errors
 - Correction of Strahler codes in certain upstream parts,

EU-Hydro upgrade II

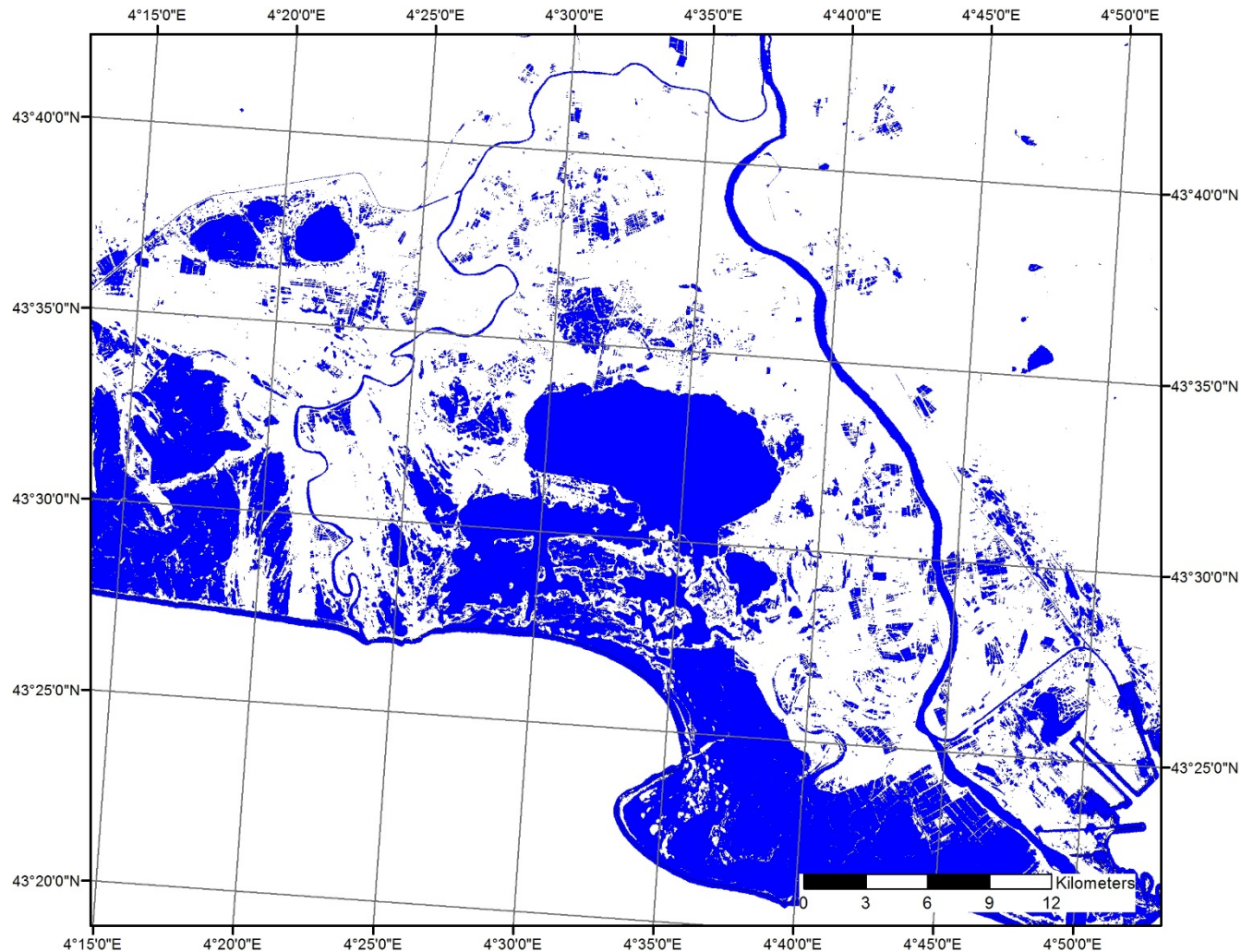
- Enrichment of the dataset in terms of attribute data:
 - Integration in EU-Hydro of national IDs of surface water bodies reported by MS under WFD
 - This will allow linking EU-Hydro to the respective national datasets -> will ensure compliance between the Pan-European and the national datasets as required by countries

EU-Hydro upgrade: expected outcome

- **A fully consistent database for EEA39 countries on surface hydrography**, containing river network and surface water bodies, linked to national identifiers of surface water bodies, and with the national transitional and coastal water bodies reported under Water Framework Directive (WFD)
- Main foreseen use is by Copernicus services, in particular Land Monitoring; **potential to become a reference dataset for other uses** at European level, as for example for the assessments under Water Framework Directive

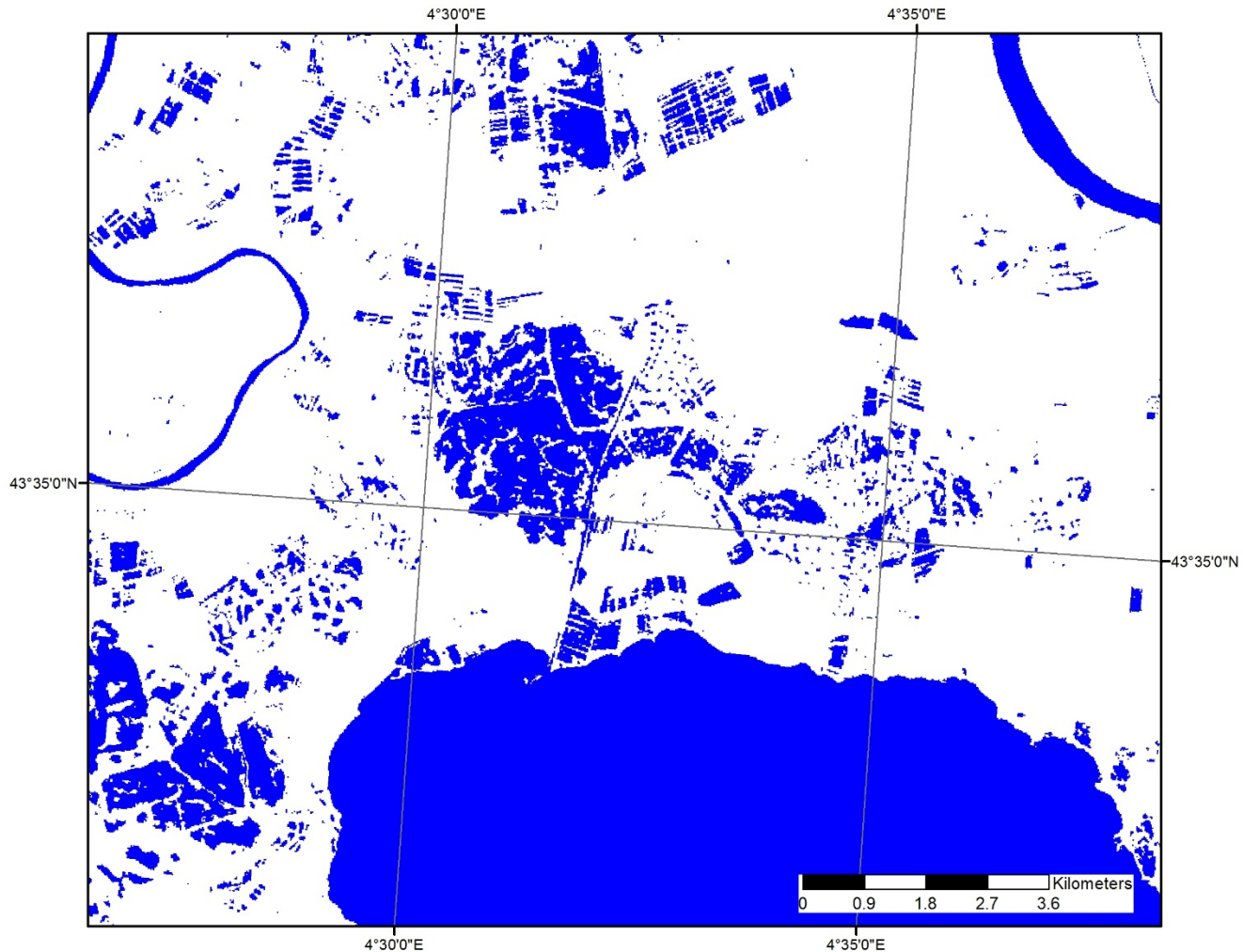


EU-Hydro beta version and PWB – some examples (Arles/Rhone S-France)





EU-Hydro beta version and PWB– some examples (Arles – detail)



EEA: from GIO land to Copernicus operational land services – challenges

- Main problem for 2012 reference year: Low level of early **image coverage** in 2011 and 2012, and image quality in particular with regards to acquisition timing (phenology)
- **Extremely complex workflow** with 39 countries, 5 (6) products in 2 different spatial resolutions, in national and European projections. Involves interdependent workflow stages and checks between the SPs (service providers), EEA, the ETC (European Topic Centre) and the countries
- Difficulty in **harmonizing production** across lot boundaries, despite streamlining phase
- Large **variation in the degree of maturity** of HRL methods and workflows (with forest products, imperviousness and water most mature)

PWB (2012 reference year) availability

- All 2012 HRL's in final production stage
- European Projection mosaics will start becoming available through Copernicus/land portal after final technical check (current **estimation in April & May 2015**).
- Final independent validation of European mosaic in second half of 2015
- Already now: 20m intermediate data (non final) for scientific purposes on request through EEA

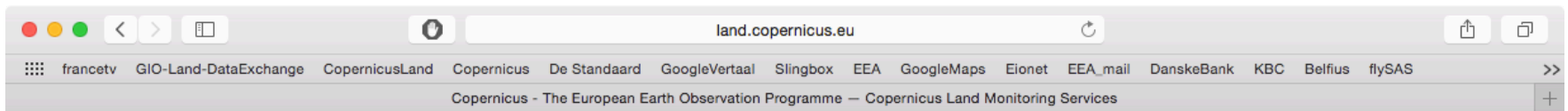
EU hydro availability

- **Beta version of EU-Hydro NOT publicly available**, but only internally at the EEA
- **EU-DEM v.1.0 available** to public via the land.copernicus.eu portal
- **Upgraded EU-Hydro and EU-DEM datasets are expected to be made publicly available in autumn 2015** (according to Copernicus data and information policy regulation) via the land.copernicus.eu portal



Copernicus

portal land.copernicus.eu



Copernicus Land Monitoring Services

[Site Map](#) | [About](#) | [Contact us](#) | [News](#) | [Log in](#)[Home](#) [Global](#) [Pan-European](#) [Local](#) [In-situ](#)

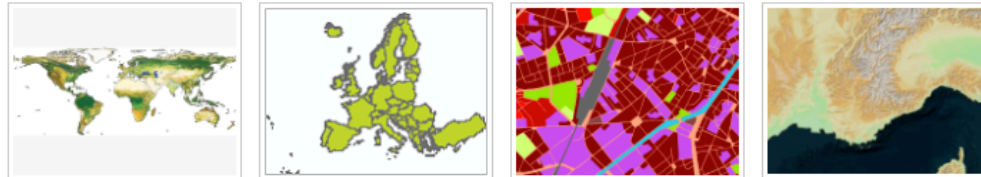
You are here: Home

Copernicus - The European Earth Observation Programme



User corner

- ➔ [Ask the service desk](#)
- ➔ [Contract opportunities](#)
- ➔ [Copernicus Land News](#)
- ➔ [EAGLE Working Group](#)
- ➔ [Events](#)
- ➔ [Land use cases](#)
- ➔ [Partners](#)
- ➔ [Publications](#)
- ➔ [Technical library](#)



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.

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.

Partners





Thank you

