

The Italian 5 m resolution Imperviousness layer

Copernicus HR layers from European to national services and their evolution at the time of Sentinels

In brief

AIM:

To produce a very high resolution (5 m) imperviousness layer for Italy.

WHY:

To be used by ISPRA (Italian National Institute for Environmental Protection and Research) for reporting on soil consumption at national and local level.

HOW:

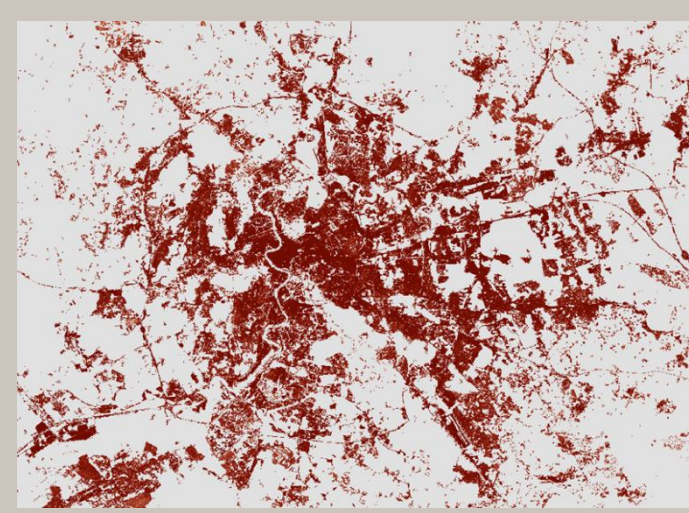
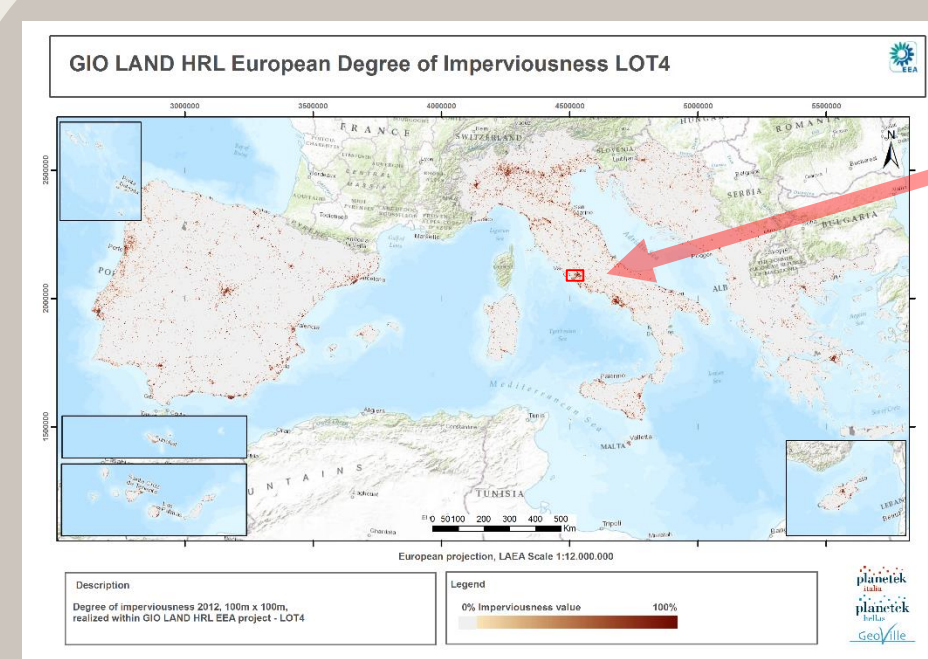
Using RapidEye data and a semi-automatic procedure based on the integration of the European 20 m resolution layer and freely available ancillary data.

THE HISTORY BEHIND:

The procedure has been developed exploiting Planetek experience in imperviousness product started in 2006.

THE FUTURE:

The advent of Sentinel missions, gives new opportunities in HR layers mapping.

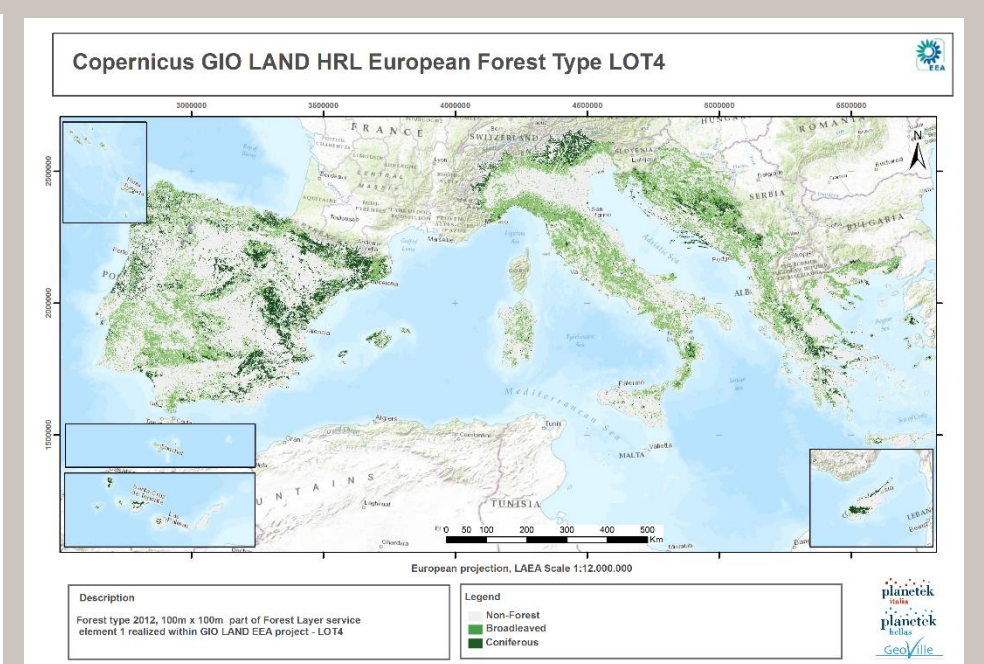
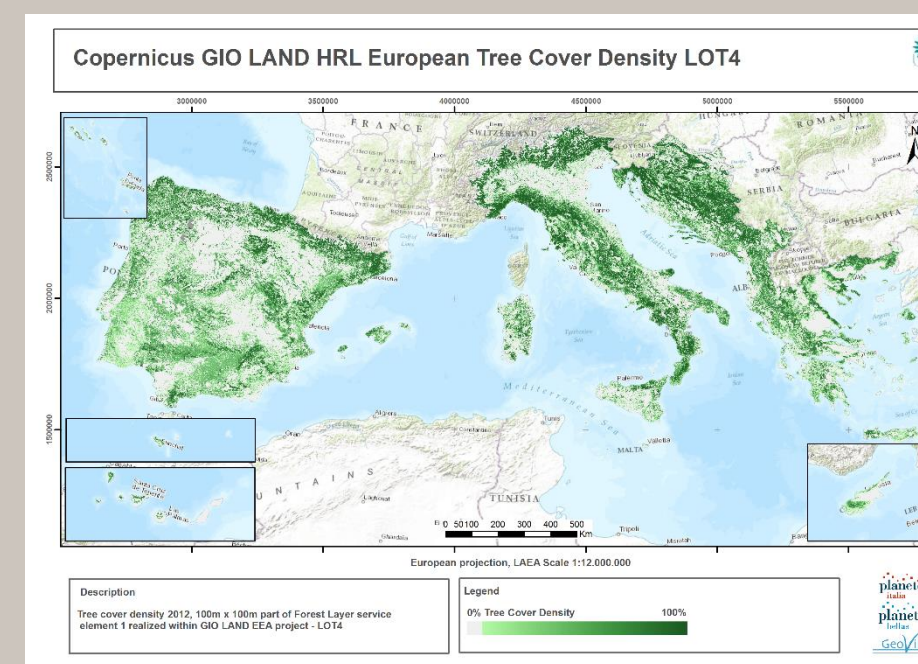


A detail of imperviousness degree map of Rome (Italy)

The imperviousness layer

Impervious areas (covering the ground with an artificial, impermeable material) is one of the main causes of soil degradation in the EU. Planetek Italia's experience in imperviousness products started in 2006 with the precursor geoinformation imperviousness service within the Copernicus initiative. The first update of the imperviousness layer was done in 2009 in the frame of the geoland2 FP7 research project.

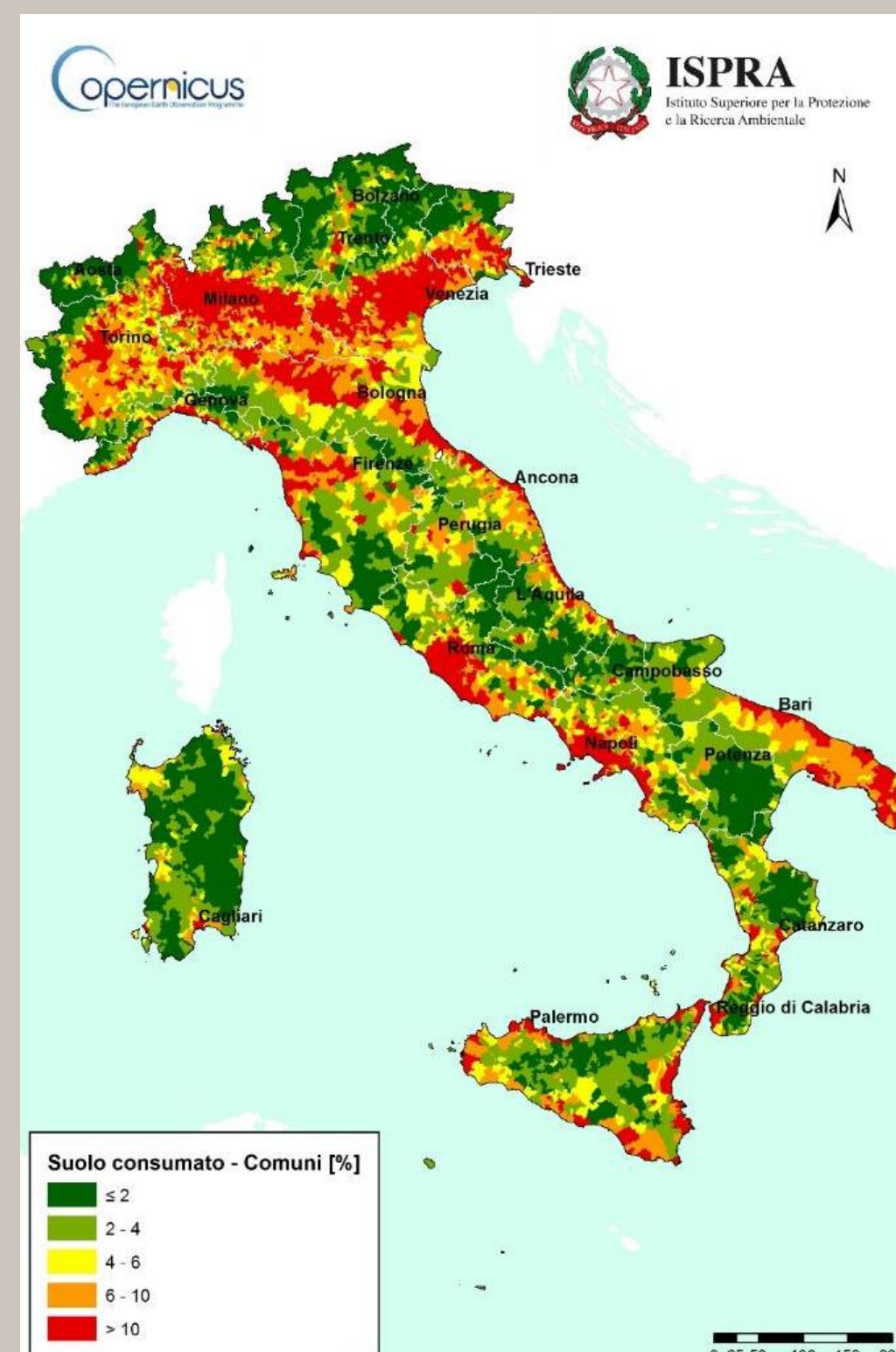
The European Environment Agency started the GIO-Land project with the aim to produce five High Resolution (HR) land-cover characteristics of five main land cover types, corresponding to the main land cover types of Corine Land Cover (Imperviousness, Forest, Grassland, Wetlands, Water Bodies). Planetek Italia, in collaboration with Planetek Hellas and Geoville, had the responsibility of LOT4, which included the production of Imperviousness and Forest service elements in Southern Europe, partim West and Central Mediterranean region (1.202.046 km²).



Downstream service: the Italian 5 m resolution imperviousness layer

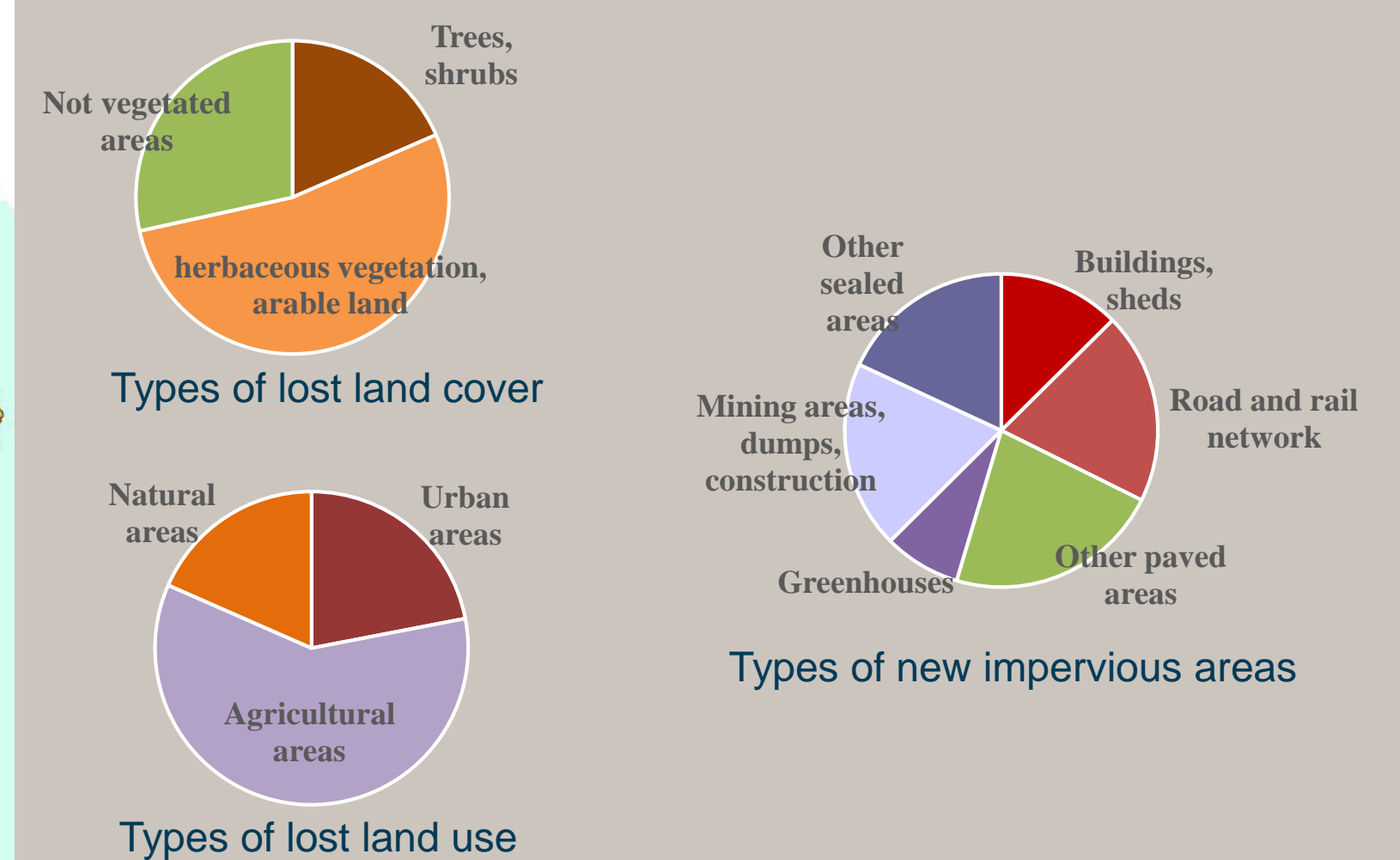
The Italian National Institute for Environmental Protection and Research (ISPRA) was in charge for the thematic and geometric improvement of the 20 m product over Italy. A new semi-automatic procedure has been set up based on the integration of the European 20 m product with a re-elaboration of the full resolution (5 m) input RapidEye images and the inclusion of regional and open source ancillary data.

With respect to the European scale, the better spatial resolution data allowed the classification of minor sealed soil elements (including road and railway network) contributing for about 20% to the total amount of sealed soil in Italy.

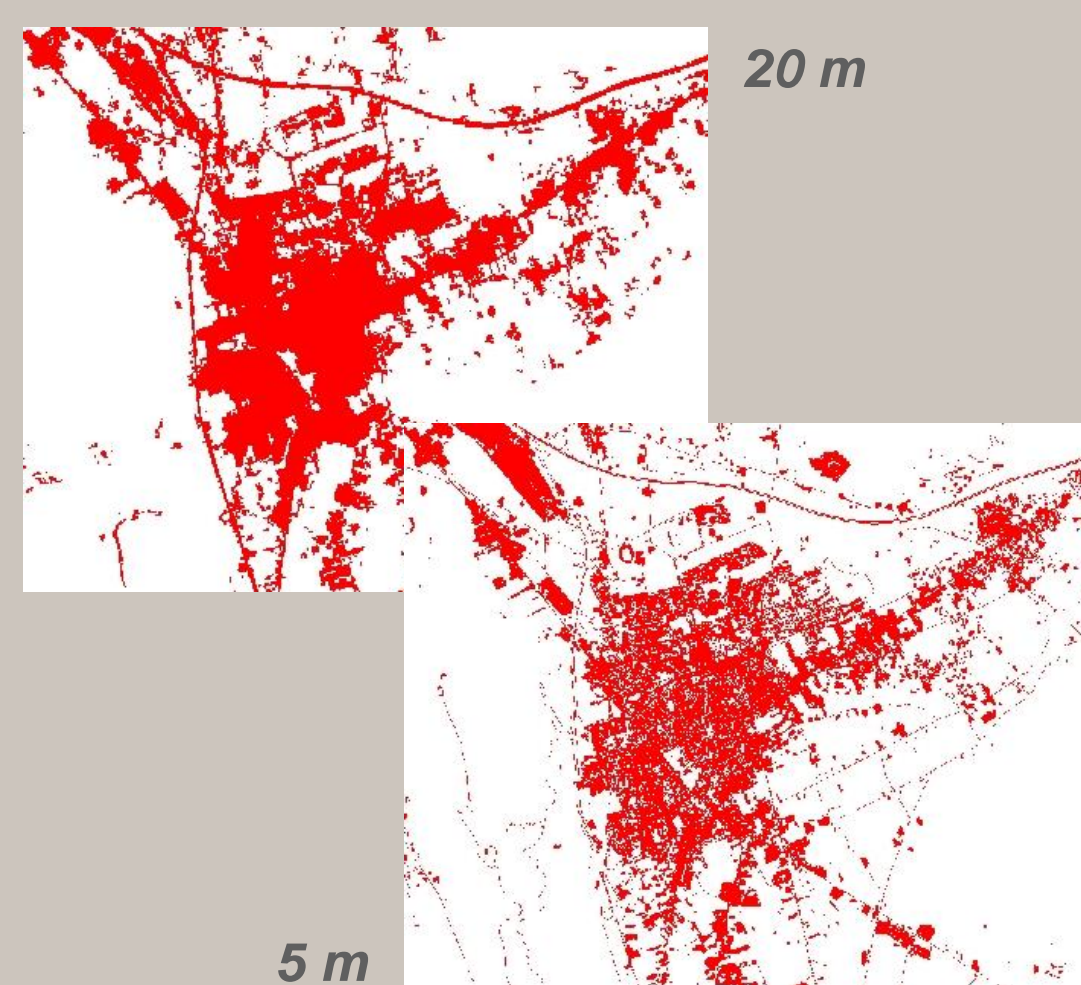


Percentage of sealed soil at the municipality scale

Based on the resulting enhanced product, ISPRA produced for Italy a set of environmental indicators at national, regional and up to the local (e.g. municipal) scale.



What happened between 2008 and 2013 in Italy according to ISPRA Environmental Report (2015) [ISPRA2015]



Reference

[ISPRA2015] Il consumo di suolo in Italia, edizione 2015. ISBN 978-88-448-0703-0

Credits

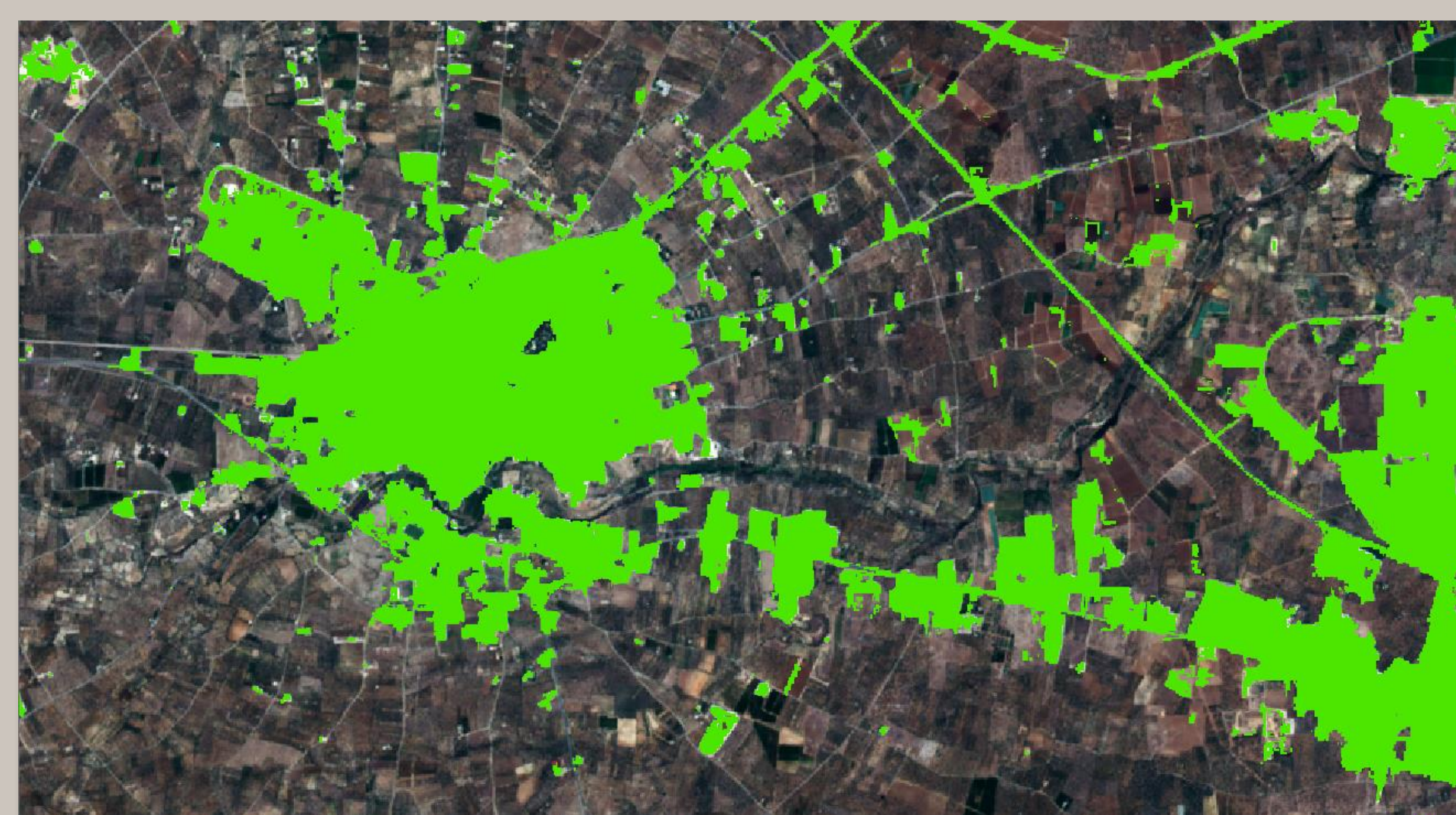
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The 5 High Resolution Layers: The Evolution

Planetek is developing a procedure for the update of 5 HR layers which take advantages from the great quantity of EO data that are coming with free and open access. In particular, in order to derive a status map for the 5 HR layers, a combination of SAR and optical data is used, primarily using Sentinel-1 and Sentinel-2 data, but the methodology has been tested also using Landsat-8, RapidEye, SPOT and other data.

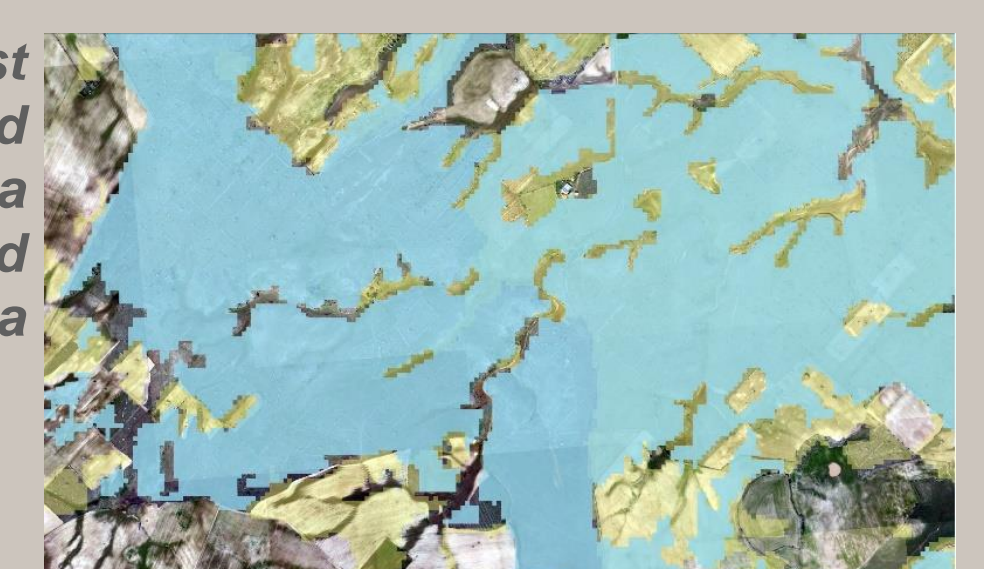
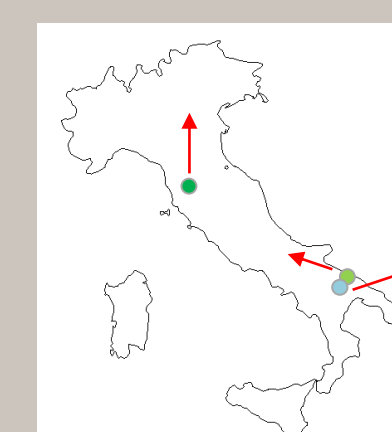


An example of an Impervious areas map obtained combining Sentinel-1 SAR data and Sentinel-2 optical data. This map has been derived using a completely automatic procedure which had in input the data acquired in July and August 2015.



Forest mapping application using SPOT and RapidEye data

Grassland mapping test on the most extended Italian grassland area using IRS-LISS3 and RapidEye data



The geographic position of the three test areas