1.1 Module 4: Copernicus Land Monitoring Service

1.1.1 Submodule C: Forest damage detection supported by the HR Forest Layer

Executive summary

Damages due to pests, weather or fire in managed forests, resulting in the loss of trees, can have a large commercial or environmental impact. Detecting forest damage at an early stage and determining the extent of the damage, can limit the losses.

The demonstration provides information on the concept of forest damage detection (related to storm damage), making use of Copernicus EO data and of the HRL Forest together with additional pre- and post-event VHR satellite observations.

This module consists of a Power Point Presentation (PPT).

Script

1. Go to the Copernicus Land Monitoring Service product portal on land.copernicus.eu and click on Pan-European.
2. Select High Resolution Layers, choose Forests and download both products with reference year 2012 at 20m spatial resolution.
3. Go back to Pan-European. Click on Image Mosaics and select Very High Resolution. Then click on True color image 2012. The Map Viewer opens. Click on **Web services** and then on WMS. The GetCapabilities XML file opens. Copy the link to the Online Resource (http://copernicus.discomap.eea.europa.eu/arcgis/services/GioLand/VeryHighResolution2012/ MapServer/WmsServer?) for later integration in your GIS.
4. Visit the website of an European satellite data service provider like AIRBUS DS: http://www.intelligence-airbusds.com/en/. Navigate and click on GeoStore. Then click on Search to perform a data search. Upload your Area of Interest (AoI) by clicking on **Upload**. Choose your AoI file format, select the corresponding file from your PC and upload the AoI. Results will be presented on the left side automatically.
5. Refine your data search by clicking on **Criteria** and specify the time span (e.g. 2014-07-01 to 2015-07-01). Then set the resolution to 1.5m and maximum allowed cloud cover to 10%. Click on **ok** to apply the criteria. The Results window provides several SPOT-6 scenes at 1.5m spatial resolution and with low cloud cover. Select the scenes from **Jun 4, 2015** and **Jul 6, 2014** and click for both scenes on the information button to receive furter details on the satellite scene. Scroll down to inspect the quicklook.
6. Put both scenes in the basket and make an order. You will be informed by the service provider, when the data is ready for delivery (in most cases via FTP delivery).
7. After notification, download the satellite scenes from the FTP site.
8. Integrate the VHR Image 2012 WMS, the HRL Forest products, and the AoI in your GIS to make you familiar with the area. Add both VHR SPOT-6 scenes as soon as available.

9. Perform a NDVI calculation for both 1.5m SPOT-6 scenes and compare the results.
10. Perform a supervised classification of the SPOT-6 pre-event scene (2014) using the HRL Forest (Tree Cover Density and Forest Type) as training data to derive a forest/tree cover mask.
11. Use the classification result to perform a supervised classification of the SPOT-6 post-event scene (2015).
12. Clip the latest classification result with the newly derived forest/tree cover mask under step 10.
13. Make a difference raster to enable the identificationof damaged areas.
14. Apply suitable size and TCD difference thresholds to identify damaged areas.
15. Export the area as raster file, convert it to vector format for visualisation and calculate its area statistics
16. Present the results.