

TOWARDS A 300 M GLOBAL LAND COVER PRODUCT – THE GLOBCOVER INITIATIVE

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ABSTRACT

The objective of the ESA GLOBCOVER initiative is to develop a service which in its first instance will produce a 300 m global land-cover map for the year 2005, using as its main source FRS (full resolution (300m) full swath) data acquired over the year 2005 by the MERIS sensor on-board ENVISAT. The overall production chain contains 4 elements: Pre-processing, Classification, Validation and Production. The pre-processing includes the following steps: geometric correction, cloud screening, land/water classification and a correction of the smile effect as a prerequisite for the subsequent atmospheric correction. The first main challenge concerned the geometric quality of the pre-processing step. The current performance assessment based on independent samples shows an absolute geolocation accuracy below one third of the sensor spatial resolution.

The GLOBCOVER processing system includes the software environment and the hardware architecture. It is able to process 1 year of global full resolution MERIS Level 1b products in less than three months. An independent verification process is performed in order to reach a high level quality development process.

A third challenge is the design of an automated global classification algorithm to transform surface reflectance values into a globally consistent land cover product. The cornerstone to tackle this issue consists in the regional tuning of all the classification steps. Indeed, a global stratification allowed splitting the world into equal-reasoning regions based on bioclimatic, ecological and satellite observation conditions. Each stratum is then processed separately and combined into a single file afterwards without any stitching procedure. Thanks to a calibration phase all the spectro-temporal classes obtained from the classification algorithm are labelled into one of the 33 land cover classes described using the FAO Land Cover Classification System (LCCS). A validation plan based on regional land cover expert network has been designed to validate the final land cover product. While the 300 m MERIS data acquisition campaign is completed, the processing of the raw data is going-on and only the very first classification results can be discussed at this stage.