Geophysical Research Abstracts
Vol. 14, EGU2012-11225, 2012
EGU General Assembly 2012

Validation of Geoland2 small water bodies product: methodological overview

S. Schlaffer (1), R. A. Kidd (1), E. M. Haas (2), and W. Wagner (1)

(1) Vienna University of Technology, Institute of Photogrammetry and Remote Sensing, Vienna, Austria (stefan.schlaffer@tuwien.ac.at), (2) Geoville GmbH, Innsbruck, Austria

Remote sensing products covering the dynamics of small water bodies are important for diverse applications such as hydrology, monitoring of endangered wetlands and natural resources management. The goal of this study is to provide a scientific validation of the BioPar Water Bodies demonstration product derived from SPOT-VEGETATION data within the framework of the EU-funded project GMES-Geoland2. The demonstration product covers Africa during a time span of 1.5 years with a spatial resolution of 1 km and a temporal resolution of 10 days. A description of the product and the underlying algorithms is given in this paper. The validation effort described here is in agreement with level 1 of the validation methodology proposed by the CEOS (Committee on Earth Observation Satellites) Working Group on Calibration and Validation.

In order to provide an independent dataset for validation, time series from the Advanced Synthetic Aperture Radar (ASAR) onboard ESA's ENVISAT are processed and analysed. Radar data offer a data source which is fundamentally different from the optical data acquired by SPOT-VEGETATION. Time series acquired by ASAR in Wide Swath (WS) mode with a resolution of 150 m have been successfully used to estimate flood extent in boreal and arctic regions. Water bodies cause incoming microwave radiation to be reflected away from the sensor so that they show up as dark areas in the resulting imagery.

In a first step, a synthesis map is produced showing water bodies which persisted at least during half of the validation period. The ability of the BioPar product to detect these water bodies is then tested on a number of sites scattered throughout Sub-Saharan Africa. The original approach for water bodies detection with ASAR, a simple thresholding, proved insufficient due to the sparse coverage of ASAR WS data at low latitudes and the occurrence of very dry soil surfaces in semi-arid climates which can be confused with water bodies when using such a simple algorithm. Permanent small water bodies are instead derived by looking at ASAR time series signatures. Using a training dataset extracted with the help of a suitable reference dataset backscatter time series can be assigned to water and non-water classes using the method of k nearest neighbours.

The second step consists of evaluating the extent of temporary open water bodies detected by the BioPar product for a limited number of dates and sites for which ASAR WS data are available that can be classified using straightforward methods like thresholding. In these cases the two classified products can be directly compared. The methodology and results of the validation effort are presented in this paper.