DEVELOPMENT OF QUALITY LAYERS FOR AIRBORNE HYPERSPECTRAL IMAGERY AND END-TO-END WATER AND SOIL PRODUCTS (HYQUAPRO)

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Technical Commission VII Symposium 2010

KEY WORDS: Hyper spectral, Aerial, Processing, Application, Indicators, Accuracy, Imagery, Metadata

ABSTRACT:

The European Facility for Airborne Research in Environmental and Geo-sciences project (EUFAR FP7/2008-2012; www.eufar.net) aims at providing researchers Transnational Access to the most suited airborne infrastructure they need. As in most cases quantitative information will be deduced from airborne hyperspectral imagery it is of utmost importance for the end-user to get insight into the quality of the imagery provided by the hyperspectral imagery provider. Therefore, as part of the EUFAR project 7 airborne hyperspectral image providers are closely working together to first identify and subsequently develop and implement harmonized quality indicators/layers in their respective processing chains. Beside quality indicators/layers, also the data description that accompanies the hyperspectral data (metadata) is being harmonized. As part of the development of quality indicators/layers, the concept of uncertainty propagation analysis (UPA) combined with Monte Carlo stochastic simulation was applied to airborne hyperspectral imagery to explore how uncertainty of input parameters propagates through the processing chain. One promising way of visualizing the results of the UPA and Monte Carlo stochastic simulation is by exceedence map, indicating e.g. the probability of the x- or y-coordinate deviating more than one pixel from the mean location. Such an exceedance map is a good candidate to be delivered as quality layer together with the hyperspectral imagery to the end-users. In order to facilitate the use of airborne hyperspectral data and thus to attract new users, water and soil products based on robust algorithms are under development for implementation in existing processing chains of DLR and VITO. The development of an improved version of an Inherent Optical Properties model for use in inland and coastal waters was investigated. Higher performing soil algorithms based on analytical approaches are developed under the double commitment of using methodologies where automatisation is possible, and offering multiple algorithms to the users, focusing on the determination of soil products such as clay, iron, carbonate, soil organic carbon maps.

TOPIC: Multi-spectral and hyperspectral remote sensing
ALTERNATIVE TOPIC: Multi-spectral and hyperspectral remote sensing