Geophysical Research Abstracts
Vol. 14, EGU2012-10434, 2012
EGU General Assembly 2012

TerraSAR-X versus Landsat 5 TM: A comparison of different sensors for estimating the present distribution of peat lands in the state of Baden-Württemberg (Germany)

A. C. Kalia, H. Weippert, K. Käufler, N. Billen, L. Herrmann, and K. Stahr

Institute of Soil Science and Land Evaluation, University of Hohenheim, Emil-Wolff-Str. 27, 70599 Stuttgart, Germany (andre.kalia@uni-hohenheim.de)

The aim of the project is to show how different remote sensing sensors can be used to derive a peat land map at a regional scale. For this reason optical multispectral data from the Landsat 5 Thematic Mapper sensor as well as Synthetic Aperture Radar (SAR) data from the TerraSAR-X sensor were processed and analyzed. The accuracy of the mapping results were evaluated by field observations and a ”conventional” peat land map made by K. H. Göttlich (1967). As a study site the so called “Pfrunger- Burgweiler Ried” was selected. The site represents a peat land with an area of 12 km^2, located at 615 m. a. s. l., 25 km north of the lake Constance. With a space borne SAR sensor like TerraSAR-X earth observation could be carried out almost regardless of weather and illumination conditions with a high geometrical resolution of up to one meter. The attempt to apply this SAR sensor for mapping of peat land represents therefore a new research field in remote sensing.

The remote sensing data was pre- processed in order to correct the radiometric values and geometric location of each pixel. Thus, an atmospheric correction was performed on the optical data using the Software ATCOR 3. Furthermore the Lee- Sigma algorithm was executed on the SAR data in order to minimize the speckle effect. Afterwards both datasets have been classified separately using an object- oriented approach. For this reason the nearest neighborhood algorithm was used within the software eCognition. The results indicate that both sensors were able to detect peat lands with varying accuracies. While it was possible to distinguish different peat land types with the multispectral optical sensor, this was not possible with the SAR sensor.

In summary, this work identifies the advantages and disadvantages of a multispectral optical sensor against a SAR sensor with respect to the special application of peat land mapping.