Geophysical Research Abstracts, Vol. 8, 03368, 2006
SRef-ID: 1607-7962/gra/EGU06-A-03368

Comparison of inversion methods for retrieval of biophysical vegetation parameters indicating drought stress

K. Huber (1), F. Baret (2), J. Eitzinger (1), J. Haumann (4), G. Kaiser (3), R. Linke (4), W. Postl (4), P. Rischbeck (1), W. Schneider (3), P. Weihs, P.(1)

(1) Institute of Meteorology, University of Natural Resources and Applied Life Sciences, Vienna, Austria; (2) Unité Climat Sol et Environnement, INRA, Site Agroparc, Avignon, France; (3) Institute of Surveying, Remote sensing and Land information, University of Natural Resources and Applied Life Sciences, Vienna, Austria;...weihs@mail.boku.ac.at (4) Department of Ecophysiology and Functional Anatomy of Plants, University of Vienna, Austria (katja.huber@boku.ac.at / Fax: +43 1 47654 5610 / Phone: +43 1 47654 5625)

The early and exact recognition of drought stress in crops is of substantial importance for sustainable crop production. The project “crop drought stress monitoring by remote sensing” (DROSMON), of which this study is a part, aims to adapt existing, and to develop new remote sensing based methods for the detection and monitoring of drought stress in agricultural crops.

The objective of this study was to test different model inversion performances to estimate biophysical crop parameters such as chlorophyll content and in particular the leaf area index (LAI), whose reduction is seen as an important response of crops to drought stress. For this purpose spectro-radiometric measurements of maize at canopy level were carried out with the portable field spectroradiometer FieldSpec Pro FR (ASD) at different test sites in Austria in the year 2005.

To test model performances for maize in 1-dimensional mode, the combined version of the physical models of leaf and canopy reflectance PROSPECT and SAILH (PROSAIL) was applied. For retrieval of the biophysical crop parameters LAI and chlorophyll content the inversion of the model was performed using an artificial neural network and a look-up table approach.

Comparison of both inversion methods indicates no significant difference between the

obtained values of LAI and chlorophyll. However, comparison of retrieved parameters by the inversion with measured field data indicates a slightly overestimation of LAI and chlorophyll content, which could be partly attributed to measurement errors or uncertainties introduced by using a 1-dimensional model. For a more detailed analysis of these aspects, next steps of work will comprise the application of further field data and the implementation of a more complex model taking into account a more realistic 3-dimensional architecture of the maize field.