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Retrieval of soil moisture using ENVISAT ASAR data for agriculture area in Poland

K. Dabrowska – Zielinska, M. Gruszczynska, I.Malek

Institute of Geodesy and Cartography, Warszawa, Poland (kasia@igik.edu.pl / Fax: +48 22 329 19 50)

The aim of the project was to examine the impact of soil - vegetation parameters on backscattering coefficient from ASAR under various polarization and incidence angle.

Alternating Polarization Mode gives a new chance to estimate various crop - soil parameters, which are significant for prediction of crop biomass and allow retrieving soil moisture under specific crop type and crop structure.

Different polarization and incidence angle (IS2 HV; HH, IS4 VV;VH, and IS6 VV VH) have been examined for retrieval of Leaf Area Index (LAI), Leaf Water Area Index, soil moisture, and leaf angle. ENVISAT MERIS and Terra ASTER data were used for: crop classification; development of soil - crop descriptors that characterize various vegetation parameters. Extensive field measurements, which included crop recognition, crop fenological phase, volumetric soil moisture [%] (bare soil and soil covered by crop, Leaf Area Index (LAI), height of the crops, wet biomass, albedo, amount of ears of wheat/m^2 have been carried out for 2003-2005 in the test site at the western part of Poland. Also the information concerning the crop type (winter and spring wheat, corn, barley) its actual development stage and growing conditions were recorded. The measurements were carried out simultaneously to ENVISAT satellite overpasses. The relation of soil moisture to microwave signal has been examined for different vegetation cover (stage of development, biomass).

The field measurements were carried out for agricultural region in the west part of Poland from April - August in 2003 – 2005. Additionally to SAR and ASAR acquisitions the optical data have been received from NOAA/AVHRR, TERRA/ MODIS and meteorological parameters measured during the satellite acquisition.
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