Geophysical Research Abstracts,
Vol. 10, EGU2008-A-04884, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-04884
EGU General Assembly 2008

Integrating field monitoring, spaceborne SAR and hydrologic models to support water resources management and agricultural practice in Mediterranean areas

R. Ludwig (1), M. Bernier (2), R. Filion (2), I. Gherboudj (2), C. Paniconi (2), M. Melis (3), A. Soddu (3), D. Arp (4), S. Meyer (4)

(1) Department of Geography, University of Munich, Germany, (r.ludwig@lmu.de / +49-89-21806675), (2) INRS-ETE, Université du Québec, Canada, (3) AGRIS Agricultural Research Agency of Sardinia, Italy, (4) Department of Geography, University of Kiel, Germany

According to current climate projections, Mediterranean countries are at high risk for an even pronounced susceptibility to water stress and drought, which is expected to have severe direct impact on agricultural productivity. The presented project is aiming to conjointly employ field monitoring, spaceborne SAR and hydrologic modelling to gather process knowledge and support adaptive water resources management and best agricultural practice. These efforts tie in with ongoing research on data assimilation, as periodic observations of surface soil moisture can be used to update the land surface boundary conditions that drive surface and subsurface partitioning of water and energy fluxes in a hydrological model. The study is conducted in the Campidano plain, the agricultural heartland of Sardinia (Italy), at a well-equipped experimental farm near Ussana. The Azienda St. Michele is operated by the regional agricultural research agency AGRIS and disposes of an extensive data base of continuous field data and satellite imagery (e.g. ASAR in single and alternating polarization since 2003). The scientific objectives of this international project initiative can be separated into four tasks:

a) development of an improved soil moisture and roughness inversion algorithm from

polarimetric and dual-polarized PALSAR-data for annual crops and grassland.

b) adaptation of an available distributed and physically based hydrologic model for an assimilation of spatial soil moisture quantities derived from a)

c) evaluation of model results prior and after data assimilation and assessment of uncertainties related to the retrieval algorithm and model concept

d) implementation of the adjusted model into an Integrated Watershed Management strategy for the Campidano plain under climate and land use change impacts

Besides the long-term project concept, the poster is presenting the findings of an intense field campaign for soil and vegetation parameters, which has accompanied a series of ASAR and PALSAR image acquisitions from April to August 2007. The development of an empirical model for the inversion of surface soil moisture and roughness from ASAR images is presented. To validate the developed model, ground data acquired on 3 bare fields and 3 crops fields as well as backscattering values extracted from ASAR imagery are being used. Furthermore, the significant differences and potentials of using PALSAR data for soil moisture mapping are highlighted in a first qualitative assessment.