



Retrieval of soil hydraulic parameters from Synthetic Aperture Radar data: an integrated multidisciplinary approach

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It is widely recognized that Synthetic Aperture Radar (SAR) data are a very valuable source of information for the modeling of the interactions between the land surface and the atmosphere. During the last couple of decades, the focus of SAR remote sensing has been on the retrieval of land cover parameters and on the estimation of model variables, more specifically surface soil moisture values. One relatively unexplored issue is the retrieval of soil hydraulic parameters, such as for example hydraulic conductivity values, through remote sensing. This is due to the fact that no direct relationships between the remote sensing observations, more specifically radar backscatter values, and the parameter values can be derived. However, land surface models can provide these relationships. The objective of this study is to retrieve a number of soil physical parameters through a combination of remote sensing and land surface modeling. The study has been performed as part of the AgriSAR 2006 campaign. Spatially distributed and multitemporal soil moisture maps are the basis of the study. The model used in this study is the TOPMODEL-based Land-Atmosphere Transfer Scheme (TOPLATS). The surface soil moisture values are used in a parameter estimation procedure based on the Extended Kalman Filter equations. In fact, the land surface model is thus used to determine the relationship between the soil physical parameters and the remote sensing data. An analysis is then performed, relating the retrieved soil parameters to the soil texture data available over the study area. The results of the study show that

there is a potential to retrieve soil physical parameters through a combination of land surface modeling and remote sensing.