



Introduction of a theoretical framework for soil roughness uncertainty characterization with respect to soil moisture retrieval from SAR

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It is well known that soil roughness characterization largely hampers the retrieval of soil moisture from Synthetic Aperture Radar (SAR) imagery. Several publications already showed the difficulty of roughness parameterization from field measurements: large variabilities are found for the roughness parameters. This property causes a large uncertainty in the roughness values and highly influences the accuracy of the retrieved soil moisture. In this presentation, a theoretical framework is introduced to better characterize the uncertainty of soil roughness. Therefore, theoretical roughness profiles are generated from which soil roughness parameters are calculated. The large range of roughness values found can be described through a possibility distribution, which is a means to capture the uncertainty in the roughness parameters. The latter can be applied in a recently introduced possibilistic retrieval technique that allows for the assessment of the accuracy of the retrieved soil moisture given an uncertain roughness description. In the current presentation, it is shown how the roughness uncertainty, i.e. possibility distribution, can be characterized in order to correctly predict the accuracy on the retrieved soil moisture for a given roughness state of a field.