

Spatial variability of surface soil moisture in African environments using ERS SAR.

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Abstract:

Ground validation measurements of surface soil moisture have been carried out in two African countries (Niger and Zimbabwe) to determine the sensitivity of ERS SAR to soil moisture variability over space and time in the presence of different vegetation covers. Both regions had predominantly sandy soils and relatively sparse vegetation cover which were considered advantageous to this application. In Niger, three vegetation types were present, millet crops, fallow savannah grassland with shrubs and tiger bush. In Zimbabwe, two contrasting grassland types were chosen: commercially farmed cattle pasture which was lightly grazed and communal grasslands which were very heavily over-grazed. Ground validation of soil and vegetation was carried out at the time of ERS overpasses to cover the transition between wet and dry seasons; in Niger during 1992 and in Zimbabwe during 1996. For Niger, strong seasonal variations in backscatter were associated with millet crops and fallow savannah and the relative importance of vegetation development and soil moisture are investigated. For Zimbabwe the seasonal variation of groundwater seepage zones in headwater dambos are described and the ability of SAR to detect these variations in the presence of different grassland covers is assessed.