

Estimation of roughness and moisture availability at the urban surface using ERS-SAR images

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The retrieval of surface moisture availability is essential to the study of surface/atmosphere interaction at the urban boundary layer. In between and within ERS-SAR images of Los Angeles we observe large variations of backscatter intensities. Low intensities are found over smooth pavement and asphalt, and higher ones over industrial and commercial areas, with a marked illumination azimuth dependence for the latter. Highest backscatter intensity is found when the flight direction is parallel to the alignment of streets. Similar anisotropy occurs over residential areas, albeit at lower intensity. These contaminations mask the backscatter variations due to other processes, and indicate that to differentiate soil moisture backscatter from that of surface roughness, the interpretation of SAR images must be preceded by the analysis of urban morphology and land uses from high resolution images. A correction for anisotropy effects and backscatter contaminations within ERS-SAR images of urban surfaces is attempted, based on SPOT panchromatic images.

Keywords: ERS-SAR, soil moisture, surface roughness, anisotropy effects, urban climatology.

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