



Radiometric Microwave Measurements and Hydrological Modelling for Estimating Soil Moisture in the MASMEX Experiment

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During the MASME_x 2002 and 2003 experiment, which was carried out in the period May-June, after the complete snow melting, on the Chertz plateau (2010 asl), in the Dolomites (Italian Alps), several meteorological and hydrological measurements were collected simultaneously to microwave radiometric observations.

The aim of this experiment was to investigate the sensitivity of microwave emission at the lower frequencies to the soil parameters and to soil moisture, in particular. Moreover, the possibility of using direct microwave measurements as inputs in hydrological models on a basin scale was also explored.

Passive microwave measurements at C- (6.8 GHz), Ku- (19 GHz), and Ka-band (37 GHz) frequencies were collected on a continuous time basis, together with micrometeorological and soil moisture data, the latter obtained by using a TDR probe. Laboratory measurements of soil saturated conductivity, retentivity curves and other soil physical properties were also conducted.

Direct comparison between radiometric measurements, especially at C-band, confirm the sensitivity of microwave emission to soil moisture at a depth of a few centimetres. An algorithm for the retrieval of soil moisture, based on a simplified form of the Radiative Transfer Theory, was tested and subsequently inverted by using the Nelder-Mead method.

Results from this research can be useful for soil moisture monitoring in mountain areas where remote sensing can provide, in perspective, a useful support for water resources

management and the prevention of flood risk.