

TRMM/TMI EXPERIMENT IN TIBET: VALIDATION OF A MULTI-FREQUENCY ALGORITHM FOR THE ASSESSMENT OF SOIL MOISTURE

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Within the framework of a NASDA program, dedicated to the development of algorithms for the extraction of soil moisture from ADEOS-II/AMSR data, a ground campaign was carried out by NASDA on Tibetan Plateau in summer 1998. The aim of this experiment was to evaluate the potential of microwave radiometry in the study of geophysical processes over land and to test the proposed algorithms for the extraction of soil moisture and vegetation biomass from satellite at global scale using TRMM/TMI data. Extensive ground measurements of soil moisture and vegetation parameters have been carried out simultaneously to TRMM passages.

The original algorithm proposed by IROE was tailored for AMSR data and was based on the use of C and X bands. The brightness temperature (T_b) at C-band is generally well correlated to the soil moisture; however, the presence of vegetation strongly affects this sensitivity. In order to correct the data for the vegetation effect, the polarization index ($PI = (T_{bv} - T_{bh}) / (T_{bv} + T_{bh})$) at X-band has been used, since from previous experiments this parameter was found to be very sensitive to plant biomass. This algorithm has been consequently modified for the use of the higher frequencies of TMI respect to AMSR and in this case T_b at X-band has been related to soil moisture and PI at Ka-band used for correcting the vegetation effects. Although Ka-band emission saturates very rapidly as soon as vegetation grows, the comparison between measured on ground and satellite extracted soil moisture was fairly good and the result of the algorithm satisfactory.