Bayesian estimation of precipitating cloud parameters:

Application to case studies of FLASH and RISKMED projects.

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The retrieval of precipitation profiles from spaceborne microwave radiometers has received, in recent years, several improvements in terms of ground resolution, number of microwave channels, sensor reliability, and computer algorithms for the processing of experimental data.

This paper describes recent developments of a Bayesian technique (BAMPR – Bayesian Algorithm for Microwave Precipitation Retrieval) that has been implemented at the CNR ISAC of Rome to produce precipitation estimates from observed multi-channel brightness temperatures.

In detail, we will present a general description of the Bayesian inversion algorithm, with particular emphasis on some improvements in the screening procedures, obtained using the polarization-corrected temperature and aimed at reducing the effect of background surface emissivity. These changes have been tested on some case studies of heavy precipitation over the Italian region that were observed by the SSM/I and SSMIS sensors. The results show a considerable improvement of the retrieval algorithm, especially for the rainfall over coastal areas where the different emissivities of the sea and land surfaces usually represent a problem. The cloud radiation database (CRD) that has been utilized for the tests, consist of about 200000 precipitating cloud profiles and of the associated brightness temperatures. The experimental data were obtained from SSM/I sensors (7 channels) of the Defense Meteorological Satellite Program (DMSP).