BAYESIAN PRECIPITATION-PROFILE RETRIEVAL FROM TRMM MICROWAVE SENSORS

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A statistical retrieval technique for estimating precipitating cloud profiles from TMI measurements has been developed. The inversion method is based on the Bayesian estimation theory and implemented by means of the Minimum Mean Square criterion. The retrieval technique is trained by a three-dimensional (3-D) cloud-radiation database, generated by inputting the numerical outputs of a mesoscale cloud-resolving model into a 3-D radiative transfer model. Retrieval products are the hydrometeor and precipitation-rate profiles, together with columnar equivalent liquid water contents and surface rainrates Also, a combined approach, using both TMI and PR data within the same framework, has been developed. The two retrieval methods will be illustrated, and their application to TRMM data will be analyzed and discussed in detail by using TRMM official products as a comparison. Finally, microphysical and radiative aspects of the forward problem will be discussed, pointing out critical aspects and further refinements of the proposed techniques.