Investigating AMSU and AMSR-E rainfall estimates using active microwave sensors

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The present work deals with the integration of data obtained from passive and active microwave sources, in order to develop procedures to suitably calibrate and validate satellite-based passive microwave rainfall algorithms using multiparameter weather radar information. Near simultaneous measurements, obtained by the following microwave radiometers: AMSU and AMSR-E (flying aboard Aqua platform) and by the Chilbolton S-band radar, are used to improve rainfall estimate.

This work investigates the different channel penetration issue and the so-called beam-filling problem, in order to improve algorithms for rainfall estimate. Precipitation related parameters, worked out from radiometers, are compared with multiparametric radar information, obtained from the Chilbolton radar set near Winchester in Hampshire. RHI (Range-Height Indicator), PPI (Plan Position Indicator) and CAPPI (Constant Altitude PPI) radar data provides useful information on cloud vertical structure in order to improve the understanding of signature of passive microwave channels and the effect due to inhomogeneous rainfall coverage. For a significant rainfall event, AMSU and AMSR-E rainfall maps are achieved, applying well-accepted (or reference) algorithms; these estimates are carefully analyzed, considering the near coincident radar information.