Rain areas delineation by means of SEVIRI: exploitation of the multispectral cloud characterization in a blended MW-IR precipitation technique

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The identification of precipitation areas by microwave based rain algorithms can be improved by means of cloud classification schemes based on multispectral observations. Several recent studies have demonstrated the potential of cloud microphysical and optical characterization for the improvement of passive microwave rain estimates, especially in detecting likely precipitating pixels over land. The multispectral sensing capabilities of SEVIRI onboard METEOSAT-8 are thus exploited to characterize the cloudy scenario, using a twofold approach: a) an RGB technique to qualitatively identify the different cloud systems on the basis of the combination of radiances measured in three selected channels, and b) a retrieval algorithm to obtain a quantitative description of cloud top in terms of optical thickness (τ), effective radius (Re) and top temperature (Tc). The approach has proved especially effective for over-land severe convective events. The multispectral analysis tools are exploited in conjunction with the blended precipitation technique (Torricella et al. 2007) originally developed at the Naval Research Laboratory in Monterey (CA). Key to the blended satellite technique is a real time, underlying collection of time and space-intersecting pixels from operational geostationary infrared imagers and microwave sensors onboard polar, low orbiting platforms. The rain intensity maps derived from microwave measurements are used to create global, geo-located rain intensity vs brightness temperature relationships that are renewed as soon as new co-located data are available. The information gathered by the multispectral analysis of the cloud field is conveyed to the blended rainfall algorithm and the results are compared to reference rain data for selected Mediterranean storm cases. Whenever possible, the TRMM precipitation radar data will be used as reference rain information.

Torricella, F., V. Levizzani and F. J. Turk, 2007: “Application of a blended MW-IR rainfall algorithm to the Mediterranean” in “Measuring precipitation from space - EURAINSAT and the future” (pp 407-507). Levizzani, V., P. Bauer, and F. J. Turk (Eds.), Springer, Dordrecht, Advances in Global Change Research, 28, 722 pages.