Characterization of Mediterranean precipitating systems using AMSU observations

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The potential of the Advanced Microwave Sounding Unit (AMSU) observations to identify and characterize precipitating systems in the Mediterranean Region is explored. Single channels or combination channels from module A are used to detect and locate upper level potential vorticity anomalies that are often associated with intensification of surface systems and occurrence of extreme events, while AMSU module B data is used to detect precipitating areas.

This study is part of the framework of project CYPRIM (Cyclogenesis and Intense Precipitation in the Mediterranean region), and the motivation for the approach presented here is the direct use of satellite data (as an alternative for reanalysis datasets) without relying on retrievals of precipitation amounts or temperature and moisture profiles of the atmosphere. The specific objectives are: 1) to form a climatology of moderate to strongly precipitating systems, and 2) investigate their relationship with upper level features that may be precursors of extreme events, establishing therefore a typology of the precipitating systems in the Mediterranean region based on their frequency, size and position relative to the upper level feature.

We will demonstrate the applicability of AMSU to detect upper level features and precipitating systems for selected case studies of extreme precipitation in the Mediterranean region. We will show that AMSU-A channel 8 is suitable to identify upper level potential vorticity anomalies associated with southward intrusions of stratospheric air. A combination of AMSU-B channels 4 and 5, in turn, is able to discriminate moderate to strongly precipitating areas with good agreement with TRMM derived products and independent ground-based data.