A MULTI-APPROACH ANALYSIS OF THE NOVEMBER 2002 INTENSE PRECIPITATION EVENT OVER NORTHERN ITALY

Francesca Torricella, Elsa Cattani, Vincenzo Levizzani and Virginia Poli

Institute of Atmospheric Sciences and Climate (ISAC-CNR), Bologna, Italy

ABSTRACT

The rainfall intensity estimate by passive microwave (PMW) measurements from space performs generally better over the sea surface with respect to land, due to the problems in separating true rain signatures from those produced by surfaces having similar spectral behaviour (e.g. snow, ice, desert and semiarid grounds). The initial screening of a typical PMW algorithm aimed at recognising the various surface types and delimit precipitation is mostly based on global derived thresholds that hardly fit all local and specific soil-atmosphere conditions. Therefore, cloudy and precipitating pixels can be erroneously discarded from the estimate as affected by snow or ice or other underlying conditions.

An intense rainfall event occurred in late November 2002 over the highly complex terrain of northwestern Italy, southern France and Switzerland is examined. The presence of complex orography and coastal areas and the heavy snowfall during part of the event are all elements that can negatively influence the performance of the adopted PMW rainfall estimates.

The PMW pixels classification is carefully inspected, to assess if evident errors in classification can be identified and removed. The 3-day evolution of the storm is followed by means of a combined PMW-IR rainfall estimation method, which produces rain maps at the time-space resolution of METEOSAT-7 observations. An improvement of the characterization of the cloud field is sought using cloud parameters such as visible optical thickness ($\tau$), effective radius ($r_e$) and cloud top temperature ($T_c$). The parameters are extracted from space and time coincident MODIS cloud official products and their use is assessed in view of deriving them SEVIRI measurements thus improving rainfall estimates in real time at GEO orbit.