



Extreme precipitation on the island of Madeira on 20 February 2010 as seen by satellite passive microwave sounders

Vincenzo Levizzani (1), Sante Laviola (1), Elsa Cattani (1), and Maria João Costa (2)

(1) CNR-ISAC, Bologna, Italy (v.levizzani@isac.cnr.it), (2) Universidade de Evora, Dep. de Fisica, Evora, Portugal

The extreme precipitation event on the Island of Madeira in the Atlantic Ocean on 20 February 2010 has triggered flash floods and mudslides in the southern slopes of the island. The frontal system moving towards the northeast and originating from a low-pressure center in the Madeira Archipelago is not unusual for the area, but its consequences on the island environment were rather extreme. Several studies demonstrated that the influence of the orography reinforced the precipitating system enhancing the transition from stratiform to convective precipitation. However, to date no studies are available in the literature on the structure of the clouds and precipitation structure as well as on its local patterns. This work is focused on the analysis of the precipitating event and its evolution using passive microwave sounding imagery from polar orbiting satellites for the retrieval of rainfall intensity and cloud property classification. The observations demonstrate that the heavy rainfall hitting the island at midday on 20 February was generated by a severe convective event whose very local character is due to orographic enhancement over the central mountain chain of the island. Precipitation was of convective type lasting for a few hours around noon and the observations confirm the numerical model results. Physically based cloud classification also reveals a powerful tool for the monitoring of these severe rainstorms. The results of the satellite observations show some potential for nowcasting in an island environment with orography perpendicular to the main flow from the ocean.