

A rainfall analysis of an active frontal perturbation over Catalonia using Meteosat, radar and lightning data.

A. Luque (1), A. Martín (1), J. A. Guijarro (2) and S. Alonso (1)

(1) Meteorology Group, Dept. of Physics, Balearic Islands University, Palma, Spain, (2) Met. Centre at Balearic Islands, Instituto Nacional de Meteorología, Spain (angel.luque@uib.es / Fax: +34 971 173426 / Phone: +34 971 172537)

This paper assesses the accuracy with which geostationary satellite imagery can be used to estimate precipitation in the 9-10 June 2000 Montserrat flash flood episode in Catalonia, Spain. This well documented severe event was produced by a cold front perturbation combined with Mediterranean hot and moist air that favored a very unstable environment over the affected area. The main difficulty found in this case for the exploitation of infrared Meteosat images to estimate precipitation was that convective cells were covered by clouds with homogeneous and relatively warm tops. This fact seems to be the principal cause of the low accuracy observed when rain rates are computed using different satellite algorithms in preliminary attempts. The Auto-estimator and CRR (Convective Rainfall Rate) algorithms were applied, a sensitivity test of rainfall correction factors like: parallax, orographic, moisture, cloud growth rate and cloud top temperature gradient for both methods were made. Recalibration of the two algorithms using radar was done and evaluated and finally, lightning data was assimilated to facilitate the detection of convective zones. Improvements, advantages and disadvantages over rain rates and accumulations are shown and discussed.