Advances in Geosciences
An Open Access Journal for Refereed Proceedings and Special Publications

Adv. Geosci., 7, 205-213, 2006
www.adv-geosci.net/7/205/2006/

Rainfall events and Hailstorms Analysis Program (RHAP)

M. Ceperuelo[1], M. C. Llasat[1], and T. Rigo[2]
[1]Department of Astronomy & Meteorology, Faculty of Physics, University of Barcelona, Spain
[2]Meteorological Service of Catalonia, Generalitat de Catalunya, Spain

Abstract. RHAP (Rainfall events and Hailstorms Analysis Program) is a new tool designed for analysing rainfall events and hailstorms. The aim of this contribution is to present the RHAP tool, which is under development, and its application to different hailstorms and rainfall episodes. The program assimilates multiple data bases (meteorological radar, meteorological model outputs, radiosondes and surface observations) with the purpose to get better event reanalysis. It is based on Storm Cell Identification and Tracking Algorithm (SCIT) with an improved version of the method, and also on a new 2-D algorithm which automatically identifies and classifies the precipitation systems distinguishing between Mesoscale Convective Systems, Multicellular systems, Isolated convection, Stratiform precipitation and Convective precipitation embedded in stratiform precipitation. These two methods allow to obtain the 2-D and 3-D features of the precipitation system like top height of the cells, maximum reflectivity, Vertical Integrated Liquid content (VIL) and VIL density (VILD), kinetic energy, severe hail probability (SHP), number of 3-D cells exceeding a given threshold, Z/R relations,... that are useful to analyse both heavy rainfall and hail events. As application, two events produced on NE Spain are discussed: the heavy rainfall event recorded on 6 September 2004, characterised by a great number of cells that crossed the affected area and that had a maximum activity associated to high values of VIL(37.5 kg/m^2), Z_{max} (54 dBZ) and SHP (73%); and the hail event produced on 29 August 2004, with a rapid development of the convective system and with hail observations in surface when the following thresholds were exceeded: Z_{max}=54 dBZ, VIL=25 kg/m^2 and SHP=63%.

Full Article in PDF (PDF, 3406 KB)

Citation: Ceperuelo, M., Llasat, M. C., and Rigo, T.: Rainfall events and Hailstorms Analysis Program (RHAP), Adv. Geosci., 7, 205-213, 2006. Bibtex EndNote Reference Manager