Geophysical Research Abstracts
Vol. 16, EGU2014-14773, 2014
EGU General Assembly 2014

Numerical analysis of flash-flood inducing storms in mountainous areas

Nikolaos Bartsotas (1), Efthymios Nikolopoulos (2), Emmanouil Anagnostou (3), and George Kallos (1)

(1) University of Athens, School Of Physics, Atmospheric Modeling & Weather Forecasting Group, Athens, Greece, (2) Department of Land, Environment, Agriculture and Forestry, University of Padova, Italy, (3) Civil and Environmental Engineering, University of Connecticut, Connecticut, USA

The study of heavy precipitation events in complex terrain areas and the comprehension of key elements behind their generation and evolution is a substantially challenging task. While the majority of such events are distinguished by common processes such as deep convection and orographic enhancement of precipitation, the role of occasionally present factors such as high dust concentrations in the atmosphere, proves to be critical. Therefore, to gain a deeper insight on the detailed mechanisms and characteristics of those events, the use of an integrated atmospheric model that is both capable of resolving the convective activity and accounting for aerosol-cloud interactions, is essential.

In this study, RAMS / ICLAMS modeling platform is used at fine spatial resolutions of 250m, with an implemented detailed topography from the NASA SRTM mission (3 arcsec). Seven signature flash-flood cases associated with heavy precipitation are analysed in this study including the Italian Alps (1 in Fella basin and 3 in Sesia basin), Southern France (2 in Gard basin) and the recent (2013) Boulder Colorado flood. Model simulations, carried out with several microphysical schemes and grid resolutions, are compared on the basis of their agreement with raingauge-adjusted radar-rainfall datasets. Results from this study underline the contribution of ice-driven processes, and especially the activation of dust particles as ice-nuclei, in capturing both the spatial structure and magnitude of rain accumulations from these extreme events.