Plinius Conference Abstracts
Vol. 13, Plinius13-98-1, 2011
13th Plinius Conference on Mediterranean Storms

Microphysical characterization of severe rainfall events occurred on North-Western Italy using a C-band radar classification algorithm for hydrometeors.

L. Molini (1), M. Montopoli (2,3), A. Parodi (1), F.S. Marzano (2,4)

(1) CIMA, Savona, I, (2) CETEMPS, University of L'Aquila, I, (3) DIEL, University of L'Aquila, I, (4) DIET, Sapienza University of Rome, I

Severe weather events affecting Mediterranean regions can be classified essentially through the different dynamical regimes distinguished by differing degrees of control of convective precipitation by the synoptic-scale flow. Molini et al. (2010), taking advantage from Done et al. (2006) work, showed that a different trigger often lead to two very different event types. The first one is dominated by short-lived (with a total duration minor than 12 hours) and small-scaled (covering areas minor than 50x50km2) rainfall events.
Moreover, the forecast skill of numerical weather prediction models turned out to be very sensitive to the weather type, since the larger was the time-space extent of a rainfall event the higher was their predictive ability.
For this reason, since the aforementioned study was carried out using mainly two-dimensional atmospheric variables like rainfall depths and CAPE, a fully three dimensional analysis of microphysical features of severe events is required as a necessary further step. To this end, we selected a set of heterogeneous events which include convective and stratiform rain regimes. C-band polarimetric weather radar of M.te Settepani, north-western Italy is used to characterize the selected events in terms of their microphysical signature.
The classification algorithm of hydrometeors based on a Bayesian approach named BRAHCC by Marzano et al. (2007) has been used for this purpose. It was initialized with ERA-Interim reanalyses temperatures and then applied to observational radar data.
This study presents the results dealing with hydrometeors concentration vertical profiles for both iced and liquid particles, their trend in time and space and their frequency as they were utilized to characterize severe events even from a fully three-dimensional microphysical standpoint.