Geophysical Research Abstracts
Vol. 15, EGU2013-10170, 2013
EGU General Assembly 2013

Predictability of a catastrophic rainfall event: evaluation of precursors.

Simon Fresnay (1), Philippe Arbogast (2), Dominique Lambert (1), Karine Maynard (3), and Evelyne Richard (1)
(1) Laboratoire d'Aerologie, University of Toulouse and CNRS, France, (2) Centre National de Recherches Meteorologiques - GAME, Toulouse, France, (3) Météo-France, Toulouse, France

Heavy precipitation short-term forecasting remains challenging despite recent progress in numerical models. In particular, uncertainties on upper-tropospheric dynamics may be the cause of consequent forecasting errors.

A severe convection episode, which hit the French Mediterranean coast in June 2010 and lead to a catastrophic flash-flood, is studied with regard to predictability issues. The event had been poorly forecast by numerical models especially in its first phase and large uncertainties remain: differences among model analyses and lack of surface observations give a blurred picture of the dynamics associated to the event.

Firstly, disruption of the mesocale predictability is demonstrated from a sequence of time-lagged forcasts. Statistical analysis based on ECMWF EPS reveals strong correlation between the locations of the precipitation and the jet streak.

Secondly, an ensemble of PV fields is obtained from a lagrangian-advection tool - run in various settings - and used to provide modified initial conditions to a NWP model. Sensitivity is obtained on precipitation but none of the scenarios produces a precipitation pattern totally consistent with the observed one.

Thirdly, initial conditions are modified in a more subjective way. It is shown that an unskilled forecast is substantially improved when the modified initial condtions lead to the enhancement of the upper-level circulation and allow vertical coupling with pre-existing shallow convection to develop. Ths particular process is investigated with the use of an alternative balance to diagnose the contribution of dynamics to the vertical velocities.

Discussion is given about these results, and an attempt is made to assess the consistence of an enhanced vertical circulation with other observations (surface pressure, satellite...).