Comparison of two mesoscale LAM-EPS generation methods for the prediction of heavy rains over the Western Mediterranean: the HyMeX IOP8 event.

Vich, M., Jaume, O., Homar, V. and Romero, R.

Grup de Meteorologia, Departament de Física,
Universitat de les Illes Balears, Palma de Mallorca, Spain

7th European Conference on Severe Storms, Helsinki, Finland, 3 - 7 June 2013

This study compares a limited area model (LAM) ensemble prediction system (EPS), hereafter PV-gradient, whose initial and boundary conditions perturbations are statistically drawn from a climatology of Potential Vorticity (PV) errors with a reference system consisting of an ensemble of dynamically downscaled members from the ECMWF global EPS. The PV-gradient system has shown better skill than a multiphysics EPS for western Mediterranean cyclonic situations associated with high-impact weather phenomena such as heavy rain. The current study compares the performance of these two generation methods for a heavy precipitation case that affected the eastern and southeastern Iberian peninsula.

The ECMWF global EPS, which initial perturbations are based on the dominant singular vectors, has proven its value and skill for the medium range large-scale forecast. The use of this 50+1 members global EPS is fairly popular for the generation of mesoscale LAM EPSs and has become a benchmark for experimental LAM EPS generation methods. The dynamical downscaling is performed with a 4-km ARW-WRF setup, rendering a considerably higher resolution version of the global predictions for the western Mediterranean area.

In this context, we compare the performance of each strategy for the precipitation field on a typical situation of heavy precipitation event in the Spanish Mediterranean, the HyMeX IOP8 event that occurred on 28-29 September 2012. During the event, heavy precipitations occurred in Andalusia, Murcia, Valencia and Catalonia with more than 200 mm of precipitation values recorded in 24 hours. The most affected regions were Andalusia and Murcia with 11 casualties and material losses estimated at 120 M€. The evaluation procedure compares the results of both EPSs against the observed precipitation values provided by raingauges covering these regions.