Plinius Conference Abstracts,
Vol. 10, PLINIUS10-A-00013, 2008
10th Plinius Conference on Mediterranean Storms

Evaluation of a Multiphysics Ensemble Forecasting System applied to Mediterranean cyclones

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The societies of western Mediterranean coastal countries often suffer from heavy precipitations and strong winds. These high impact weather phenomena are mostly due to the cyclones developed over the region. So, in order to improve the short and mid-range numerical forecasts of this kind of events, an ensemble prediction system based on varying physical parameterizations has been developed and tested in the context of the Spanish project PRECIOSO.

The non hydrostatic MM5 mesoscale model has been used to generate the ensemble members. The simulations are performed for a two-day period with a 22.5 km resolution domain (Domain 1 in http://mm5forecasts.uib.es) nested in the ECMWF large-scale forecast fields.

In this study, the performace of the multiphysics ensemble forecasts is tested and compared to an individual member, called control. The test and comparison include a deterministic and probabilistic verification of the precipitation. A wide range of verification methods have been used to achieve this evaluation. Some of these verification methods are the attribute diagram, rank histogram, brier score and ROC curve that describe different quality attributes of the forecast such as reliability, resolution, uncertainty and sharpness. The obtained results show a major improvement in skill of this multiphysics ensemble system over the control member.