An analysis of the 9-12th November 2001 West Mediterranean storm based on PV inversion

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1 Introduction

A sensitivity study to the initial conditions is performed for a high impact cyclonic situation occurred on the western Mediterranean area on 9-12 November 2001. Numerical simulations with the mesoscale model MM5 are driven by a single climatic with 54 km horizontal grid resolution and 48 h forecast length at 0000 UTC 11th November 2001. With a minimum of PV anomalies initially included in the model initial conditions, numerical simulations are introduced, considering for this purpose a large number of PV anomalies related with different thermodynamic aspects of the flow. Statistical indices are used to summarize the results in an objective way.

2 Case description

2.1 Synoptic overview

2.2 PV evolution

2.3 Vertical PV interactions

3 PV anomalies definition

4 Results

4.1 Statistical analysis of the PV-perturbed numerical simulations

4.2 Effects on forecast fields of the PV modifications

3.1 Thermal positive surface anomaly

5 Cyclone evolution

5.1 Cyclone trajectory

5.2 Central pressure

6 Conclusions

- Clear description of the intense syneclonic event on the basis of the PV anomalies structure and evolution.
- The PV effects are oriented over large scale and has vertical distances, the anomalies interacting as a result with each other.
- The surface warm PV anomaly can be treated as a surface warm PV anomaly through the bottom boundary condition of the PV inversion scheme.
- Different PV anomalies influence the forecast fields in different ways, with the greatest effect resulting from the upper level trough configuration, the baroclinic environmental structure and the Atlantic inflow.