



Influence of the upper-level dynamics on the predictability of Mediterranean cyclones and implications for the HYMEX project

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The presentation will explore the benefit that can be achieved from incorporating local potential vorticity modifications into a numerical forecast. The cases under study correspond to severe cyclogenesis which occurred in the Western Mediterranean and which were shown to be very sensitive to the upper-level dynamics.

Corrections of potential vorticity were guided by METEOSAT7 water vapour observations and constrained to the upper-troposphere to only alter the topography of the dynamical tropopause. Using both the French operational global model ARPEGE and the non-hydrostatic mesoscale model Meso-NH, it was found that carefully designed potential vorticity corrections led to a substantial improvement of the simulations both in terms of surface pressure, cloud cover and precipitation forecasts.

The results also suggest that ensemble prediction systems dedicated to the mesoscale should try to also include initial perturbations that follow upper-level coherent structures. Such a methodology could be developed and evaluated in the framework of the HYMEX project.