A tropical-like cyclone over southern Italy: observational and numerical analysis

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In the framework of RISKMED - INTERREG IIIB project, whose overall objective is the weather risk reduction in the central and eastern Mediterranean area, a forecasting system has been implemented for operational weather prediction over south-eastern Italy. The system comprises two different forecasting chains. One is based on the hydrostatic model BOLAM and the non hydrostatic model MOLOCH, using a 1-way nesting procedure. The second is based on the Weather Research and Forecasting Model (WRF), set up with two domains, in a 2-way nesting configuration.

On 26 September 2006, a subsynoptic-scale vortex developed over the Mediterranean Sea and affected south-eastern Italy. The cyclone has been documented by radar maps, Meteosat Second Generation satellite images and surface stations, as well as by numerical weather prediction model (NWP) forecasts. Both the modelling and observational analyses agree in identifying in this small scale cyclone the typical characteristics of a Mediterranean tropical-like cyclone, such as, for example, eye-like features, intense convection around the centre, strong wind, a warm core and high vorticity values.

Model forecasts are able to properly capture timing and intensity of the small-scale cyclone development, although the results show strong sensitivity to the specification of the initial and boundary conditions.

Finally, sensitivity experiments have been performed to analyse the mechanisms responsible for the development and the maintenance of the cyclone over the sea. They show the orographic origin of the vortex on the lee side of the Atlas Mountains. Also, the role of the surface fluxes and of the latent heat release have been investigated.