EMS Annual Meeting Abstracts,
Vol. 6, EMS2009-76, 2009
9th EMS / 9th ECAM

9th EMS Annual Meeting
9th European Conference on Applications of Meteorology
High resolution meteorology
- applications and services

Sensitivity of a Mediterranean 'hurricane' to sea surface temperature

A. Moscatello (1), M. M. Miglietta (2), and R. Rotunno (3)
(1) ISAC-CNR, Lecce, Italy (agata@le.isac.cnr.it), (2) ISAC-CNR, Padua, Italy, (3) NCAR, Boulder, Colorado

The presence of a subsynoptic-scale vortex over the Mediterranean Sea has been documented in southeastern Italy on 26 September 2006. The transit of the cyclone over land allowed an accurate diagnosis of the structure of the vortex, based on radar and surface station data, showing that the cyclone had features similar to those observed in tropical cyclones.

To investigate the cyclone in greater depth, numerical simulations have been performed with the Weather Research and Forecasting Model (WRF). Model results show that the model is able to realistically capture the timing and intensity of the cyclone, identifying in this small scale cyclone the typical characteristics of a Mediterranean tropical-like cyclone. An analysis of the mechanisms responsible for the genesis, development and the maintenance of the cyclone has also been performed, stressing the role of sea surface fluxes and latent heat release in the different phases of cyclone lifetime.

Some sensitivity experiments to sea surface temperature (SST) have been also performed. SST has been uniformly increased (and decreased) all over the Mediterranean Sea by a few degrees. When SST is changed by less than 2°C, model results show that the cyclone depth and trajectory are not significantly affected; on the opposite, the cyclone loses the characteristics of a tropical cyclone when SST is decreased by 5°C, while it becomes much deeper compared to the control run for an SST increase of 4°C. The reasons for such a different behavior are finally discussed.