



Tropical transition of a Mediterranean storm by jet crossing

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The tropical transition of a Mediterranean storm that occurred on 26 September 2006 over southeastern Italy is investigated. The explosive development classified this cyclone as a bomb and its full-tropospheric warm core as a tropical-like storm or medicane. Forecasts at different scales were analyzed to identify the key mechanisms in the explosive development of the medicane. At 96-h lead time, the European Centre for Medium-Range Weather Forecasts (ECMWF) failed to predict the medicane and the associated upper-level trough downstream of the extratropical-cyclone Helene during its extratropical transition. At shorter range, forecasts by both ECMWF and Action de Recherche Petite Echelle Grande Echelle (ARPEGE) were increasingly improved with decreasing lead times. The depth of the medicane was missed, however, because the resolution was too low. Forecasts at kilometre scale were run using the mesoscale model Meso-NH. Verified against in-situ and satellite observations, the Meso-NH forecasts were found to be very sensitive to the initial conditions. Reduced static stability at the southern tip of the upper-level trough determined the convective activity around the pre-existing mesocyclone. The medicane was then formed only if enough vertically developed convection was further enhanced on the left jet-exit region. Otherwise, no tropical transition of the mesocyclone was predicted. This study shows the role of an upper-level jet in explosively deepening a mesocyclone into a tropical storm.