18–22 September 2017, Pula, Croatia
ECSS2017-7

Numerical simulations of a tornadic supercell in the Mediterranean

Mario Marcello Miglietta (1), Jordi Mazon (2), and Richard Rotunno (3)

(1) ISAC-CNR, Lecce, Italy (m.miglietta@isac.cnr.it), (2) Department of Physics. Universitat Politecnica de Catalunya – BarcelonaTech, Barcelona, Spain (jordi.mazon@upc.edu), (3) NCAR, Boulder, CO (rotunno@ucar.edu)

On 28 November 2012, an EF3 tornado developed in southeastern Italy causing one fatality and an estimated damage of 60 M€ . At approximately 1050 LT (0950 UTC), this tornado, which initially formed in association with a supercell thunderstorm over the Ionian Sea, moved inland. The environment where the tornadic supercell developed was characterized by large vertical wind shear in the lowest 1 km of the atmosphere and moderate conditional instability. The WRF-model numerical simulations show that it is possible to reproduce the track, the change in intensity, and the evolution of a simulated supercell thunderstorm similar to the actual one. The genesis of the simulated supercell is due to a combination of mesoscale-meteorological features: warm low-level air advected toward the Ionian Sea, combined with mid-level cooling due to an approaching trough, increased the potential instability; the intense vertical shear favored the possibility of supercell development; boundary layer rolls over the Ionian Sea fed the cells triggered by the orography of Calabria to supply moisture and heat to convection. An unusual feature of the present case is the central role of the orography, which was checked in a sensitivity experiment where the orography of Calabria was reduced. Simulations with modified sea surface temperature show that the thermodynamic changes induced by the positive temperature anomaly during the event enhanced lower tropospheric instability and favored deep convection.