



Tornadoes in Italy: comparative analysis of two Mediterranean tornado hotspots

Elenio Avolio¹ and Mario Marcello Miglietta²

¹ISAC-CNR, Lamezia Terme, Italy (e.avolio@isac.cnr.it)

²ISAC-CNR, Padua, Italy (m.miglietta@isac.cnr.it)

Tornadoes are among the most extreme hazardous weather phenomena. Several recent studies have assessed their important impact also in mid-latitudes European countries. An update climatology of the EF1+ tornadoes in Italy confirms that the central Tyrrhenian (CT) and the South-Eastern (SE) regions of the Italian peninsula represent two of the areas most affected by tornadoes in the Mediterranean.

Two recent works, in particular, analyzed some case studies affecting these two regions: Avolio and Miglietta (2021) studied four tornado-spawning supercells over SE regions, that hit the same (Ionian) areas and that were characterized by similar synoptic conditions; in a more recent work (Avolio and Miglietta, 2022; under review), the same authors performed a synoptic/mesoscale analysis of the main patterns associated to the most intense tornadoes in the CT regions, also analyzing a significant event hitting the surroundings of Rome.

Aim of this work is to propose a comparative analysis between these two tornado hotspots: the possible causes that generate these events in relation to the peculiarities of the two areas are analyzed by using upper air observations, radar images, ERA5 reanalysis, and high resolution WRF simulations. While for tornadoes in southeastern Italy the synergy of orographic forcing and air-sea interaction in a strongly sheared environment appears fundamental, in the Tyrrhenian regions the genesis is mainly related to the presence of convergence lines over the sea.