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Conference on European Tornadoes and Severe Storms

Deep convection over Northern Italy: synoptic and mesoscale processes

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Severe storm outbreaks, some of them supercell storms, over Northern Italy's Po Valley are examined from a synoptic and mesoscale perspective. Early summer circulation with heavy synoptic forcing in the Alpine area induces marked instability conditions south of the Alps with distinctive patterns at all levels (Cacciamani *et al*., 1995). In June-July fronts sweep the area from NW generally after a few days of relatively weak synoptic forcing: heat and humidity accumulation at low levels are favored by the scarce circulation within the Valley with a resulting increase of the potential instability of the air mass. The frontal passage releases the energy and pre-frontal and frontal storms are often observed with various degrees of severity (Alberoni *et al*., 1996). The steep Alpine orography plays a key role in determining favorable conditions for downwind storm development: 1) cyclogenesis or low pressure deepening, and 2) mountain drag or low-level blocking of the frontal structure. The typical vertical structure of such events shows a strong wind shear with a sharp jet of about 100 knots at 250 hPa. An inversion around 700 hPa with dry air aloft characterizes some of the observed cases. High resolution mesoscale analysis is conducted using the Local Analysis and Prediction System based on conventional and remote sensing data sources, including Doppler radar and satellite imagery. The resulting fields contain a high degree of information that are used as a tool for deep convection identification. Supercell features are documented by Doppler radar analysis (Alberoni *et al*., 1998). Polarimetric measurements allow for hailshaft positioning.

References

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