

The Messina Flood of 22nd November 2011

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▲ Figure 1

On the 22nd November 2011, intense and persistent rain affected the province of Messina in Sicily - especially the areas along the Tyrrhenian coast - and Calabria in the south of the Italian mainland. The municipalities most affected were Saponara, Villafranca Tirrena, Rometta and Barcellona Pozzo di Gotto (Fig.1), with 4 dead and about 700 displaced persons (data from Protection Civile). Strong convective precipitation fell in these areas, with hourly precipitation amounts of the order of 60-100 mm, and total cumulative values around 150 mm (data from the observational network and the Civil Protection rainfall network).

The event was associated with a so-called V-shaped storm (named after the shape of the convective system) within a baroclinic area, a deep cyclonic circulation at high altitude, combined with a significant warm anomaly in the lower layer, activated by strong sirocco winds. The 500 hPa Potential

Vorticity and the wind at 300 hPa on November 21st showed a large anomaly in the dynamic tropopause over the Strait of Sicily 24 hours later, with a jetstreak further south between Tunisia and Libya (see Fig. 2).

The precipitation forecast by the ECMWF model and COSMO ME gave a clear signal for very high values over small spatial scales equivalent to a maximum of 60 mm (ECMWF) and 220 mm in 12 hours (COSMO ME; see Fig. 3) These values were extremely localized on the Sicilian Ionic coastal area and did not give similarly strong signals for Calabria.

The evolution of weather conditions on the evening of Monday 21st and the morning of Tuesday 22nd confirmed the risk of strong convective activity in Sardinia, and the localised nature of precipitation forecast for the island by the models compares well with the actual precipitation distribution.

On Sicily, however, the shift of the anomaly in the altitude over the intense southern moist, flow allowed the development of a supercell (V-shaped

storm), which had its southern peak in Messina and spread to Calabria, as is clear from the composite satellite/radar/lightning image in Fig.4.

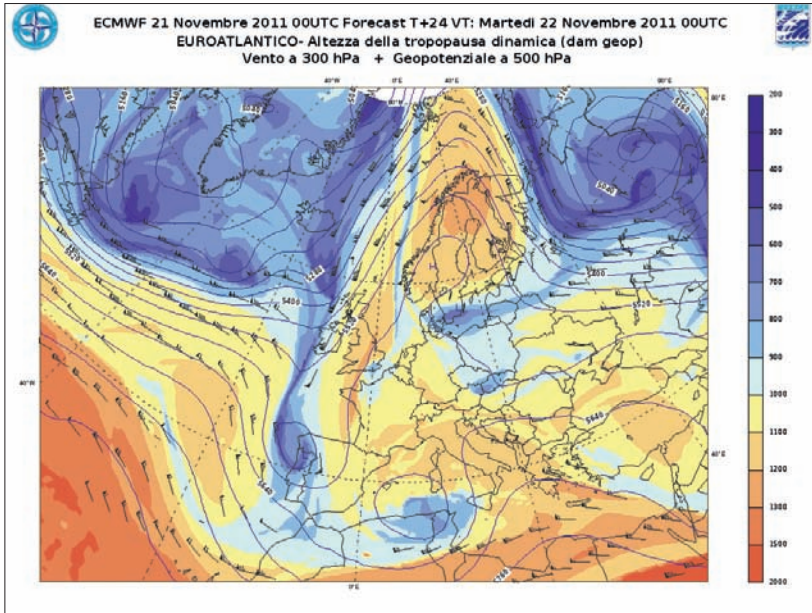


Figure 2

Figure 3

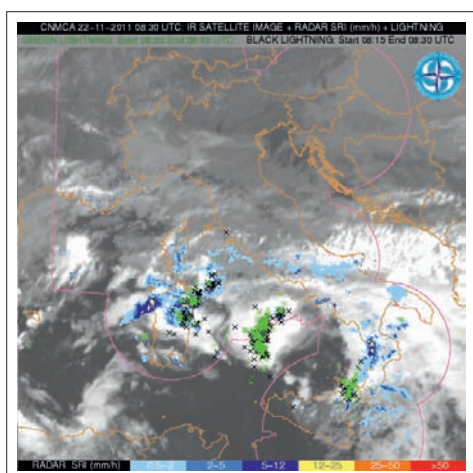
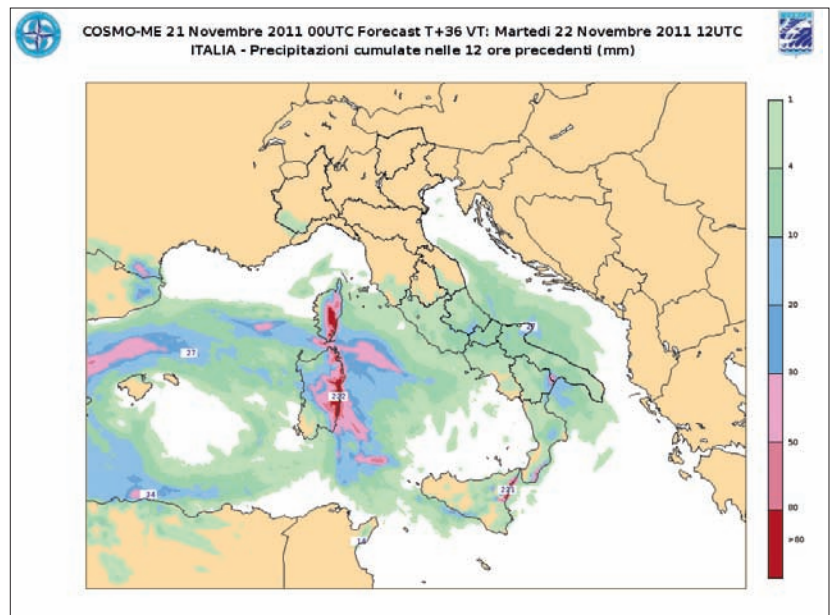


Figure 4