An observational and numerical analysis of a heavy rain event over south-eastern Italy.

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A flash flood episode affecting a small area in Apulia region (south-eastern Italy) has been documented on 22 October 2005. A rainfall of 160 mm has been recorded in a 6-hour interval in the central part of the region, producing severe damages and causing six fatalities. Synoptic maps, observations from surface stations and remote sensing data are used to describe the evolution of the system. The analysis of the vertical profiles suggests that the small hills in the centre of the region play an important role in the release of the instability and the localisation of the rain.

Numerical simulations have been performed to understand the mechanisms responsible for the heavy rain event. The Weather Research and Forecasting Model (WRF) has been setup in a 2-way nesting configuration including two domains. Model results show that the model is able to realistically simulate the evolution of the system and to capture pretty well the localisation, the amount and the timing of the rainfall, although a strong sensitivity to the specification of the initial conditions is apparent. Finally, some sensitivity experiments have been performed to evaluate the role the surface sensible and latent heat fluxes for the development of the system.