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## Application of the MM5 and the analogous method to heavy rainfall event, the case of 16–18 October 2003 in Catalonia (NE Spain)

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**Abstract.** Between the 16 and 18 October 2003, some amounts of precipitation greater than 225mm and sea waves higher than 8.5m were recorded in Catalonia (NE Spain) and near its coast. Some rivers in the NE of the region were overflowed and the sea swell produced several damages near the coast. In order to analyse this case and to improve the forecasting of events like this, two methodologies have been applied: one deterministic and another one, probabilistic. The deterministic analysis has been made by using the MM5 mesoscale model. A 48 h simulation has been designed for three domains connected with two way nesting and having 54, 18, 6 km horizontal grid resolution and vertical resolution of 23 levels, and it has been initialised with the NCEP Analyses. The simulation suggests that orography played an important role on the precipitation generation (maxima were located where the wind at low levels impinged on the mountain ranges perpendicularly). The strong pressure gradient produced in the North of Catalonia and West part of the Gulf of Lyon, was the responsible of the great marine alteration. On the other hand, the 6 km resolution precipitation forecast for Catalonia is accurate, since it shows a spatial distribution and amounts quite similar to the observations obtained from 315 automatic rain gauges. The analogous technique applied here, considers the meteorological situations similar to the current one, in terms of the 850 and 1000 hPa geopotential fields at 00:00 UTC and 12:00 UTC from the NCEP/NCAR meteorological reanalysis for the period 1958–2003. Two windows have been considered, the first one from 60° N to 30° N and from 30° W to 30° E, and the second one, centred in Catalonia, from 45° N to 37.5° N and from 5° W to 10° E. The best 100 analogous have been selected and the comparison of the results with those obtained for other heavy rainfall events has been also done.

Full Article in PDF (PDF, 3408 KB)

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