

# **Numerical study of orographic influence on convection initiation**

**A. Buzzi**, S. Davolio and P. Malguzzi

Institute of Atmospheric Sciences and Climate, ISAC-CNR, Bologna, Italy,  
(A.Buzzi@isac.cnr.it)

Orographically induced convection can produce intense local floods, especially when the orography favours the persistence of mesoscale convective systems (MCS) in a restricted area. In one of the most severe floods that inspired this work (Gard basin, 8-9 Sept. 2002), the orography of the Massif Central favoured the onset and maintenance of the MCS at some distance upstream of the main orographic slope. In this study based on numerical experimentation using the MOLOCH convection-resolving model, the initial atmospheric conditions have been largely idealized, taking horizontally uniform conditions for wind, temperature and humidity profiles. Isolated orography of different shapes and height has been introduced in the model. Convective systems are initiated embedded in a quasi-stationary solution of flow over the orography.

The numerical experiments have been designed in order to better understand the complex mechanisms of upstream orographic influence on the convective life cycle, as a function of the environmental profiles and, in particular, of the orography characteristics. The triggering of convection occurs preferably near or within the convergence area upstream of the orographic obstacle, when the height of the mountain is sufficiently large. The intensity and movement of the MCS also depend on the topography properties.