For Details, Contact:

V. Ducrocq

CNRM, Météo-France
42,Ave Coriolis,
31057 Toulouse, France
Tel: 33 561 07 96 02
Email: Veronique.Ducrocq@meteo.fr

Conference on European Tornadoes and Severe Storms

Experiments of fine scale prediction of mesoscale convective systems over France

V. Ducrocq, J.-P. Lafore, J.-L. Redelsperger, C. Cibot and F. Orain, CNRM-GAME, Météo-France, Toulouse, France.

The purpose of the presentation will be to describe experiments of fine scale numerical prediction of mesoscale convective systems, with emphasis on the precipitation forecast.

In order to obtain more realistic prediction, we address the problem of the initialisation of the fine scale models with real data. Our approach consists in introducing more fine scale observations in the initial state of the numerical simulations. The observations arise from the French operational network: a surface observation mesonet with stations approximately 30 km spaced, radar reflectivities with 1 km2 pixels and Meteosat imagery with a 6 km2 spatial resolution. A mesoscale (OI) analysis incorporates the surface observations while the radar reflectivities and the METEOSAT imagery are used to adjust the vapour mixing ratio, the rainwater and the snow variables.

This initialisation procedure has been applied to three different cases of French mesoscale convective systems; two of them formed over flat areas while the latter developed over the Massif Central. All the cases were remarkable for their associated observed surface precipitation. For the 4 august 1994 case, the surface rainfall was not exceptional by its total amounts but by its intensity. For the 13 May 1998 case, the surface rainfall reached locally 70 mm, inducing floods. The 13 October 1995, a quasi-stationary system over the south-eastern France led to surface rainfall amounts of more than 100 mm in several places.

. . . . . more

The numerical simulations have been performed with MESO-NH (Lafore et al, 1998), using a 2.5-km horizontal grid size and prognostic equations for five hydrometeor species (cloud water, rainwater, primary ice, graupel, snow). The simulations start one hour after the first radar echo, so that the initial state contains the signature of a one-hour-old convective system. In the three cases, the model succeeds to simulate convective systems during the next hours. Moreover, the model reproduces the type of organisation of the convection: a line organisation for the former case, several convective systems stretched along the tropospheric flow for the second case, a quasi-stationary system for the third case. Model results will be discussed at the conference with respect to the different behaviour of the convective systems. Detailed comparisons with the observations, and especially of the precipitation fields, will also be presented at the conference.