A STUDY OF CONVECTIVE PARAMETERS WITH WRF MODEL IN A SEVERE THUNDERSTORM WEATHER

Ying Zhang[1,2], Claudio Cassardo[2]

[1] *Jiangxi province Meteorological Bureau, Nanchang, People's Republic of China*

[2] *Department of General Physics "Amedeo Avogadro", University of Turin, Turin, Italy*

I. INTRODUCTION

In the 2006, from 06 UTC of April 11th to 12 UTC of April 12th, a series of severe rainfalls were observed over the Jangxi province. This event has been simulated using the Weather Research and Forecasting (WRF) model, version 2.1.1, driven by the analyses of a global model. In this article, the attention has been focused on the convective indices such as CAPE, NCAPE, CIN, SWEAT, SRH, EHI.

II. METEOROLOGICAL ANALYSIS

The severe meteorological conditions occurred over the Jiangxi province during 11-12 April 2006 was mainly determined by the contrast of two completely different air masses. From one hand, a strong south-western air stream brought moist and unstable air in the lowest layers. On the other hand, an intense cold front moved southwards from northern China, bringing cold and dry air over the region.

III. NUMERICAL SIMULATION

In this simulation, two-nested domains with 2 different horizontal grid sizes have been used: 50 km (DM1) and 16.6 km (DM2). 30 vertical layers have been selected, with the model top at 100hPa. We choose as initial and lateral boundary conditions for DM1 and DM2 the NCEP global final analyses on $1^\circ \times 1^\circ$. The simulation results have been exported once every hour.

IV. THE ATMOSPHERIC CONVECTIVE PARAMETERS

Using the output data of the simulation, some atmospheric convective parameters have been calculated.

From the results of simulation, all above parameters show a good correspondence with the severe weather processes. The increasing of these energy-related parameters can effectively indicate the occurrence of severe weather. In addition, the spatial distribution of these parameters also has a good significance for the prediction of severe weather.

V. CONCLUSION

1) WRF can reproduce the main structures of the observed synoptic pattern, regarding both its temporal and spatial distribution

2) The north dry and cold air in upper layer and the intense convergence of warm and humid air at lower layer were responsible for the unstable stratification.

3) All of the indices should be considered synthetically with wind shear. It will produce a better indicating significance. Concerning the vertical distribution of CAPE, especially on 850hPa, it is more reasonable.

4) EHI has synthetically considered with CAPE, CIN,SRH, which is favorable to distinguish the types of severe weathers.

VI. REFERENCE

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