



Impact of the back scatter kinetic energy on the perturbation of ensemble members for strong convective event

Jakub Guzikowski

Institute of Geophysics PAS, Atmospheric Physics, Warsaw, Poland (jguzikowski@igf.edu.pl)

Complex scale of processes in the atmosphere have strong influence on the quality of the numerical weather forecast. Application of the ensemble forecasts system allows to minimize errors dictated by this unavoidable sources. However, problem with multi - scale of energetic flow in the atmosphere is still current. Now energetic cycle is only considered in a global scale and a dissipation of the kinetic energy is generalized to disappearance caused by friction in a molecular scale. This approximation have strong influence on reliability of the mesoscale and regional weather predictions. Above issues are strongly outlined during convection events where energy outflows are poorly represented by NWP models.

In order to minimize above problems, a stochastic backscatter kinetic energy (SKEB) for sub – grid scale energetic fluctuations is used. The main goal of SKEB is representing the model uncertainty due to the interaction between unresolved scale.

In this project potential impact of SKEB on perturbing ensemble members in ensemble system is considered. To achieve this, a high resolution short range ensemble forecasts system was created. The ensemble system is based on nine WRF's models perturbed by SKEB. WRF models have 35 vertical levels and 2.5 km x 2.5 km horizontal resolution. For a test, a case with heat wave and convective weather conditions in Poland area from 23th July to 1st August 2013 was selected. From 23th July to 28th July 2013 temperature oscillated below or above 30 Celsius degree in many meteorology stations and a single deep convection was developed. On 29th July 2013 an advection of cold air masses was recorded in the area of Poland, which causes strong convection event with mesoscale convection system (MCS). MCS caused local flooding, a damage to the transport infrastructure, buildings, trees, several injuries and direct threat of life. In a comparison of the meteorological data from ensemble system with the data recorded on 74 weather stations localized in Poland and a reanalyses data from Erainterim was conducted. Finally, obtained result will be presented.