Geophysical Research Abstracts, Vol. 8, 01693, 2006
SRef-ID: 1607-7962/gra/EGU06-A-01693

The fine-scale precipitation structures of a cold front observed by high resolution radar and the problem of representativeness error

S.Ivanov, Y.Palamarchuk

Odessa State Environmental University, Ukraine (svvivo@te.net.ua / +38 048 746-7339)

This work mainly considers two related factors that affect the quality of data and their merging in model simulations: the resolution of networks/grids and representativeness error. The case studies of a cold front with the use of high resolution (125 m) radar data allow us to obtain the temporal and spatial characteristics of precipitation structures on fine scales. The spectra obtained along the front line show a descending pattern with significant high-frequency peaks at approximately 1 km or less. The resolution of existing numerical models is normally coarser than the fine-scale structures captured by radar. This resolution inconsistency makes direct comparison of the observations and the model fields in a point-by-point manner impossible. Both informational sources should be weighed taking into account the representativeness error. This term means that the given value of an atmospheric property at the grid point should be derived from the resolved scales only and free from smaller-scale impact, i.e. the noise, which causes representativeness error. Such approach is especially important for the processes and fields whose spectra are descending (red), which is the case with the atmospheric processes. The assumption that the observation error is a composite of two parts, the instrumental and representativeness ones, is explored for two data types: (i) the data sets whose instrumental error complies with the Gaussian statistics, and (ii) indirect observations that may have a potential instrumental bias.

Acknowledgement: These researches are a part of cooperation work with the Meteorological Institute University of Bonn, Germany, which kindly provided us with the high resolution radar data, and performed within the framework of the NATO SfP project "Extreme precipitation events".