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# Vertical cross section coupling analysis of the flood event situation from the summer 2004 in eastern Slovakia with numerical model ALADIN

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In the previous study: *Coupling Data Influence to the ALADIN Model Forecast in an Extreme Synoptic Situation [Acta Met. Univ. Comenianae: Vol. 33, 2004]* was the influence of the change of space-step and the size of the domain of the limited area model (LAM) on the accuracy of precipitation field forecast analyzed.

In comparison with the above-mentioned study, where the horizontal meteorological fields were analyzed, in this paper the vertical structure of the meteorological fields with dependence to the formulation of lateral boundary condition (LBC) is presented. The case of serious flood events that occurred during the summer 2004 in the area of eastern Slovakia was analyzed by using the spectral 3D ALADIN numerical model. Several domains with different geometry (in this case with different spatial resolution and different size of the domain) as well as the implementation of multiple nested models were used. Thus an attempt to assess the influence of the model resolution in individual domains and the quality of LBC in nested LAM (in this case it is the shape of the relaxation function in coupling zone) to the final forecasted vertical cross sections was demonstrated. From the previous experience on understanding and improvement of model forecast, also the vertical dependence of meteorological quantities with data coupling starts to play important role. Considering the prior precipitation analysis, the attention is aimed at vertical velocity, relative humidity, terrain, instability etc. which dominantly impact the accuracy of the precipitation forecast.

Two main requirements on coupling scheme, i.e. to transfer the signal entering LAM-domain from driving to the nested model and to absorb the signal leaving LAM-domain in the nested model, were tested.

For the forecast verification the real data from aeorological stations were used.


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