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# Assessing the Influence of Lateral Boundary Conditions in Limited Area Numerical Weather Prediction Modelling for the Territory of Latvia

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Increase in available computing power has allowed even more research centres to begin work on atmospheric modelling and Numerical Weather Prediction (NWP). When Limited Area Models (LAM) are used, the possible influence of boundary conditions must be taken into account for sufficient analysis of the modelling results. However, there is no universally applicable approach and the analysis must be performed for each domain setup.
The Weather Research and Forecast (WRF) model [1] is currently used in University of Latvia for research in NWP. The region of interest is the territory of Latvia that is situated in the North-Eastern part of Europe and on the Eastern shore of the Baltic Sea. The terrain is relatively flat (highest elevation $\sim$ 300 m ASL). The climate of Latvia is hemiboreal (Dfb) according to the Köppen classification. In the winter the climate is strongly influenced by mid-latitude cyclones. The target computational domain covers the territory of Latvia with the resolution of 3 km (301x301 grid points) and is nested in a lower-resolution outer computational domain.
The aim of this study is to assess the uncertainty that is caused by the choice of the computational domain and consequently the influence of the applied boundary conditions. Due to the limited computational resources selected events characteristic of different meteorological conditions are chosen for investigation. Several aspects are analysed such as: (1) domain sizes (2) positioning of the domains (with the aim of better cyclone description) and (3) boundary condition data sources (4) influence of the model spin-up times. The results are compared with the surface meteorological observations from the Latvian Environment, Geology and Meteorology Centre (LEGMC) observational network.

References:
[1] Skamarock, William C. and Klemp, Joseph B. A time-split nonhydrostatic atmospheric model for weather research and forecasting applications. Journal of Computational Physics. 227, 2008, pp. 3465–3485.