

ALARO-Climate: regional climate model with a very high resolution being developed in the Czech Republic

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We present the national project of the development of a regional climate model (RCM) with a very high resolution, which is funded by the Czech Science Foundation, and its first results. The RCM, ALARO-Climate/CZ, is being developed from the numerical weather prediction model ALARO, which is operationally run at the Czech Hydrometeorological Institute. It is intended to operate at the spatial resolution of 4 to 7 km, while keeping its ability to be executed at a common contemporary resolution of 20 to 50 km. The model utilizes the semi-implicit semi-Lagrangian advection scheme and is based on the hydrostatic approximation. Both direct coupling and double nesting with driving data will be considered in its implementation. The increased resolution together with the state-of-the-art physical parameterizations, including the improved simulation of the water cycle, turbulent transport, and radiation transfer, adapted from and developed within the contemporary numerical weather prediction practice, are expected to bring improvements in the information quality of the fine scale obtained by the model. The ALARO-Climate/CZ model is intended to produce high-resolution data required in climate change impact studies in the sectors of hydrology, air pollution, agriculture, and forestry. Given the very high resolution and advanced physics of the ALARO-Climate/CZ model, it may become a very useful tool for climate change analyses of the local severe weather phenomena, such as local heavy rain and flash floods.