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High resolution experiments with the ALADIN-Climate regional climate model

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The global climate models are able to describe the climate of the Earth at a rather coarse resolution providing realistic projections only for the synoptic scale characteristics of the climate. For this reason, they are insufficient for detailed regional or local scale estimations. However, impact studies and policy makers need simulations including all the effects caused by local features. Consequently, techniques for downscaling global climate model simulations – such as regional climate modelling - are essential.
The ALADIN-Climate regional climate model (developed by Météo France on the basis of the internationally developed ALADIN modelling system) was adapted at the Hungarian Meteorological Service a few years ago. In the framework of the CECILIA project (www.cecilia-eu.org), the ALADIN-Climate regional climate model runs at high (10 km) horizontal resolution. Therefore, it is anticipated to give more realistic climate estimation for this century than either the global models or the lower resolution regional climate models.
The ALADIN-Climate model was coupled to both ERA-40 re-analysis data and the ARPEGE/OPA global atmosphere-ocean general circulation model for the past - 1961-1990 - as the reference period. For the future time slices of 2021-2050 and 2071-2100, the lateral boundary conditions were provided by the same global model with the use of A1B SRES scenario.
The results have been validated against different observational datasets for the past, and have been compared to the results of the ARPEGE-Climat global model in order to expose the added value of the regional climate model. The ALADIN-Climate model has also been evaluated for the future to give an estimation of climate change in the Carpathian Basin.