A new generation of the regional climate model REMO: REMO non-hydrostatic

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The regional climate model REMO is well established and has proofed it's value in regional climate simulations for more than a decade. However, due to the hydrostatic formulation REMO is not able to produce useful regional climate information on scales smaller than ~10 km. The demand for higher resolution data especially in the climate service sector is evident. Often climate change information on urban district or even point level is needed. A previous development of a non-hydrostatic dynamical core for REMO utilizing ideas of Miller and Pearce (1974) and Janjic (2001) has been picked up and implemented into the latest hydrostatic REMO version. One of the advantages of the Janjic formulation is that hydrostatic and non-hydrostatic computations are well separated. This offers a straightforward implementation of the non-hydrostatic calculations into an existing hydrostatic model. Other advantages are the easy quantification of the error done by the hydrostatic approximation and the lower computational costs at lower resolutions by switching of the non-hydrostatic part. We will show results from climate simulations on the EURO-CORDEX domain with and without non-hydrostatic option.