



## **Validation of ALARO-0 within the EURO-CORDEX framework.**

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Validation with respect to observations of Regional Climate Models (RCMs) forced by re-analyses is an important phase in the process of making climate projections. Within the EURO-CORDEX framework, different research groups have performed such simulations and results were summarised in Kotlarski et al., 2014. Recently, the Royal Meteorological Institute of Belgium has used the model ALARO-0 to simulate the past climate using ERA-INTERIM as boundary conditions on both the high and low-resolution EURO-CORDEX domain. Important here to note is that the used code of ALARO-0 was in no way 'tuned' towards a 'climate mode' but that all settings and parameters were identical to those used in the operational NWP version. Also, it was the first time ever ALARO-0 was run in a continuous way for several years, instead of short runs of a few days.

Kotlarski et al. analyse an ensemble of 17 RCMs using a set of metrics for different European regions for monthly mean values of 2-meter temperature and precipitation. The same scores are calculated for the ALARO-0 simulations and compared to the existing ensemble. Results show that ALARO-0 has some difficulties in predicting 2-meter temperature and is on a number of occasions outside of the ensemble of scores. For precipitation however, ALARO-0 almost always either lies within the existing ensemble or is the best performing model. This could be attributed to the new and improved convection scheme that was used. Given the exploratory nature of the simulations, the comparison with other models, often with an extensive history of research and adjustment, was satisfactory.

Furthermore, Kotlarski et al. calculated scores based on the 20-year period 1989-2008, while the simulations with ALARO-0 include the 32-year period 1979-2010. For both periods, a bootstrapping procedure was used to determine the uncertainty on every score. Results show that for some metrics the scores for the 20-year and 32-year period do not significantly differ and that the calculated uncertainty intervals are much smaller than the total ensemble spread. This indicates that the 20-year period used by Kotlarski et al. is sufficient to compute reliable scores. For other metrics, more specifically those which assess inter-annual variability, the bootstrap intervals often span the complete ensemble, indicating that uncertainty on the scores is large due to the short period which is assessed.