



## Investigation of the uncertainties in regional climate modelling

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Ensemble simulations are a useful tool to estimate forecast uncertainties in model simulations. However, it is not straightforward to construct an ensemble that gives a good estimate of this uncertainty. Many methods exist to cover uncertainties due to internal variability or structural uncertainty coming from the model formulations itself. In the case of limited area models internal variability is, on the one hand, strongly depressed by the boundary conditions coming from a large scale forcing (at least on small domains with less than 100x100 grid boxes). On the other hand, a new problem of uncertainties in the boundary conditions comes into play. This can either be due to the position of the model domain over the target area or due to uncertainties in the driving fields. In this paper an overview over all these different types of uncertainties associated with a limited area model will be given. Therefore, one control run and different sets of ensemble runs covering the discussed types of uncertainty were performed. All simulations were carried out with the regional climate model REMO with a horizontal resolution of  $0.5^\circ$  ( $\sim 55\text{km}$ ) and a domain size of 81x91 grid boxes on 20 vertical levels. They have been performed over 10 years (1979-1988) and were forced by ERA-40 Reanalysis data at the lateral boundaries. Results for near surface temperature and precipitation will be shown. A short discussion on the relative importance of these uncertainties in regional climate simulations will be given.