

Assessing the performance of high resolution climate hindcasts over the Alpine Region

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The increasing demand for high-resolution climate datasets has fostered a large number of regional initiatives in particular with regard to climate impact related studies. This paper reports on results from the project Research for Climate Protection: Model Run Evaluation (reclip:more), conducted by five Austrian research institutions. Specifically, the performance of two sets of high resolution (~ 10 km) climate hindcasts for the period 1981 to 1990 will be assessed over the Alpine region. These simulations serve as control for future scenario runs for the timeslice 2041 to 2050. The regional models applied are MM5 in a climate configuration using a double-nesting strategy and the single-nested ALADIN model operated in downscaling mode with daily reinitialization of the atmospheric fields. Coupling data are derived from ERA40 reanalyses for the reference simulations and from ECHAM5 (T106) simulations for both the hindcasts (i.e., control) and scenario runs.

The main focus of this paper is the comprehensive evaluation of the high resolution hindcasts as a necessary prerequisite for the interpretation of predicted regional climate scenarios. The comprehensive evaluation of the reanalysis-driven simulations is the basis for assessing the suitability of the ECHAM5-driven runs as control simulations. The observational information used for the comparisons includes high-resolution surface analyses from the Vienna Enhanced Resolution Analysis (VERA) system, gridded precipitation datasets (i.e., the HISTALP dataset; Auer et al. 2006, Efthymiadis et al. 2006) available for the Alpine region as well as radiosonde data taken from the Comprehensive Alpine Radiosonde (CALRAS) dataset. The evaluation domain is divided into subregions enclosing the Alps to assess the spatial variability of the hindcasts in particular with regard to potential benefits (or drawbacks) of high resolution (i.e., ~ 10 km) simulations. Preliminary evaluation results for precipitation are encouraging.