



Regional climate modelling focussing the Eastern Alps - comparison of 2 RCM's, model setup, parameterization and sensitivity analysis – 1st results

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The 3-year project “Research for Climate Protection: Model Run Evaluation” (reclip:more) is a cooperation of five academic and research institutions in Austria (ARC - Systems Research, Vienna University: Institute of Meteorology and Geophysics, University of natural resources and applied Life sciences Vienna, Institute for Meteorology, Central Institute for Meteorology and Geodynamics, and Graz University, Inst. for Geophysics, Astrophysics, and Meteorology).

The major goal of the project is to provide future regional climate scenarios for Austria at mesoscale and microscale resolutions by applying regional climate models (RCM) and statistical downscaling methods and to evaluate the capability of the applied models and methods to create climate scenarios for the Alpine region. The goals besides providing climate scenario data are – to quantify the uncertainties of regional climate simulations related to observed climate data, and to investigate the sensitivity of regional climate simulations and interpolated climate data to the influence of various model parameters.

Two regional circulation models - the ALADIN and the MM5 model - will be driven by ERA-40 reanalysis data and by ECHAM5 global circulation model (GCM) results, representing current (1981-1990, 1999) and future (2041-2050) climate to accomplish dynamical downscaling from the coarse GCM resolution (spectral truncation T106, i.e. ~ 120 km horizontal resolution) to 15 km. Further downscaling to 1 km resolution will be carried out by statistical methods. The Model validation tasks will provide a benchmarking of the 2 regional climate models.

Within the first year of the project, tests were performed to optimize the setup (domain setting, vertical and horizontal resolution, etc.) and the physical parameterizations. Then several sensitivity studies at selected episodes (~ 14 days length) were carried out, to test the possibilities and limits of the two models. In order to examine the effect of different soil-vegetation models, one year model runs of the 2 models were recently applied.

Sensitivity tests are forced by ERA40 reanalyses and compared with gridded observation data at the surface with “Vienna Enhanced Resolution Analyses-Model” and the “Mesoscale Alpine Programme” -precipitation data set) and in the free atmosphere by radiosonde data “Comprehensive Alpine Radiosonde Data Set” – CALRAS. Deviations between the models results and observation are assessed by several statistical

measures and figured out in Taylor-diagrams

Further downscaling of the model results were derived for a horizontal resolution of 1 - 5 km for temperature, precipitation and solar radiation by statistical methods, with the help of terrain-related response variables, and for near-surface-wind by dynamical downscaling via MM5-equations.