Regional Studies with COSMO-CLM over Siberia

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Siberia, a vast landmass extending from the arctic, subarctic to temperate northern latitudes of Russia, is largely underlain by permafrost and characterised by one of the most continental climates on earth. In this region temperature rise have been among the most pronounced globally with profound and spatially variable impacts on frozen ground and snow cover.

In order to represent these spatial details as well as to obtain realistic ground and atmospheric data, we use the regional climate model COSMO-CLM (CCLM). A good representation of soil column resolution and snow treatment is needed. Therefore, we test the capability and limitation of the current model configuration in reproducing the present-day air temperature, precipitation and soil temperature in its temporal and spatial characteristics. Then, this data is compared with 10-year test runs using the multi-layer snow model and additional soil layers up to a total soil depth of 92 m in the soil model. For the integration period of 1990-1999 boundary conditions are taken from the NCEP-1 Reanalysis of the National Centers for Environmental Prediction. The model domain covers an area in Siberia of approximately 45° N - 85° N and 70° E - 140° E with a horizontal resolution of $\sim$ 50 km.

First simulations indicate a strong warm bias in winter months of the CCLM-simulations over the whole model domain compared to observation data. Using the multi-layer snow model this bias can be reduced.