Project: **937**

Project title: **Influence of land-use transformations on local and regional climate in Germany**

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Convection-permitting simulations were carried out with the regional climate model COSMO-CLM with a tested configuration based on COSMO-DE over the ALP-3 domain in Europe. The CCLM model version used was CCLM5-0-15. The evaluation simulation was forced with ERA-Interim reanalysis data for the period 1999 to 2015, where the year 1999 was for model spin-up. The historical simulations were conducted from 1993 to 2005, where the first three years were for model spin-up. Furthermore, future simulations are ongoing based on MPI-ESM-LR RCP8.5. All of the simulations are direct downscaling experiments. No intermediate nest is applied. The results compared to simulations using multiple nesting-steps reveal minor discrepancies in spatial structure and value. No obvious unphysical behaviour is seen. Figure 1 and Figure 2 demonstrate comparison results between direct downscaling and downscaling with one intermediate nest for the evaluation and historical period. These results give confidence to avoid the intermediate nesting step and directly downscale to the high horizontal resolution using a convection-permitting configuration reducing computing time intensively for long-term climate projections. First results are currently CMORized.

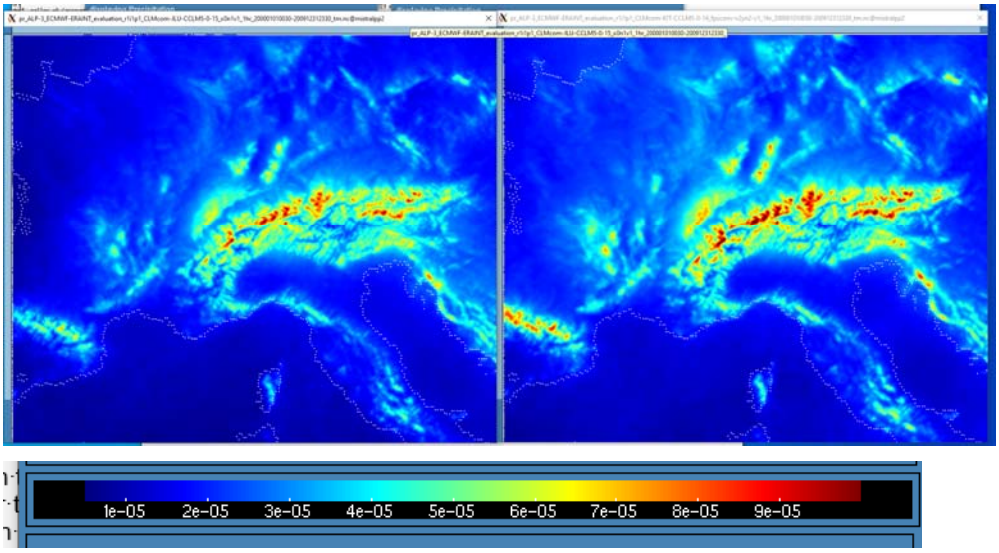


Figure 1: Time-averaged hourly precipitation of the evaluation simulation at 3 km horizontal resolution from 2000 to 2009 for direct downscaling (left) and downscaling with one intermediate nest (right). Data with intermediate nest is courtesy of KIT.

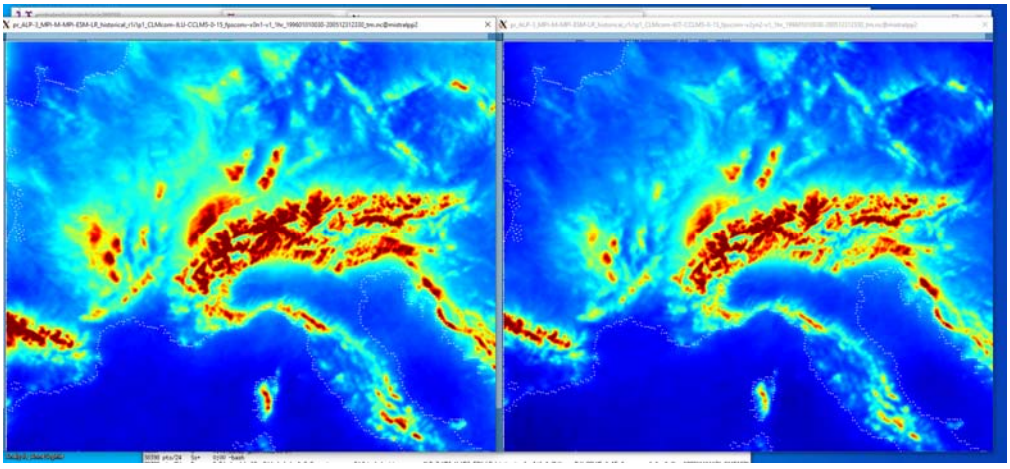

Figure 2: Time-averaged hourly precipitation of the historical simulation at 3 km horizontal resolution from 1996 to 2005 for direct downscaling (left) and downscaling with one intermediate nest (right). Data with intermediate nest is courtesy of KIT.