

Project: **1118**

Project title: **DyKliLand**

Principal investigator: **Merja Toelle**

Report period: **2019-07-01 to 2020-06-30**

The project started on the first of November 2019 which is two months later than planned before. Therefore, we could not do as many simulations as desired.

We started with the evaluation simulation forced with ERA5 reanalysis data. To overcome computational resource issues we are revisiting the rule of thumb for dynamical downscaling. Therefore, we directly downscale to the final high horizontal resolution grid without interim nesting steps. This procedure has proven to be successful in the frame of CORDEX FPS Convection for specific weather events (see Coppola et al. 2018), where the administrator of this project is a co-author. In that study we used ERA-Interim reanalysis as forcing data. Now, we directly downscale ERA5 reanalysis data to the final high horizontal resolution grid for a longer time period.

Unfortunately we have to redo the downscaling experiment forced by ERA5 reanalysis data. The climatological seasonal mean of daily precipitation field shows a discrepancy to the HYRAS observational precipitation data from 1980 to 1989 (see Figure 1). Several testings and further investigations could not resolve this problem. Finally, we got the feedback that no wind components of ERA5 were available before the year 2000. The further derived wind components out of vorticity and convergence are not correct and lead to the different patterns seen in our simulation. The U and V components are now available at DKRZ, and simulations need to be redone.

Summary of next steps:

1. We will use existing model runs as a reference.
2. We will perform high resolution runs over the desired study regions only.
3. We will combine our efforts with the other project we are running to avoid repetitions.
4. We identify specific global model runs

Coppola, E., S. Sobolowski, E. Pichelli, F. Raffaele, B. Ahrens, N. Ban, M. Belda, D. Belusic, U. van Bert, R. M. Cardoso, S. Davolio, A. Dobler, J. Fernandez, L. Fita Borrell, Q. Fumiere, K. Goergen, I. Güttler, S. Kartsios, E. Katragkou, L. Kendon, S. Khodayar, S. Knist, A. Lavin, T. Lorenz, D. Maraun, L. Marelle-Sebrechts, J. Milovac, H.-J. Panitz, M. Piazza, T. Raub, C. Schär, K. Sieck, P. M. M. Soares, S. Somot, P. Stocchi, C. Teichmann, M. H. Tölle, L. Torge, H. Truhetz, R. Vautard, H. de Vries, K. Warrach-Sagi, F. Giorgi, 2018: The CORDEX FPS on convective phenomena at high resolution over Europe and the Mediterranean: work plan description and preliminary results, Climate Dynamics, DOI: 10.1007/s00382-018-4521-8

Summer 1980-1989

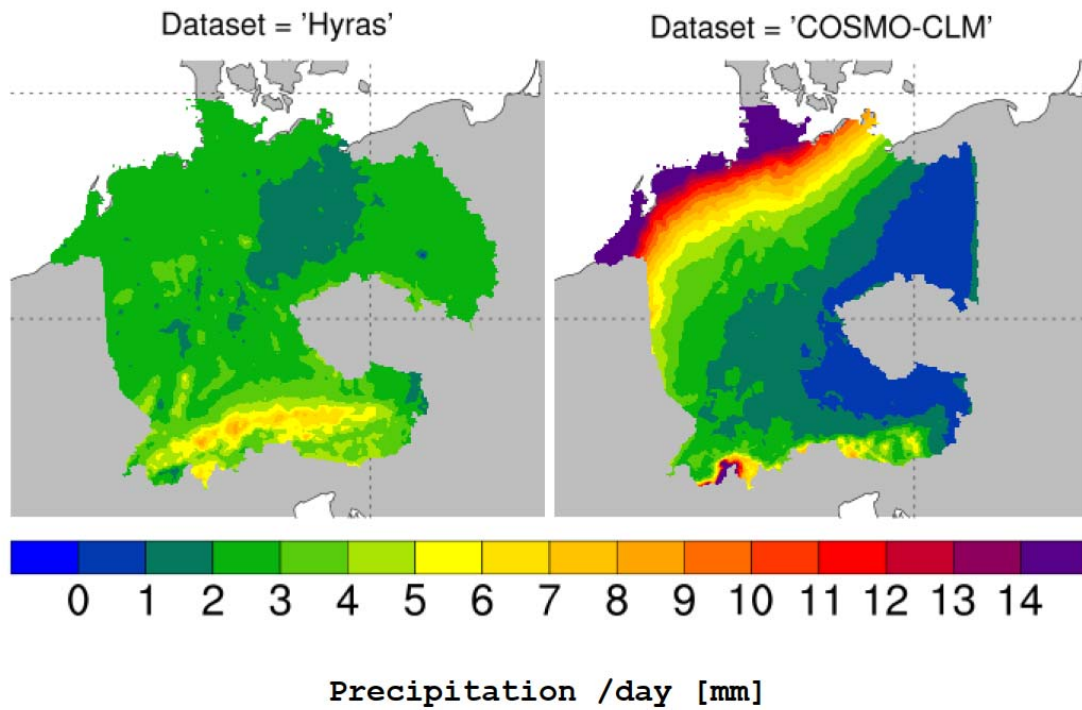


Figure 1: Climatological seasonal mean daily precipitation in mm for summer over the time period from 1980 to 1989. Left: HYRAS observational data. Right: Simulation data of COSMO-CLM.