



How the complexity of the soil model impacts seasonal prediction of European summer temperatures

Felix Bunzel (1), Wolfgang A. Müller (1), Tobias Stacke (1), Stefan Hagemann (1), Mikhail Dobrynin (2), Johanna Baehr (2), and Kristina Fröhlich (3)

(1) Max Planck Institute for Meteorology, Hamburg, Germany (felix.bunzel@mpimet.mpg.de), (2) University of Hamburg, Hamburg, Germany, (3) Deutscher Wetterdienst, Offenbach, Germany

We investigate the impact of the new 5-layer soil-hydrology scheme on seasonal hindcast skill obtained for 2-meter air temperatures over Europe with the Max Planck Institute Earth System Model (MPI-ESM). A full-field assimilation experiment from 1981 to 2010 and seasonal hindcasts started on 1 May each year are performed with MPI-ESM using the old bucket soil scheme and the new 5-layer soil-hydrology scheme. We find improved seasonal hindcast skill for European summer temperatures with the 5-layer scheme compared to the bucket scheme, and investigate the origin of these improvements. On the one hand, the indirect soil-moisture assimilation is more realistic causing a different behaviour of land-atmosphere coupling in the 5-layer scheme compared to the bucket scheme. On the other hand, the prediction of the atmospheric blocking frequency is improved, reflecting more realistic persistence of large-scale weather patterns over Europe.