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# Introduction of a simple-model-based land surface dataset for Europe

Rene Orth and Sonia I. Seneviratne
ETH Zürich, Zürich, Switzerland (rene.orth@env.ethz.ch)

Land surface hydrology is important because it can play a crucial role during extreme events such as droughts, floods and even heat waves. We introduce in this study a new hydrological dataset for the European continent that consists of soil moisture, runoff and evapotranspiration. It is derived with a simple water balance model (SWBM) forced with precipitation, temperature and net radiation. The SWBM dataset covers Europe and extends over the period 1984-2013 with a daily time step and 0.5°x0.5° resolution. We employ a novel approach to calibrate the model, whereby we consider 300 random parameter sets chosen from an observation-based range. Using several independent validation datasets representing soil moisture (or terrestrial water content), evapotranspiration and streamflow, we identify the best performing parameter set and hence the new dataset. To illustrate its usefulness, the SWBM dataset is compared against ERA-Interim/Land and simulations of the Community Land Model Version 4, using all validation datasets as reference. For soil moisture dynamics it outperforms the benchmarks. Therefore the SWBM soil moisture dataset constitutes a reasonable alternative to sparse measurements, little validated model results, or proxy data such as precipitation indices. In terms of runoff the SWBM dataset also performs well versus the benchmarks. They all show a slight dry bias which is probably due to underestimated precipitation used to force the model. The evaluation of the SWBM evapotranspiration dataset is overall satisfactory, but the dynamics are less well captured for this variable. This highlights the limitations of the dataset, as it is based on a simple model that uses uniform parameter values. Hence some processes impacting evapotranspiration dynamics may not be captured, and quality issues may occur in regions with complex terrain. Furthermore we investigate the sources of skill of the SWBM dataset and find that the parameter set has a similar impact on the simple model results as the choice of the forcing dataset. The newly derived SWBM dataset is of relevance for a range of applications given the deficit of available land datasets. It will be made publicly available on the web upon publication of the corresponding article.