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Inter-comparison of climatological datasets for the hydrological modelling of six european catchments

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The H2020 project DRYvER (https://doi.org/10.3897/rio.7.e77750) on drying river networks and climate change aims at understanding the impact of climate change on intermittent rivers and ephemeral streams in six mesoscale river basins between 200~km² and 350~km² in different European countries (Croatia, Czech Republic, Finland, France, Hungary, Spain).
One of the objectives of the DRYvER project is to compare the evolution of streamflow intermittence under climate change in the six study areas.
To do so we are developing a common modelling framework, using the distributed and physically based hydrological model J2000 (Krause et al., 2006), which is able to represent processes at the reach scale, and therefore, simulate flow intermittence at a high spatio-temporal resolution.

A challenge here is to use a climate forcing dataset (precipitation and temperature) that has a sufficiently large coverage to cover all the catchment case studies, but that also accurately represents the spatial and temporal variability of the meteorological variables in order to accurately simulate the local hydrological response.

In this study, we analyze the impact of using datasets with global or European coverage (ERA5-land, WFDE5, UERRA-MESCAN, E-obs) versus using local observed data or local gridded datasets (e.g. SAFRAN reanalysis for France, Nordic Gridded Climate Dataset for Finland).
First, we compare the climate datasets at the catchment scale, and then analyze the impact of using them on the simulated runoff.
Results show variable differences between the datasets for the six catchment case studies, with larger gaps in mountain basins with a larger range of elevations.

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