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Comparison of two gridded climatological observation-based datasets for use in climate projections development

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Future climate projections are based on future climate simulations by numerical climate models. Model performance is evaluated by comparing historical model simulations against observations. As model simulations are gridded, gridded observation-based datasets are widely used as the evaluation reference. These datasets can be created either by interpolation of station observations, or by using station observations as input into numerical weather prediction models producing reanalyses (simulated gridded 'observations'). Specifics of the method used to create a gridded observation-based dataset (e.g. interpolation method, NWP model) cause individual datasets to differ, leading to uncertainty in climate model evaluation. For credible model evaluation and therefore credible future climate projections, it is important to asses this uncertainty. Additionally, this uncertainty can be reduced by avoiding the use of gridded datasets which show large inconsistencies with station observations.

In this work, two gridded temperature and precipitation datasets available for Slovakia are compared - CARPATCLIM (gridded observations) and ERA5-Land (reanalysis). Furthermore, the two datasets are evaluated against selected Slovak station observations. Results show that there are significant differences between the two datasets, with CARPATCLIM corresponding to station observations to a considerably greater degree than ERA5-Land.

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