



Developments to the E-OBS gridded dataset across Europe

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The E-OBS dataset provides daily gridded data across Europe from 1950 to present-day through the interpolation of the station data contained in the ECA&D database. The E-OBS dataset is widely used for a variety of applications from the analysis of past variations in climate to the validation/bias-correction of modelling simulations. The E-OBS dataset is particularly important in these applications as the data cover the entire European domain. In this paper we describe a number of improvements to the E-OBS dataset, which are related to the techniques used to interpolate the station data to a regular grid. We place particular emphasis on the advantages offered by the regression-kriging techniques used to interpolate the station data to a regular grid. Under this approach the spatial 'trend' of the station data is first evaluated using a generalized additive model. The residuals from this model (the unexplained variance) are then gridded using ordinary kriging. This technique improves the E-OBS dataset in two ways: it provides a more stable model than the thin-plate spline currently used, which is particularly vulnerable to station coverage and outliers, and allows for the generation of an ensemble of grid realizations. These multiple realizations provide a better measure of gridded uncertainty than the standard error estimates currently provided with E-OBS and should be of use to a variety of end-users, particularly those who use the data to derive indices of temperature and precipitation extremes. In this paper we also describe several additional improvements to the E-OBS dataset, such as a better gridding of precipitation through a gamma-transformation of the station data, and we discuss the potential for gridding to a higher resolution than the currently available 0.22° resolution grid.