Correlation Decay Distances (CDDs) of Daily Temperature and Precipitation Data over Europe

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Daily, gridded climate data is important for a number of applications, including the evaluation of regional climate models. To obtain insight in the best interpolation method for the interpolation of daily climate data to high spatial resolution grids (<25km x 25 km), information about the relation between stations is necessary. We report on the analysis of inter-station relationships for a new dataset of daily station data over Europe (precipitation; mean, maximum and minimum temperature). Correlations between each station and all others were calculated and plotted against the distance, and an exponential curve was fitted through the points. The distance where the fitted correlation curve equals $1/e$ is called the correlation decay distance (CDD). The CDD is, for example, used as a search radius to select stations in the interpolation method angular distance weighting (ADW). Several factors can influence the CDD and thus interpolation. The CDDs have been studied in relation to seasonality, spatial characteristics, elevation and synoptic state. We use the results to inform choice of interpolation method and specification of parameters in a given method.