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Reconstruction of precipitation in Europe: in search of an optimised proxy network

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Our study aims at finding an optimal proxy network which is best suited to spatially reconstruct precipitation over European land areas. Only a limited number of seasonally resolved proxies are available and they are usually not equally well distributed in space. Furthermore, proxy series have their unique characteristics, particularly considering their temporal resolution, the parameter they represent, the seasonality and the stability of the climate signal they contain. Therefore, an optimally distributed proxy network that incorporates regional to large scale rainfall variability is important to accurately estimate European precipitation back in time.

For this purpose we apply various methodologies. First we analysed the distribution of precipitation over Europe for every season using the gridded instrumental dataset by Mitchell and Jones (Int J Climatol., 2005). This dataset provided a basis to determine optimal proxy sites by calculating correlations between the average of the entire European precipitation field and every single gridpoint in this field. In addition, the same procedure was applied between the gridpoints next to selected proxy locations and every gridpoint in order to reveal the representativeness of the single gridpoints in the investigated field.

Preliminary results indicate that European average precipitation is best explained around the Baltic Sea for the warm season and in Western Europe for the winter season. The results provide information on the optimal proxy network, however not considering that in reality the proxy network is rather sparse and that the proxy infor-

mation might not directly represent the local climate. To overcome this limitation, we use backward elimination technique (Pauling et al., Geophys Res Lett., 2003) to locate the most suitable proxy series of the selected proxy data. This technique will enable us to determine an optimal, minimised proxy network which will finally be verified in a regression based reconstruction of past European precipitation fields.