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The Djäknebol Farmer Diary as Proxy Data for Temperature Reconstruction in Southwestern Sweden 1761-1861



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Abstract

In this study the diaries of the Djäknebol farm in the Halland County in southwestern Sweden are analysed. The farmer and parish clerk family Ausell kept the diaries for four generations. They contain amongst other agrarhistorical notes a nearly continuous series of the first day of sowing of several grain sorts as well as “korntal“, a relative, area non-related measurement of yield for the period 1761 to 1861. From 1804 onwards, historical temperature measurements have been made in Göteborg, approximately 120 kilometres northwest of Djäknebol.

The historical climate proxy data in the diaries is used to reconstruct various temperature series by establishing linear multiple regression models. The measured temperature records for Göteborg are used as predictand for calibration and verification of the proxy data. In the regression models, the first day of sowing and “korntal“ for different grain sorts were used as predictors and temperatures as predictands. With the first day of sowing as proxy data, there is a linear multiple correlation with seasonal spring mean temperatures as predictand of $r=0.79$; explaining 62% of the variance. Using “korntal“ as predictor, the linear multiple correlation coefficient with summer temperatures is $r=0.56$; 31% of the variance is explained.

Comparing the modelled temperatures for Djäknebol 1761 to 1861 with the independent long instrumental temperature series for Stockholm many similar trends are detected. Best results are shown with spring seasonal average temperatures (MAR-MAY). Summer temperatures (JUN-AUG) show poorer results. Calibrating the models with the homogenized temperature series from Göteborg, *Gtb_{Dats}* (Datsenko et al. 2001) leads to the conclusion that the proxy series are strongly influenced by the individual farmers observing. The proxy series can be split up in three parts (1761-1786, 1787-1835, 1836-1861).

Considering the sparseness of the proxy data and the fact that only one diary was analysed and used for modelling, the modelled temperature from sowing date is a good proxy temperature series at least on a 10-year average timescale. “Korntal“ proved not to be reliable and seems to be more influenced by other factors than temperature.