

Supplementary material for “Changes in solar activity during the Wolf Minimum – new insights from a high-resolution ^{14}C record based on Danish oak”

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In order to compare the Wolf Minimum to the two following GSMs, we plotted our SK2 record together with the annual radiocarbon record from Fogtmann-Schulz et al. (2019) covering a large part of the Spörer Minimum (Figure S1A) and the annual radiocarbon record of Stuiver, Reimer, and Braziunas (1998) covering the Maunder Minimum (Figure S1B). When looking at these $\Delta^{14}\text{C}$ records, the Wolf Minimum is most similar to the Maunder Minimum. The duration is the same, and the increase in $\Delta^{14}\text{C}$ has the same slope, whereas the slope during the Spörer Minimum appears to be flatter. The decrease in $\Delta^{14}\text{C}$ after 1330 CE in the Wolf Minimum is more rapid than the decrease towards the end of the Maunder Minimum.

The supplementary material also includes two tables as separate files. Table S1 shows ring widths of the wood, SK2, used in this study. Table S2 shows the radiocarbon ages as well as $\Delta^{14}\text{C}$ measurements made in this study.

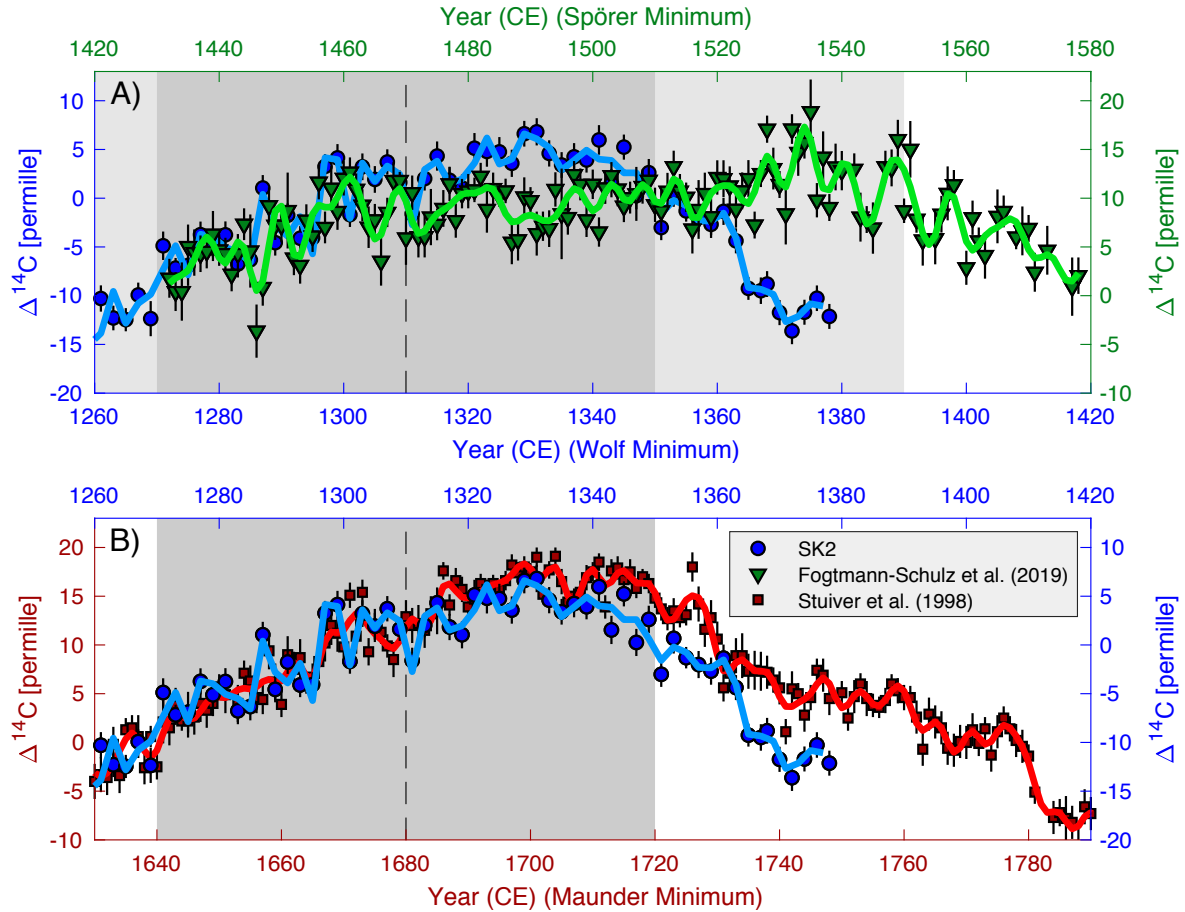


Figure S1. The SK2 record plotted together with the annual record of Fogtmann-Schulz et al. (2019) (A) and the annual record of Stuiver, Reimer, and Braziunas (1998) (B). The colored lines are lowpass-filtered data (cut-off frequency of $1/5 \text{ years}^{-1}$) corresponding to the data points of the same colors. The dark grey boxes show the duration of the Wolf and the Maunder Minima. The light grey box shows the duration of the Spörer Minimum. The dashed black lines mark the center year of the GSMs. We used the durations and center years from Usoskin et al. (2016).

References

- Fogtmann-Schulz, A., S. M. Østbø, S. G. B. Nielsen, J. Olsen, C. Karoff, and M. F. Knudsen. 2017. "Cosmic ray event in 994 C.E. recorded in radiocarbon from Danish oak." *Geophysical Research Letters* 44: 8621–28. <https://doi.org/10.1002/2017GL074208>.
- Stuiver, M., P. J. Reimer, and T. F. Braziunas. 1998. "High-Precision radio-carbon age calibration for terrestrial and marine samples." *Radiocarbon* 40 (3): 1127–51.