Project: **1251**

Project title: **Computational approaches to Final Palaeolithic/earliest Mesolithic climate change**

Principal investigator: **Claudia Timmreck**

Report period: **2025-11-01 to 2026-10-31**

The project was temporarily paused due to the PhD student's academic leave followed by a parental leave. Work on the finalization has now resumed, though progress continues at a gradual pace during this transition period. We could finalize our paper on the volcanic response on NH winter climate. Using a large ensemble of simulated idealized tropical eruptions with the MPI-ESM, we find that stratospheric aerosols from volcanic eruptions induce zonal anomalies in NH winter surface temperatures via two different and independent pathways (Andreasen et al., 2026).

For societies in the mid- and high-latitudes, storms are an inherent part of weather, especially during the cold season. This may have been particularly clear during the Little Ice Age were storm related-disasters seem to have been more frequent than today. In 2026, we continued our work on volcanic fingerprints on Little Ice Age (LIA) Storm Severity in the North Sea Region, where we compare an annually resolved assessment of Little Ice Age storm severity based on historical documents with a storm proxy based on ice core data and simulations. We find that storm severity and the ice core storm proxy correlate positively, which is interpreted as their shared dependency on wind strength conditions in the northern North Atlantic. Their correlation further suggests that historical documents capture real meteorological conditions and not only societal vulnerability. We also find indications of volcanic influence on storm severity, but no indication of forcing from solar activity (Andreasen et al, in prep. 2026). At present, we work on the comparison of our simulation data with new storm proxies which has recently been published.

References

Andreasen, L. S., T. A. Shaw, M. Günther and C. Timmreck (2026), Independent Short- and Longwave Pathways for a zonally asymmetric Northern Hemisphere Temperature Response to Tropical Volcanic, Geophs. Res Lett. 53, e2025GL117680.

Andreasen, L S, C. Timmreck, and F. Riede, Interpretation and forcing of an annually resolved Little Ice Age storm proxy, and its dependencies on external forcing in preparation for climate of the past.