

EGU21-11404

<https://doi.org/10.5194/egusphere-egu21-11404>

EGU General Assembly 2021

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



Tephrochronological evidence of a later Younger Dryas ice-sheet maximum in central Norway

Simon A. Larsson^{1,2}, Stefan Wastegård¹, and Fredrik Høgaas³

¹Department of Physical Geography, Stockholm University

²The Bolin Centre for Climate Research

³Geological Survey of Norway, Trondheim

The Scandinavian Ice Sheet responded time-transgressively to the Younger Dryas (Greenland Stadial 1) cold event with large regional variations. Around Trondheimsfjorden in central Norway, the Tautra Moraines and the Hoklingen Moraines have long been assumed to have formed by glacial readvances during this event, as they have been dated to c. 12.7 and 11.6 cal. ka BP respectively (Olsen et al., 2015), mainly based on radiocarbon dating of often marine fossils. The Tautra Moraines, being the outer ridges of the two, should thus represent the maximum ice-sheet extent in this region during the Younger Dryas.

This ice-front position established a pro-glacial lake west of present-day Leksvik village on the Fosen peninsula (Selnes, 1982), which covered the Lomtjønnin lakes and Lomtjønnmyran fens, and drained through a spillway via Lake Rørtjønnna. Some 20 km inland (northeast) from this location, inside the Tautra Moraines, the location of the Damåsmyrkan bog was covered by the ice sheet at that time.

By examining sediments from these sites for occurrences of volcanic ashes (visible and cryptotephra), combined with radiocarbon dating, we find that the ice front remained at the Tautra Moraines until the late Younger Dryas, contrary to the previous chronology (and overriding the suggested formation age of the Hoklingen Moraines). These findings comply with several recent reconstructions of the deglaciation at other sites in western (Lohne et al., 2012; Mangerud et al., 2016) and southern Norway (Romundset et al., 2019) and are a strong example of the usefulness of tephrochronology in the reconstruction of past ice-sheet dynamics.

References

Lohne, Ø.S., Mangerud, J. & Svendsen, J.I. (2012) Timing of the Younger Dryas glacial maximum in Western Norway. *Journal of Quaternary Science*, vol. 27, pp. 81–88.

Mangerud, J., Aarseth, I., et al. (2016) A major re-growth of the Scandinavian Ice Sheet in western Norway during Allerød–Younger Dryas. *Quaternary Science Reviews*, vol. 132, pp. 175–205.

Olsen, L., Høgaas, F. & Sveian, H. (2015) Age of the Younger Dryas ice-marginal substages in Mid-Norway—Tautra and Hoklingen, based on a compilation of ¹⁴C-dates. *Norges geologiske undersøkelse Bulletin*, vol. 454, pp. 1–13.

Romundset, A., Lakeman, T.R. & Høgaas, F. (2019) Coastal lake records add constraints to the age and magnitude of the Younger Dryas ice-front oscillation along the Skagerrak coastline in southern Norway. *Journal of Quaternary Science*, vol. 34, pp. 112–124.

Selnes, H. (1982) Paleo-økologiske undersøkelser omkring israndssetninger på Fosenhalvøya, Midt-Norge. Thesis at the Department of Botany, University of Trondheim.