Configuration of the Scandinavian Ice Sheet in SW Norway during the Younger Dryas

John Inge Svendsen[a], Jason B. Briner[b], Jan Mangerud[a], Henriette Linge[a], Richard Gyllencreutz[c], Svein Olav Dahl[d] and Derek Fabel [e]

[a]Department of Earth Sciences, University of Bergen and Bjerknes Centre for Climate Research, Bergen, Norway, John.Svendsen@uib.no; [b]Department of Geology, University of Buffalo, Buffalo, USA, jbriner@buffalo.edu; [c]Department of Geological Sciences, Stockholm University, Stockholm, Sweden; Department of Geography, University of Bergen and Bjerknes Centre for Climate Research, Bergen, Norway, svein.dahl@uib.no

Based on ^{10}Be dating we reconstruct the 3d configuration of the Scandinavian Ice Sheet along a transect extending from the Younger Dryas margin just west of Bergen city and over to the Ra Moraine on the opposite side of the mountain range in southern Norway (Briner *et al*. 2023). We sampled many bedrock surfaces and perched boulders on or near the highest summits in the Bergen area, which lies slightly within the Younger Dryas ice extent. In addition, we have dated some ice-transported erratics located up to 1600 m a.s.l. in a mountain area (Tarven) 120 km further inland. All exposure ages were calculated by using the ^{10}Be production rate of Goering et al. (2011, 2012) and using version 3 of the online exposure age calculator (https://hess.ess.washington.edu/; Balco et al. 2008). The results indicate that all mountain summits around Bergen, ranging from 400-680 m a.s.l, were covered by the ice sheet during the final phase of the Younger Dryas cold spell. Furthermore, in the light of the dating results from the mountain Tarven further inland it seems clear that the ice surface had risen to well above 1600 m a.s.l. in this area. The inferred ice sheet configuration resembles today's profiles over the Greenland ice sheet. By making a comparison with Greenland we find it likely that the surface of the ice dome in the area just north of the Hardangervidda mountain plateau reached a height of about 2100 m a.s.l. during the Younger Dryas maximum ice sheet extent. With the support of a large number of existing ^{14}C dates and sea-level data, it seems clear that the subsequent collapse of the entire ice sheet happened in response to the Early-Holocene warming.

References

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