



Analysing palaeo cirque glacier equilibrium line altitudes as indicators of palaeoclimate across Scandinavia

Rachel Oien¹, Matteo Spagnolo¹, Brice Rea¹, Iestyn Barr², Robert G. Bingham³, and John Jansen⁴

¹School of Geoscience, University of Aberdeen, Aberdeen, United Kingdom of Great Britain and Northern Ireland

(rpoien@hotmail.com)

²Department of Natural Sciences, Manchester Metropolitan University, Manchester, United Kingdom of Great Britain and Northern Ireland

³School of GeoSciences, University of Edinburgh, Edinburgh, United Kingdom of Great Britain and Northern Ireland

⁴GFU Institute of Geophysics, Czech Academy of Sciences, Prague, Czechia

The equilibrium line altitudes (ELAs) of past cirque glaciers are used to obtain quantitative palaeoclimatic information from Alpine environments. The dimensions of these glaciers, and therefore their ELAs, are partly reconstructed from ice-free glacial cirques. However, in order to derive palaeoclimatic data for a particular time period, studies typically gloss-over the fact that cirques are time-transgressive landforms, shaped over multiple glacial cycles. In this study, we test the time-transgressive nature of cirque formation and assess the validity of using cirques as indicators of climate during individual glacial periods. To achieve this, we reconstruct glaciers and obtain palaeo ELAs from ~4000 cirques across Norway and Sweden. The cirques are mapped in GIS, and the GlaRe tool is used to reconstruct glacier outlines before palaeo ELAs are estimated. The population of cirques is analysed to investigate whether sub-divisions can be made on the basis of floor altitude, aspect, and links to known palaeoclimatic patterns. In all, this study allows us to test the usefulness of cirques as indicators of palaeoclimate during specific time periods.