



Yet another in-situ cosmogenic 10-Be local production rate for the British Isles : Llyn Arenig Fach, North Wales

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Cosmogenic production rates (PRs) are the essential conversion factor between AMS cosmogenic concentrations and absolute exposure ages. The accuracy of cosmogenic glacial chronologies and reliability in their comparison to other palaeoclimate systems is largely contingent on the precision and accuracy of the adopted production rate. This is particularly critical in determining past glacial geochronologies at the scale of millennial temporal resolution. Most PR calibrations are carried out at deglaciation sites where radiocarbon provides the independent chronometric control usually based on calibrated ¹⁴C ages in basal sediments or varves from lake or bog cores which is assumed to represent the minimum age for glacial retreat. Under these conditions PRs should be considered as maximum-limiting values. Given that today most AMS facilities can deliver ¹⁰-Be, ²⁶-Al and ³⁶-Cl data with analytical errors less than 2%, the accuracy of a PR for a given scaling method (ie transfer function of the site-specific production rate to a reference sea-level high latitude (SLHL) PR) remains largely dependent on the error in the independent chronology and accuracy of AMS standards. The history over the past 20 years of the ever-changing value of SLHL ¹⁰-Be cosmogenic spallation PRs with a continual decreasing value from initial estimates of about 7 atoms/g/a to the current 'accepted' value of ~4 atoms/g/a, is an interesting story in itself and demonstrates the complexity in such determinations.

Today there are both global (average) SLHL PRs and also regional-specific PR values (referenced to SLHL). For the British Isles, there are a number of ¹⁰-Be 'British Isles' choices that, for the Lm scaling scheme, range between 3.92 ± 0.11 atoms/g/a (Putnam et al., QG, v50, 2019) to 4.41 ± 0.25 atoms/g/a (Small et al., JQS, v30, 2015). This range in ¹⁰-Be spallation PRs has recently raised some debate and challenges for the assumed extent and timing of the local-LGM and demise of the British Ice Sheet. This work provides a new British Isles site specific ¹⁰-Be PR from the Arenig Mountains in North Wales. We have measured ¹⁰-Be concentrations in 13 selected moraine boulders that are tentatively mapped as outer and inner Younger Dryas deglacial deposits hugging a cirque lake, Llyn Arenig Fach, just below the head wall at Arenig Fach. Radiocarbon dating of basal sediments from a number of intermorainal core bogs has provided independent age control. We will present our results and compare them to the current collection of other British Isles ¹⁰-Be production rates.