GLO#12 **SESSION 9A** **Wednesday 23rd March, 1400 – 1540**

Evaluating cosmogenic exposure ages of boulders from glacial deposits

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Cosmogenic exposure dating has greatly enhanced our ability to determine glacial chronologies, and glacially-deposited boulder exposure ages are now routinely used to constrain deglaciation ages. However, exposure dating involves assumptions about the geological history of the boulders that may impact the inferred age. There are two primary geological factors that can result in erroneous ages: exposure of the boulders prior to glaciation (yielding exposure ages that are too old) and post-depositional processes that effectively change the integrated shielding of the boulders (yielding exposure ages that are too young). We have analyzed datasets of boulder exposure ages. The datasets we have used include boulder ^{10}Be exposure ages from the Tibetan Plateau (1272 boulders), Northern Hemisphere palaeo-ice sheets (631 boulders), and present-day glaciers (208 boulders). Our observation is that no boulders from present-day glaciers and few boulders from the palaeo-ice sheets have exposure ages significantly older than independently known deglaciation ages. Evidently, at least for this dataset, prior exposure of the boulders to cosmic rays is not a significant factor. What is clearly observed is that the spread in the boulder ages from individual features increases with increasing landform age. Prior exposure could in principle account for this spread but this would seemingly demand that the prior exposure is not occurring on younger features. A more plausible explanation is that the spread in boulder ages is attributable to post-depositional processes. We have developed a model, based on post-depositional processes, that qualitatively accounts for this spread in ages. Based on the large dataset and the results of our modelling we believe, in the absence of other evidence, that glacial boulder exposure ages should be viewed as minimum limiting deglaciation ages.