Glacial exposure dating - insights from a global compilation

Jakob Heyman (1,2), Arjen P. Stroeven (2), and Jonathan M. Harbor (1)

(1) Purdue University, Department of Earth, Atmospheric, & Planetary Sciences, (2) Stockholm University, Department of Physical Geography & Quaternary Geology

Cosmogenic exposure dating has dramatically improved our ability to define the timing of past glaciations and has become an important tool in paleoglaciological reconstructions. In ideal cases, exposure dating can constrain the timing of past glacial events with high accuracy and precision, but surface processes often limit interpretations to minimum ages. Here we present a new global compilation of published Be-10 exposure ages from glacial environments. The objective is twofold: to evaluate the effect of surface processes on exposure age scatter, and to compare the timing of glaciation in different regions of the world. By organizing multiple exposure ages from discrete glacial landforms or deposits into groups, we can quantify the exposure age scatter within single age groups. This extensive dataset of exposure age scatter is of crucial importance for glacial exposure dating studies because it shows how well clustered landform exposure ages have been in past studies for particular glacial landforms, and what exposure age clustering should be expected for future studies. Based on the clustering of particular landform group exposure ages we can determine which landforms yield best age confidence (highest exposure age clustering). Results from these best exposure age groups can then be compared across different regions of the world, enabling an evaluation of global glacial synchronicity.