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Synoptic analysis of globally-distributed data sets of cosmogenic-nuclide exposure ages

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This abstract describes a project to make large data sets of cosmogenic-nuclide measurements useable for synoptic global analysis of paleoclimate, glacier change, and landscape change. It is based on the 'ICE-D' (Informal Cosmogenic-nuclide Exposure-age Database), a transparent-middle-layer infrastructure for compiling and storing cosmogenic-nuclide measurements and generating internally consistent exposure-age data. The prototype implementation of this project focuses on a global data set of exposure ages from glacial deposits that are, potentially, useful for synoptic analysis of glacier change and paleoclimate. The aim is to address a number of messy data-management and analysis problems associated with cosmogenic-nuclide data, thus making it possible to apply unbiased, automated quantitative analysis to the entire globally-distributed data set. The presentation will highlight (i) examples of error-tolerant hypothesis testing using this approach; (ii) means of quantifying the importance of the details of cosmogenic-nuclide production-rate calculations to global paleoclimate inferences, and (iii) likewise, approaches to understanding the importance of geomorphic processes and landform evolution to global paleoclimate inferences drawn from exposure-dated landforms.