Heinrich Events recorded in Mono Lake moraines?
Refining the glacial chronology by new Surface Exposure dates

Field trip to Mono Lake, California

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Abstract

Reconstruction of paleodynamics of mountain glaciers has become a focus of paleoclimatology, as the changes in snowline seem to sensitively record past climate changes. The most direct approach is to date the geological witnesses of past glacial advances, i.e. moraines. A progressing and highly appropriate dating method is Surface Exposure Dating (SED) using in-situ cosmogenic nuclides (^{10}Be, ^{26}Al, ^{36}Cl, ^{3}He, ^{21}Ne). This proposal ask for support for the start-up of a project to refine the glacial chronology at one of the classical, late Pleistocene moraine sets in the U.S., the Bloody Canyon moraines in the Mono Basin, Sierra Nevada, California. We present a truly inter-disciplinary approach, combining direct dating of the moraines with detailed paleomagnetic and geochemical studies on the Wilson Creek Formation, a sediment archive of glacial highstand. This SED study reevaluates the existing chronology, which is based on ^{36}Cl data. We plan to improve the precision of the moraine ages by applying the better constrained cosmogenic isotopes ^{10}Be, ^{3}He, and ^{21}Ne. These ages will be correlated with the datings of drop-stone and glacial flour layers from the Wilson Creek Formation. This project attempts to give insight into the structure of cold climate events during the last glacial cycle, tackling such fundamental questions, as (i) are Sierra Nevada glaciations indeed related to the Heinrich Events, as suggested by [1], (ii) did the alpine glaciers advance during Younger Dryas time? and (iii) how was the timing and amplitude of the Last Glacial Maximum at Mono Lake?