



Patagonian glaciation of MIS 8 age from cosmogenic exposure dating of outwash terraces, 47° S, Argentina

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The Lago Pueyrredon valley (47° S, Argentina) was a major outlet of former Patagonian Ice Sheets. The chronology of the rich glacial geomorphic record preserved is poorly constrained due to a lack of datable material, a problem suffered over much of the arid Argentinean Andes. Cosmogenic exposure dating offers the only means of directly dating these glacial landforms. However, moraines older than 100 kyr are difficult to date because of their unstable nature and problems with boulder erosion/exhumation. We show that rounded cobbles (implying minimal erosion) on stable outwash terraces are better targets for exposure dating in this environment because the factors causing wide scatter in boulder ages (erosion/exhumation) are reduced. This allows us to extend the chronology of these previously undated glacial surfaces.

To test this we measured ^{10}Be and ^{26}Al concentrations in boulders/cobbles from the crest of moraines, and cobbles/pebbles from the associated outwash terrace. On moraine crests, boulders yield exposure ages of 110 – 190 kyr while cobbles yield ages of 50 – 60 kyr. On the terraces, surface cobbles yield exposure ages of 220 – 280 kyr while pebbles taken from a depth profile follow a simple exposure history and yield a burial corrected exposure age of ~ 260 kyr or MIS 8. This depth profile alone gives compelling evidence that these surfaces are MIS 8 in age and not younger as the boulder/cobble ages from moraine crests would suggest. Data from the next oldest terrace system give exposure ages of 500 – 650 kyr while boulders on associated moraine crests range from 180 – 620 kyr. The results suggest that our method of dating older glacial events in this geomorphic environment is promising.