A New Method of Estimating Basin-scale Erosion Rates --
Measurement of In Situ Produced ^{10}Be and ^{26}Al in Sediments

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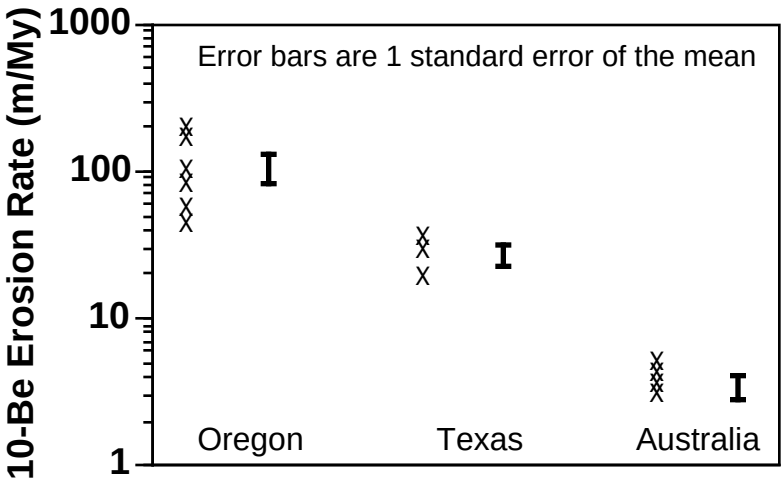
Measuring rates of bedrock erosion is difficult and uncertain. Over the past decade, advances in mass spectrometry have allowed measurement of rare nuclides produced by cosmic ray bombardment at and near Earth's surface. Such measurements have been interpreted as erosion rates using simple, steady state models and have yielded significant information concerning the rate of bedrock erosion at points on the landscape (Bierman, JGR, 1994). However, extrapolating such information to larger spatial scales is difficult.

We recently proposed a model for interpreting the abundance of cosmogenic nuclides in terms of basin-wide rates of erosion (Bierman and Steig, ESPL, 1995). We have applied this model to 26 isotopic measurements made in sediment from the rapidly eroding Oregon Coast Range, the granitic Llano uplift of central Texas, and a slowly eroding quartzite basin in south central Australia (Wilpena Pound). The cosmogenic erosion rate estimates are consistent with site specific and regional erosion rates estimated by a variety of other means. These data suggest that cosmogenic isotope abundance in sediment may provide a rapid means by which to estimate erosion rates of large drainage basins.



1. 1995 Spring Meeting

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