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IMPACTS OF CONTEMPORARY SEDIMENT YIELD ON THE USE OF *IN SITU* ^{10}BE IN RIVER SEDIMENT AS A TOOL FOR ESTIMATING BACKGROUND EROSION RATES

NEILSON, Thomas B., Department of Geology, University of Vermont, 180 Colchester Ave, Department of Geology, UVM, Burlington, VT 05401, BIERMAN, Paul, Department of Geology and Rubenstein School of Environment and Natural Resources, University of Vermont, Delehanty Hall, 180 Colchester Ave, Burlington, VT 05405, SCHMIDT, Amanda H., Geology, Oberlin College, 52 West Lorain Street, Oberlin, OH 44074-1044, SOSA-GONZALEZ, Veronica, The Rubenstein School, University of Vermont, Aiken Center, 81 Carrigan Drive, Burlington, VT 05405 and ROOD, Dylan H., AMS Laboratory, Scottish Universities Environmental Research Centre (SUERC), East Kilbride, G75 0QF, United Kingdom, tneilson@uvm.edu

In situ ^{10}Be concentrations in river sediment are thought to be well buffered against changes in contemporary erosion rates because most sediment originates from well-mixed upper soil horizons. However, the buffering capacity of ^{10}Be as a long-term erosion rate monitor can be undermined in catchments where long- and short-term, sub-basin erosion rates differ in time and space due to varying land-use, slope, and lithology.

We measured *in situ* ^{10}Be in 54 samples of river sediment collected in Yunnan, SW China, and used the data to calculate apparent long-term erosion rates which vary between 12 and 195 m/My. Samples were collected from three tributary basins of the Mekong River between 21° and 27° N that are 200, 1000, and 2000 km^2 in area. Total relief for each catchment ranged from 1180 to 2000 m, and mean annual precipitation ranged from 870 to 1300 mm/yr. Mean slope was the best predictor of erosion rate (R^2=0.37, p<0.001).

At 13 stream junctions, we collected samples from each contributing stream and below the confluence. For each set of samples collected upstream of a junction, we estimated the downstream concentration of ^{10}Be by convolving the long-term sediment flux, derived from the ^{10}Be erosion rate, the sub-basin contributing area, and the measured sub-basin ^{10}Be concentration (e.g. Granger et al., 1996). When we compared the measured and calculated downstream concentration of ^{10}Be, we found they did not agree well. Measured concentrations ranged from -48% to +79% of the calculated concentration; however, the mean difference for the 13 junctions is within 0.5% of the calculated value indicating that on average, the downstream ^{10}Be concentrations are meaningful.

Results suggest that the apparent long-term sub-basin sediment flux estimated from ^{10}Be erosion rates and used to calculate isotope concentration downstream of junctions does not equate to the modern sediment flux in all instances. This discordance occurs because altered contemporary sediment yield in a sub-basin relative to long-term sediment yield influences the ^{10}Be concentration in sediment downstream of junctions. Intensive land-use such as agriculture, clear cutting, or dams, therefore, can change mixing ratios between sub-basins in a drainage network away from the long-term average, introducing bias in *in situ* ^{10}Be samples collected downstream.

Session No. 274

T44. Progress and Challenges in Developing Tools and Approaches Used in Sediment Budgets
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