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USING ^{10}BE AND SHORT-LIVED FALLOUT RADIONUCLIDES TO TRACK SEDIMENT MOVEMENT THROUGH WATERSHEDS IN YUNNAN, CHINA

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Modern Chinese land use policies are widely believed to have substantially increased erosion in western China, but extensive sediment yield data from the region do not show a corresponding increase. In order to better understand catchment-wide patterns in erosion and untangle natural and anthropogenic processes, we measured *in situ* 10-Be, meteoric 10-Be, unsupported 210-Pb, and 137-Cs on the 250-850 µm fraction of 54 fluvial sediment samples from three tributary catchments (200-2500 km^2) of the Mekong River, Yunnan, China. Each of the three catchments has over 20 years of daily sediment yield data, a variety of land-uses, and a wide range of topography. Long-term erosion rates scale with topographic parameters in two of the three catchments. *In situ* 10-Be and unsupported 210-Pb also show that erosion is more rapid in more heavily cultivated areas. Furthermore, unsupported 210-Pb activity in samples is quite low and only three samples contain measurable 137-Cs, suggesting widespread topsoil loss over the past 60 years. However, legacy sediments are stored at the base of slopes and in rice paddies due to a disconnect between toe slopes and the fluvial system, so contemporary sediment yield has not increased notably due to land-use change. While each isotope provides unique information regarding erosional process, because *in situ* 10-Be provides long-term, background erosion rates and unsupported 210-Pb is still present in the watershed despite widespread erosion, these isotopes are the most useful; meteoric 10-Be is the most challenging to utilize because pedogenic processes affect its distribution in the soil profile and thus in fluvial sediment derived from soil erosion. Overall, the low levels and widespread presence of unsupported 210-Pb and lack of 137-Cs imply changes in contemporary erosion that are consistent with national policies promoting deforestation from 1950 – 1980's and conservation from the late 1990's to present. While interpretation is complex, measuring all four isotopes on the same sediment samples provides context for *in situ* 10-Be derived background erosion rates by simultaneously allowing for assessment of contemporary and human induced erosion.

Session No. 82

T9. Developing Proxies for Human Impact on Soil and Sediment Mass Transfer throughout the Holocene
Monday, 2 November 2015: 8:00 AM-12:00 PM

Room 318 (Baltimore Convention Center)

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Back to: T9. Developing Proxies for Human Impact on Soil and Sediment Mass Transfer throughout the Holocene

<< Previous Abstract | Next Abstract >>