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Detection of lithological control on landslide type and pattern using 10Be dilution

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Determining the landslide type and pattern which are greatly conditioned by the lithological properties of the land surface, is vital for evaluating geo-hazard risk for different area and understanding regional landscape evolution pattern. Landslides could supply substantial deep-seated, low-nuclide debris from hillslope into channel network, resulting in a dilution of the detrital cosmogenic nuclide concentration in fluvial sediments. At present, the cosmogenic nuclide dilution model for fluvial sediments has been shown to evaluate the landslide depth and quantify landslide-derived sediment yield, which could be used as the criteria for determining the landslide type and pattern. Here, we presented a detrital 10Be concentrations dataset obtained from Minjiang catchment located in the eastern margin of the Tibetan Plateau, where shows contrasting lithological conditions, and attacked by coseismic landslides during 2008 Wenchuan earthquake. Sampling sub-catchments were carefully selected to cover a range of landslide distribution and to be representative of specific lithology. The presumable model parameters were evaluated and constructed through multifaceted geospatial analyses. The scaling factors for evaluating landslide depth and sediment yield were obtained inversely from the diluted 10Be concentrations and corresponding landslide inventory. Our data allow us to characterize in detail the lithological control on landslide type and pattern for the Minjiang catchment from the differential nuclide concentration dilution of fluvial sediments for areas with different lithologies. In addition, we also use them to solidify our quantitative understanding of landslide response to basement lithology setting, that can be ported into other environments or locations as a refined tool.

Student Submission

Yes

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