



Uniform grain-size distribution in the active layer of a braided stream: implications for paleo-hydrology

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The grain-size distribution of ancient alluvial systems is commonly determined from surface samples of vertically exposed sections of gravel deposits. This method relies on the hypothesis that the grain-size distribution obtained from a vertical cross section is equivalent to that of the riverbed, in direct contact with the flow. Such an hypothesis implies first that the sediments are uniform in size in the river bed, and second that the sampling method implemented on a vertical section leads to a grain-size distribution equivalent to the bulk one.

Here, we present a field test performed on granulometric samples collected in an active, gravel-bedded, braided stream: the Urumqi River in China. We compare data from volumetric samples of a trench excavated in an active thread and from surface counts performed on the trench vertical faces. Based on this data set, we show that the grain-size distributions obtained from all the samples are similar and that the deposit is uniform at the scale of the river active layer, a layer extending from the surface to a depth of approximately 10 times the size of the largest clasts.

As a consequence, the grid-by-number method implemented vertically leads to a grain-size distribution equivalent to the one obtained by a bulk volumetric sampling. This study thus supports that vertical surface counts provide an accurate characterization of the grain-size distribution of paleo-braided rivers.