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The size distribution of the sediments eroded by water from cultivated hillslope is a key parameter that controls both the quantity and the composition of the sediment delivery to the streams. In order to predict this sediment delivery, it is important to know how the different fractions of the initial soil are preferentially exported by water, i.e. the size selectivity of erosion. Most of previous the size selectivity studies only considered the dispersed particle size distribution. However sediments are mostly eroded and transported as aggregates. If we want a deeper insight on the erosion mechanisms we also need to look at the aggregate size distribution. The objectives of this paper is to examine both the dispersed particle and the aggregate size distribution and to asses the relationships between these two size selectivities in interrill erosion conditions.

A set of laboratory experiments was carried out to describe the size characteristics of sediment exported by overland-flow. Two aggregated soils, a silt loam and a silty clay loam, were tested. Soil trays of $0.5 \times 0.5$ m$^2$ and $1 \times 5$ m$^2$ were filled with air-dried soil aggregates. The trays were then set at a slope of 5 % and submitted to a 30 mm.h$^{-1}$ simulated rainfall. During the runoff period two samples of overland flow were taken at the outlet of the trays approximately every 10 min. One set of samples was processed to determine water discharge and soil loss rate. The second set was used to measure aggregate and dispersed particle size distributions of the exported sediments. The size distributions of the sediments were compared to the size distributions of the original soil.

The analysis of the results shows that (i)the aggregate size selectivity is influenced by the aggregate size distribution of the detached sediment and the characteristics of overland flow and (ii)the dispersed particle size selectivity is determined by the composition of the eroded aggregates and the aggregate size selectivity.