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## Influences of channel morphology and large wood on bed sediment grain size characteristics along a headwater stream, southern Brazil

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Headwater streams are mainly responsible for providing sediments and nutrients to the downstream regions. In addition, the riparian vegetation of these streams is a source of large wood (LW) for the water channel. Sediments and LW play an ecologically-important role in maintaining aquatic habitat, meanwhile sometimes execute serious intensification of the impact of downstream large floods. The quantity and size distribution of sediments on the channel bed and LW certainly influence on channel hydraulics and stability as well as the quality of aquatic habitats. Hence, the characterization of sediments and LW supports the renaturalization and conservation of streams/rivers. Therefore, the objective of the present study was to evaluate the influence of the LW deposition and the channel morphology on the bed sediment grain size along a reach (700 m) inside a headwater catchment (15 km<sup>2</sup>), southern Brazil. The mean slope of the reach channel is 0.33% which can be considered low. This catchment is characterized with the Mixed Ombrophilous Forest, the climate is the Cfb according to Köppen classification and the average annual rainfall is 1881 mm. Hydrological (rainfall and discharge) and LW dynamics monitoring has been carried out in this catchment since 2017. The step, pool and cascade are observed as channel morphologies along the study reach, which were divided into three parts (upstream, middle, and downstream). Furthermore, 26 cross-sections of the stream were established for field survey, such as measurement of the diameter (axis -a, -b, and -c) of the bed sediments ( $D_{90}$ ,  $D_{84}$ ,  $D_{50}$ ,  $D_{16}$ ,  $D_{10}$ , and  $D_{max}$ ) and LW presence verification. The definition of the sampling points sought to ensure a correct representation of the fluvial geomorphology. The present study reported the results obtained through the field survey carried out on August 8th, 2020, using caliper, tree caliper, metric tape and GPS. The grain sizes varied from 324.64 mm to 2.76 mm (particles smaller than 2 mm were not computed). The results showed that the presence of LW in the section induced a smaller value of the sediment grain size. In the pool formation a greater variation in the sediment granulometry was found than in cascades and steps. Furthermore, within the pool, the sediment sizes tended to increase from upstream to downstream. It is concluded that the LW acts as natural barriers for sediment deposition, avoiding the sediments exhaustion and generating low-velocity zones, favoring the maintenance of aquatic habitat. Also, the difference in the granulometry of the sediments within the pool formation may be a function of the flow velocity. In Brazil, the importance of fieldwork involving the monitoring of LW and bed sediments should be highlighted as a tool for understanding the hydrogeomorphic processes and for conserving the riparian zone, because such fieldworks are still few.

