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Large Woody Debris measurements, in a gravel bed braided river environment, using Terrestrial Laser Scanner: the Piave River study case.

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In-channel Large Wood (LW) in riverine environments is of high importance because of its influence on the hydraulics, sediment transport and geomorphological processes, and on the creation of niches for a variety of organisms. At the same time, LW in rivers can represent a source of additional risks on sensitive infrastructures (e.g. bridge piers) during high-magnitude floods. Traditional measuring techniques usually involves very time consuming manual field surveys, especially in wide and complex gravel-bed rivers. This work explore the potential of airborne and terrestrial laser scanner techniques to provide reliable and spatial distribute assessment of in-channel LW volumes, degree of organization and distribution for both single and jammed logs. This preliminary analysis is based on a series of measurements collected both manually and using a terrestrial laser scanner in an area of around 2 ha on the Piave River, a gravel-bed river located in the north eastern Italian Alps. The device used in this study (Leica Scan Station 2) is a pulsed TLS able to collect up to 50000 points per second at a spatial resolution higher than one point per mm2 at 100 m. The results suggest that the TLS can be used to assess reliably the volumes, shape and orientation of single logs, and also to assess volume and porosity of wood jams at a medium spatial scale. Even if the technique still needs relatively relevant time-consuming manual filtering processes, it has the potential of allowing spatial distributed assessment of wood characteristics in river environment, as well as detailed quantification of temporal variation of LW volumes and LW-related morphological changes after signle flood events.