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Assessment of Large Wood budget in the gravel-bed Piave River: first attempt

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During the last decades, the dynamics of large wood (LW) in rivers were analyzed to consider and define the LW budget. The space-time variations of LW amount results from the differences among input (e.g. fluvial transport, lateral recruitment) and output (e.g. fluvial transport, overbank deposition, natural chronic dead) of LW along a riverine environment. Different methodologies were applied in several fluvial environments, however in large river systems characterized by complex LW dynamics, the processes are still poor quantified. Aim of this contribution is to perform a LW budget estimation over the short period, assessing the effect of an over bankfull flood (Q=1039 m3 s-1; R.I=3.5 years). The research was carried out along a 1 km-long reach (around 15 ha) located into the middle course of the large gravel-bed Piave River (North East of Italy). The LW budget has been defined considering the recruitment through bank erosion and the fluvial transport of LW into and out of the study reach. The former factor was achieved integrating field data on riparian vegetation with the monitoring of riverbanks with a Differential Global Positioning System (DGPS). The latter was obtained detecting all LW elements (diameter $\geq$ 0.10 m and/or length $\geq$ 1 m) stored along the study reach, before and after the flood. For each LW the GPS position was recorded and a numbered tag was installed with the addition of colored paint to permit a rapid post-event recovery. Preliminary results indicate that, along the study area, the floating transport of LW is one of the most significant processes able to modify the amount of LW deposited along a riverine system. In fact, considering the input of LW, the 99.4 % (102 m3 km-1) comes from upstream due to floating, whereas the 0.6% (0.17 m3 km-1) was recruited through bank erosion. Analyzing the output, 94.3% (40.26 m3 km-1) of LW was transported downstream of the study area, whereas only the 5.7 % (2.43 m3 km-1) of LW was involved in the "internal displacement". In this study, the amount of LW increased of about 60.29% in the number of LW elements and 145% in volume, corresponding to 61.98 m3 km-1. The methodology here presented appears an easy and economical way to assess LW budget at a small spatial scale. However, further improvements are needed to allow the construction of comprehensive LW budget, considering also the loss of LW from overbank deposition as from natural decay. This research is funded within both, the University of Padova Research Project CPDA149091- "WoodAlp: linking large Wood and morphological dynamics of gravel bed rivers of Eastern Italian Alps"- 2014-16 and the Project "SedAlp: sediment management in Alpine basins, integrating sediment continuum, risk mitigation and hydropower", 83-4-3-AT, in the framework of the European Territorial Cooperation Program "Alpine Space" 2007-13.