



A water and sediment budget for a Mediterranean mountainous catchment (Southern Pyrenees)

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Sediment transport in Mediterranean mountainous catchments is highly variable influenced principally by sediment availability, which in turn is controlled by the temporal and spatial variability of rainfall, runoff and land uses. In this paper we present the water and sediment budget of the Ribera Salada, a Mediterranean forest catchment located in the Catalan Pre-Pyrenees (NE Iberian Peninsula). The river drains an area of 224 km². The data acquisition design is composed by five nested experimental sub-catchments. Each monitoring station registers discharge and suspended sediment transport continuously. Here we present the data obtained between 2012 and 2013, two contrasted hydrological years. These data allows to analyse the contribution of each sub-catchment to the total water and suspended sediment yield of the catchment at multiple temporal scales.

Annual water yield in the catchment outlet varied between 15 and 31 hm³ y⁻¹. Maximum peak flow in the outlet of the basin was 60.9 m³ s⁻¹; equivalent to a specific discharge of 0.28 m³ s⁻¹ km². Results indicate that, hydrologically, the catchment can be divided in two areas with contrasted regimes. The upper part of catchment is the wettest zone, where the water yield of each sub-catchment is directly and positive correlated to its area. In contrast, the bottom of the valley has an ephemeral hydrological regime that only supplies water during important rainfall events. Annual suspended sediment load at the catchment outlet oscillated between 615 and 3415 t y⁻¹, with an average value of 2015 t y⁻¹ (i.e. 9.3 t km⁻² y⁻¹). In contrast to the water yield, most of the suspended sediment load (i.e. 80%) is supplied from the driest part of the catchment where sediment availability is greater and there is a greater connectivity between sediment sources and the channel network. The humid part of the catchment only yielded the 20% of the sediment load, where, as in the case of the water yield, sediment yield is directly and positive correlated to the catchment area of the sub-catchments. In general, the values obtained for the Ribera Salada are lower than the yields reported for other neighboring catchments, what indicates the low geomorphic activity of the catchment.

Results indicate as although the majority of the water is supplied from the headwaters of the catchment, only 1/5 of the sediment load is supplied from this area. Suspended sediment dynamics are clearly controlled by the driest part of the catchment (lower part) where sediment availability and connectivity are higher. The results point out the importance of sediment sources and availability to understand sediment dynamics in Mediterranean mountain catchments.