

Suspended sediment transport during rainfall events in the Rio Cordon (Italy). Analysis of the last decade.

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This work shows the results of 11 years of measurements carried out in the Rio Cordon catchment, a small watershed located in the Eastern Italian Alps. A monitoring station installed in 1986 is continuously measuring several hydrological parameters. Hourly values of water discharge and water turbidity (or 5 min interval during flood events) were recorded throughout the whole study period. Several flood events induced by rainfall and presenting suspended sediment transport were isolated, and variations of the hydrograph and sedigraph during these events were studied. The return interval of the water discharge showed always values under 3 years during the studied period. Consequently, only ordinary floods are analyzed in this work. The hysteresis relationship between suspended sediment concentration SSC and water discharge Q was established for each event. Runoff volumes and suspended sediment loads were calculated for every season of the study period, in order to assess the fraction of the suspended load produced by floods within each season. The results show that clockwise loop is the most frequent relationship between Q and SSC in the Rio Cordon basin. This can be explained by a morrenic belt located in the upper part of the catchment. This belt creates a strong disconnectivity and blocks the sediments originated upstream. Consequently, only the sources which are close to the exit section contribute to the total suspended load during ordinary flood events. During the studied period, runoff controls the total suspended sediment budget. The suspended load from the events represents on average the 38 % of the seasonal suspended sediment budget, but it can reach almost 100% in some seasons. It was not possible to establish a flow peak threshold that determines the advance or delay of the hydrograph peak with respect to the sedigraph peak, probably due to the small size of the catchment and the bedload fraction characterizing the total transport of some of the events. The disconnectivity present in the upper part of the Rio Cordon basin seems to be the determining factor of the low in-channel sediment presence despite the high erosive potential of rainfall. This research was supported by the Italian Research Project of Relevant Interest PRIN2010-2011, prot. 20104ALME4, ITSE; and by the University of Padova Research Project CPDA149091-WoodAlp