



Modelling of sediment yield of the highly-erodible meso-scale Isábena basin (Central Spanish Pyrenees)

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In dryland regions, reservoir siltation caused by severe upland erosion often threatens reservoir viability. This is the case for the 92 hm³ Barasona Reservoir located at the outlet of the 445-km²-Isábena basin (Central Spanish Pyrenees) which experienced considerable losses in storage capacity during the most part of the 20th century. The major part of the deposited sediments originates from highly erodible badlands, which are well connected to the river network, resulting in efficient sediment conveyance and delivery.

Water and sediment yield of this basin was modelled using the semi-distributed process-based WASA-SED model. The two major headwater catchments Villacarli and Cabecera with very contrasting erosion response were included in the analysis.

Despite the challenges of parameter and data availability at the meso-scale in general, and their high spatial heterogeneity for the Isábena in particular, the hydrological module of the model performed agreeable after calibration. For the sediment module, numerous uncalibrated variations, based on USLE/MUSLE-derivatives and the transport capacity concept, were compared to monitoring data of up to 3 years length. The MUSLE and MUST approaches with transport capacity predicted sediment yield best, with total error as low as 11 % despite the high magnitude of specific sediment yield varying by more than one order of magnitude between subcatchments. Model limitations, i.e. overestimation of sediment yield, have been identified for the lower subcatchments, where hydrologic calibration could not be performed adequately. Furthermore, the results suggest that processes in the riverbed (i.e. transmission losses of water, sediment storage in the river channel) exert an important control on the sediment yield and thus need further investigation.