Seasonal dynamics of streamflow and sediment transport in three research basins with different land cover

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Abstract Three small basins with differing histories of land use in the central Pyrenees were studied to investigate and quantify their hydrological and sediment responses. The highly degraded Araguás basin reacted to most rainfall events, and discharge was mainly related to rainfall characteristics. The hydrological behaviour in the abandoned Arnás basin was more complex, with discharge being strongly related to water reserves and rainfall characteristics. In the forested San Salvador basin, spring was almost the only high flow period, and discharge was always related to preceding rainfall and to pre-event basin wetness. The hydrological behaviour of the three basins partially influenced their sediment responses. The sediment yield in the degraded basin was dominated by suspended sediment, and it was two orders of magnitude greater than estimated for vegetated basins. In the abandoned basin, suspended sediment was important but solutes dominated. In the forested basin, solutes largely dominated over suspended sediment. The results illustrate how land cover influences a basin’s hydrological dynamics and sediment response. The data for the three basins will be useful for calibrating and validating hydrological and sedimentological models, and to predict streamflow and sediment transport responses under different land cover scenarios.

Key words rainfall–runoff relationships; sediment response; land cover changes; experimental basin; Spanish Pyrenees