

Seasonal differences in runoff between forested and non-forested catchments: a case study in the Spanish Pyrenees

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Abstract The hydrological response of two neighbouring catchments in the central Spanish Pyrenees with similar lithology and topography but different land use was compared. One catchment (2.84 km²) was extensively cultivated in the past, and the other (0.92 km²) is covered by dense natural forest. Differences in runoff were strongly related to catchment wetness conditions and showed a marked seasonality: under dry conditions runoff tended to be greater in the former agricultural catchment, whereas under wet conditions it tended to be greater in the forested catchment. One explanation for this switching behaviour could be an increase in the hydrological connectivity within the slopes of the forested catchment as it becomes wetter, which favours the release of large amounts of subsurface flow. Differences in land use (vegetation and soil properties) dictate the contrasting dominant runoff generation processes operating in each catchment, and consequently the differences between their hydrological responses.

Key words water yield; seasonal controls; hydrograph characteristics; forested catchment; land use/land cover change; experimental catchment; sub-Mediterranean mountains