



Hydrological and sedimentary analysis of two recent flash floods in a Mediterranean basin with major changes in land uses and channel shape (Sió River, NE Iberian Peninsula)

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Two important rain events occurred in November 2015 and November 2016 in the Sió River basin (150 km²), a small tributary of the Segre River, within the Ebro River basin (NE Iberian Peninsula), caused two considerable flash floods.

The first event (November 2015) was the most destructive: although the rain only fell on a small area in the headwaters, the subsequent flood killed four people and inundated many dwellings in the town of Agramunt. Total precipitation ranged between 136 and 146 mm in 12 hours, with maximum intensities of 32 mm·h⁻¹ over very dry soils. The highest peak flow along the river occurred in Les Oluges (150 m³·s⁻¹); this peak flow was very much abated when it reached Agramunt (45 m³·s⁻¹) and even more at the junction with Segre River (8 m³·s⁻¹). This runoff reduction of about 90% was caused by a great lamination due to water stored on the flood plains.

In the second event (November 2016) the maximum precipitation within the basin was about 50 mm in 5 hours and the subsequent water discharge did not overflow in the town of Agramunt. In this second event, rainfall data in three locations within the basin and discharge data in two locations will permit the calibration of a hydrological model.

From a hydrological point of view, runoff production has been controlled more by morphology (channel slope and length and basin shape) than by soil type and land use, because these soils have a very limited capacity of retention in the case of heavy precipitation.

Long-time land use management in the basin has incorporated the flood plain to the agricultural fields, thus reducing dramatically the channel dimensions. Thus, the flowing discharge easily overflows and circulates over the flood plains, which store and infiltrate a great part of the runoff. This results in a great buffer effect that laminates the floods and protects the towns downstream.