



## **Spatio-temporal analyses of the 19-21 October 2012 torrential events in the Spanish Pyrenees**

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On 19-21 October 2012, a torrential rainfall episode occurred in the central Spanish Pyrenees with catastrophic effects, damaging properties, public infrastructure and disrupting economic activities. The total amount of precipitation was over 150 with maximum around 250 mm. Using data from automatic rain gauge stations (15 min interval, 26 stations) from Water Planning Authorities (Confederación Hidrográfica del Ebro) and synoptic chart from National Spanish Meteorological Agency (AEMet) we analyze the spatial and temporal evolution of precipitation in the area in which the maximum precipitation values were recorded headwaters of the Aragón and Gállego rivers. Precipitation was produced by two successive different atmospheric configurations. The first event (19 - noon time 20 October) corresponded to an intrusion of cold air in the upper level trough (500 hPa) and migration of a surface cold front from west to east. This caused a clear temporal and spatial distribution of rainfall; hourly values changed from west to east. The evolution of the trough produced a cut-off-low of cold air in the upper levels to the south-east of the Iberian Peninsula, and the migration to the east during the 20-21 October, causing the second torrential event in which the surface prevalent flow changed from west-east to east-west. This second event, lasting until 21 October, was similar in total precipitation amount, but was quite different with respect to the first ones: it had lower intensity and the spatial distribution of the rainfall was temporarily quite homogeneous. We present different selected hydrograms of the river response to show the behavior of various rivers during both events.