



The significance of avulsion phenomena in the alluvial filling configuration of a mountain stream: Venero Claro (Central Spain)

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In the dynamics and evolution of large river floodplains, alluvial fans and debris cones, avulsion phenomena have been considered very important. However, traditionally, in mountain streams, avulsion phenomena have been underestimated because they are not very frequent, and usually they are restricted to little chute cut-off.

Nevertheless, there are mountainous areas where the valley bottom gets wider, and the alluvial filling works like an elongated debris cone. The Cabrera Stream in the Venero Claro reach (Spanish Central System) is one of these special areas. In this case, avulsion phenomena took place triggered by flash floods, and they were usually associated with hyperconcentrated flows, which exceeded the upper level of levees and banks, redefining the sedimentary architecture of the alluvial filling.

In this study, an analysis of geomorphologic and sedimentological evolution of the alluvial filling in Venero Claro have been carried out. On this way, cartography made from the 19th Century until ninety ages were compared, and a stereoscopic analysis of aerial photographs and digital orthoimages were applied. Furthermore, the sedimentary filling was studied applying classic sedimentological techniques, such as a description and interpretation of sedimentary structures and facies analysis at field.

As a result of the geomorphologic evolution analysis, a straightforward evolution model is proposed. This model enhances the relevant importance of the avulsion phenomena in the geomorphologic configuration of the Cabrera Stream in the Venero Claro reach. From the river pattern point of view, the avulsion phenomena originate capture processes in the main stream and its tributaries. As a result of these processes, the drainage network pattern changes successively from dendritic to sub-parallel. On other hand, from the sedimentologic point of view, the stratigraphy is composed of channel facies (debris flow facies and fluvial-torrential gravelbars) and back-levees facies.

Nowadays, the Venero Claro reach is being investigated putting into practice other kind of methods, such as Dendrogeomorphology, distributed precipitation-runoff models and adapted hydraulic models to torrential catchments. These investigations and the abovementioned are carrying out in order to improve the knowledge of geomorphological processes in mountain streams and their hazard assessment.