

# Improving the Flash Flood Frequency Analysis using dendrogeomorphology in the Arenal River (Spanish Central System)

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The flash flood frequency analysis in small river catchments presents specific scientific challenges. One of these, is the lack of information from rainfall or discharge gauge stations or from documentary sources. Dendrogeomorphology studies the response in the wood growth pattern on the trees affected by geomorphological processes. With regard to floods, the dendrogeomorphological evidences bring forward valuable information about single past events and their occurrence periodicity. The main macro-evidence that we can find in the trees is a stem scar originated by a wound in the bark of the tree. This wound remains reflected in the tree ring sequence. The best way to analyze the tree ring sequence is by using a complete section of the trunk. Due to the unfeasibility of cutting down the trees, in Dendrogeomorphology is enough to obtain an increment core. Nevertheless, this study has been based on stem discs analysis facilitated for the felling works in vegetation in the Arenal River, carried out by the Tagus River Water Authority. On this way, 100 samples along the Arenal River crossing Arenas de San Pedro Village (Spanish Central System) have been analyzed. A meticulous fieldwork has been carried out. Every sample was analyzed locating its geomorphological position. Manual skills of count were used to obtain the time of the evidences in the stumps at field. At the laboratory, the sections were polished and the count was made using a magnifying binocular glass. Later on, the WinDendro software was used. As a final result, the temporary distribution of floods in this section of the river for the last 50 years was obtained. As well, an analysis of how this not systematic information improves the flash flood frequency analysis in mountainous catchments has been determined.

Keywords: Dendrogeomorphology, flash flood frequency analysis, mountainous catchment, tree ring, Spanish Central System