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Geomorphological evolution of ephemeral rivers through historical and UAVs images

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Ephemeral rivers hydromorphological processes are intermittent and many times of fast response. Therefore they remain still quite unknown. The geomorphological mapping of river forms and geomorphological units is a useful tool to recognize the evolution, changes and the response of river adjustments of hydrological events.

A diachronic geomorphological mapping has been done in some ephemeral rivers located in Ebro basin, Segura basin and Calabrian ephemeral rivers. We are presenting the specific results of six reaches distributed by the Ebro basin (Tudela, Reajo, Alpartir, Cariñena, Valcodo, Sosa and Seco). The first historical aerial image is that of the American Flight B of 1956-57, another of the mid 80's, the last official ortophotography available (around 2017), and a specific flight with an unmanned aerial vehicle (UAV) done during the winter of 2019. An altimetry correction has been performed on the first two images.

Different categories have been identified within the channel (active channel, principal channel and secondary channel), the sediment bars (vegetated, scant vegetated and non-active paleo-bars), the deposits coming from bank failures or tributaries, rocky areas, exhumed old sediment areas, consolidated or unconsolidated granular bed. The categories were mapped at different scales depending on the image quality (for example, from $\leq 1/300$ scale of the UAV to $\leq 1/1,000$ scale of the American flight).

This evolutionary cartography allows comparing the geomorphology of each river reach among different dates, considering the different resolution of the images and its limitations (i.e. previously, the results were unified to compare among them), and relating to the fluvial processes and changes on the river and basin.

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