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The timing of formation of the Douro and Tejo rivers and implications for the evolution of the landscapes of central mainland Portugal

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The formation and development of major rivers limits the overall pace of the surrounding landscape evolution and drives sediment delivery from source to sink. The timings and rates of river incision may be a response to external influences, such as tectonic or climate driven base-level changes, or alternatively they may be linked to the breaching of internal thresholds, for example, drainage capture events. The Tejo and Douro rivers (also known as Tagus and Duero rivers) each drain a significant portion of the Iberian Peninsula and much of their courses through Portugal are typified by v-shaped valleys that are deeply incised into the surrounding topography. Earlier work has dated fluvial terrace deposits, mostly by luminescence techniques, but also by electron spin resonance and cosmogenic nuclide exposure dating. This has provided constraints on the late Pleistocene histories of the Tejo and Douro rivers, however, the timing of their transition from endorheic to exorheic is not precisely known and whether or not their histories are linked to a common mechanism is unclear.

This study aims to provide age constraints on the early history of the Tejo and Douro rivers, and to examine whether and to what degree the erosion rates of low relief, granite etchplain landscapes within the river's catchment areas are responding to the trunk channel incision. We focus on reaches of the Tejo and Douro rivers located in the eastern sector of mainland Portugal. Samples were collected for cosmogenic nuclide (¹⁰Be and ²⁶Al) surface exposure and burial dating to date upper fluvial terrace levels. In addition, a combination of cosmogenic nuclide exposure ages and depth profiles in bedrock outcrops, alongside basin-wide erosion rate determinations will be used constrain the pace of evolution of nearby granitic landscapes. Preparation of the samples for measurement is ongoing and we will present our initial findings.