

Terraces staircases of Douro and Sabor rivers (NE of Portugal, Iberia): characterizing the last stages of the Douro exoreic system

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In the Iberia Peninsula, the process leading to the fini-Cenozóic exoreic discharge of the Douro basin remains a major geomorphological challenge (Pereira et al, 2010; Anton et al, 2012), particularly, understanding the connection between the geomorphological evolution of the trunk river and its tributaries in the Portuguese sector with the Douro Cenozoic basin in Spain. Good geomorphological and sedimentological data available to interpret the process refers to the last stages of incision and enlargement of the valleys leading to the formation of fill and rocky terraces (Cunha et al., 2010), which are well individualized at confined areas of the Douro and Sabor valleys, as well as on other tributaries rivers of the Portuguese basin.

The main objective is to present the research that is being done about the terrace levels present in the valleys of these rivers (Sabor is the second and longest tributary of the exoreic sector), and compare the fluvial staircases of those rivers located at the interface between the endorheic to the exoreic basin. Furthermore, it is interpreted the tectonic conditioning of the areas where the staircases are well preserved.

This research is based on the analysis of altimetric and hydrographic data available from the Portuguese Military Maps (scale 1: 25,000), the analysis of detailed geological maps (scale 1: 50000), the analysis of digital terrain models and on the fieldwork performed on the area.

The fluvial staircases of both rivers are similar for the first fill terrace above the actual alluvial plain ($T1 = \pm 10/15m$), which is composed mainly by sandy-silt deposits that have Upper Pleistocene/Holocene age and conserve archaeological remains from the Bronze Age (Gaspar et al., 2014). For the upper levels there are big differences in the fill terraces, more levels for the Douro (4-5 levels at Quinta da Canameira site) than for Sabor (2 at Quinta de Barraís), and huge differences in the sedimentary architecture. The second fluvial terrace above actual alluvial plain (T2), tend to be coarser and was explored by the Romans to extract mineral.

The differences of the preserved fluvial staircases on the four main sites, Quinta da Canameira and Barca D'Alva sectors for the Douro River, and Quinta de Barraís and Quinta de Crestelos sectors for the Sabor River, despite of local geological/geomorphological conditions, seems to reflect regional tectonic conditioning, since these fill terraces are well preserved in small elongated depressions with NNE-SSW direction. The faults that bound these depressions are also responsible for the conservation on the area of Mio-Pliocene sediments along small sinistral strike-slip basins, which support the hypothesis of a reactivation of old strike-slip faults that are well impressed on the relief of the area.

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