The NW Iberian river Miño terraces in a new perspective: tectonic implications

Willem Viveen (1, 2), Ronald T. van Balen (3), Jeroen M. Schoorl (1), Antonie Veldkamp (4), Daniel Fernandez Mosquera (2), Jorge Sanjurjo Sanchez (2)

(1) Chairgroup of Land Dynamics, Wageningen UR, Wageningen, the Netherlands. Please send correspondence to wim.viveen@wur.nl or wviveen@udc.es
(2) Instituto Universitario de Geologia, University of A Coruña, A Coruña, Spain
(3) Faculty of Earth and Life Sciences, Vrije Universiteit, Amsterdam, the Netherlands
(4) ICT Enschede, University of Twente, Enschede, the Netherlands

The fluvial terrace staircase in the Galician/Portuguese Lower Miño region has been studied for a long time. Already in 1945 the first systematic study was made by Lautensach, followed in later years by e.g. Teixeira (1952), Nonn (1967) and Alves (2004). Those studies focused on either the Portuguese or Galician side of the river, or covered only a small area in the region. Investigation tended to be focused on either terrace height mapping or sedimentology. Due to the unfavorable conditions for fossil preservation, absolute ages for the Miño terraces are not known. Because of these restrictions, a coherent framework in which to place terrace formation is lacking.
We re-mapped all terrace levels of the Lower Miño using a 5 m DEM, aerial photographs and field studies. Our analysis reveals that terrace distribution is strongly controlled by both small and large scale lineaments. Small lineaments are probably fractures in the granites underlying the terraces. The larger lineaments however, may represent faults. Their principal directions, N-S, NE-SW and E-W, coincide with known fault directions in the area (Pliego-Dones et al., 1972). Throughout the area these faults intersect, forming small rhomboidical structures in which conglomerates and clays are found. The termination of these structures usually marks a step in the landscape towards a new terrace level. Some terrace levels are unusually wide, sometimes up to 1 km.
Inspection of the many outcrops and gravel mines in the region shows that the terraces are made up of predominantly homogeneous course-grained conglomerates and clay banks. Up to 30 m of deposits have been found in some mines, without the base of the terraces being visible. In the upper part of most outcrops, sediments with fluvial characteristics are found. These include clast imbrication, paleao-channels and channel leg deposits. Deposits in the lower part of the outcrops seem to lack these characteristics, especially in one of the larger mines. Preliminary results of quartz-OSL dating of a geomorphologically young terrace yields minimum ages of >100 ka.

These results suggest that in the Lower Miño river basin, a large number of tectonic sub-basins are present, which are controlled by potentially active faults. The sediments found in these basins might therefore be much older basin infill than previously assumed. Correlation with other tectonic basins in NW Iberia points towards a possible Tertiary age. These sediments in turn, may be overlain by more recent alluvial deposits which form the current river Miño terrace staircase.

References

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