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The central Alentejo plateaus: a review of the regional relief units

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Since the 1990s, detailed studies on the relief units of the central and upper Alentejo region have been lacking. Previously, tectonics were used to explain most of the relief units, even those in which lithological differentiation is remarkable, such as the dolomitic plateaus of Elvas and Estremoz. The morphotectonic reliefs like Serra d'Ossa and Serra de S. Mamede were previously explained by vertical tectonics, in a horst-graben system, difficult to understand under the Cenozoic compressive tectonic regime affecting the Western Iberian margin.

The superposition of geological maps with digital terrain models suggests a more complex genesis in the formation of the morphotectonic regional reliefs. The Serra d'Ossa (652 m) develops in a WNW-ESE general trend (N80°W), slightly asymmetrical with a 200 m high north-facing escarpment, much steeper than the south-facing slope. The north-facing escarpment (Ossa Fault – OF) is transversal to the NW-SE variscan structures (N40°W). Thus, this escarpment cannot be explained by differential erosion. Indeed, Feio (1983) already hypothesized a tectonic origin to the Serra d'Ossa, although without presenting a tectonic model.

The western termination of the Serra d'Ossa small scarps, with NE-SW orientation, coincide with the horse tail terminations of the NNE-SSW left strike-slip Graça do Divor fault (GDF). If both GDF and OF are connected, the Serra d'Ossa can be interpreted as a *push up* deformation of the South Portuguese Planation Surface (SPPS).

In this work, a greater relevance of differential erosion is highlighted in the individualisation of Elvas and Estremoz plateaus, as well as the Serra de Monfurado.

Towards the north of the town of Évora, the landscape is formed by broad-bottomed valleys at 240 m, with gentle slope and flat uplands at ca. 320-340 m. Looked in Davisian terms, the valleys looks like a mid-cycle maturity landscape. The flat upland level corresponds to the SPPS, well developed in the upper Alentejo (Nisa and Alpalhão), while the bottom of the valleys correspond to a younger level, embedded ca. 80–100 m in the SPPS. The valley bottoms widens to downstream forming a flattening surface (named N1 fluvial surface) related with the beginning of the incision of the drainage network in the SPPS and with the first (older) terraces of the Tejo and Guadiana rivers.

The prominence in the landscape of the Serra de Monfurado should be understood as a resistant ridge, whose summits were not completely flattened due to the lithological diversity and to the geographic location in the watershed limit of the Tejo, Guadiana and Sado rivers, where the

flattening of the SPPS was difficult to achieve. Differential erosion during the formation of the N1 fluvial surface is thought to be the main responsible for the prominence of this ridge in the central Alentejo landscape, as well as other resistant reliefs as the Monsaraz *inselberg*.

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References:

Feio, M., 1983. O Relevo da Serra de Ossa: uma interpretação tectónica. *Finisterra*, XVIII, 35, 5-26.