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Revisiting the Variscan transpressional tectonics in the Southwestern Iberian suture

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The boundary between the Ossa-Morena Zone (OMZ) and the South Portuguese Zone (SPZ) in southwest Iberia is a Variscan collisional suture with transpressive left-lateral kinematics, contrasting with the dextral component that characterizes most of the Variscan convergence in other regions of the Orogen. Recent work including new structural and radiometric data has improved our knowledge on the geometry and timing of deformations affecting the OMZ/SPZ suture, which can be summarized as follows:

1. Closure of the Rheic Ocean in Late Devonian time is attested by high-pressure and ophiolitic thin allochthonous units emplaced on the southern border of the OMZ. The kinematic interpretation of early stretching lineations and tectonic fabrics indicate that these units were emplaced in a tectonic regime of oblique left-lateral convergence.

2. Transient transtension in Early Carboniferous time gave way to a narrow aisle of newly-formed oceanic-like crust just over the foregoing Rheic Ocean suture, accompanied by mafic magmatism intruded/extruded at both continental sides. Radiometric dating has yielded the same age of around **340 Ma** for the oceanic-like mafic protholiths and their granulite/amphibolite facies tectonic fabric, thus indicating the very ephemeral life of the oceanic-like strip.

3. Oblique convergence was resumed immediately after transtension, first causing northward obduction of the oceanic-like unit and north-verging folding in metasedimentary units of the southern border of the suture. Later on, a south-vergent regional fold was developed synchronous with left-lateral granulite-amphibolite facies shearing. Finally, shear deformation gave way to a low pitch stretching lineation, thrusting the OMZ over SPZ, concentrated on the southern limb of this regional fold and constituting a complex ductile 2-3 km-thick shear band evolving from amphibolite to greenschist facies, developing: (i) high-temperature greenschists at the southern border of the mafic oceanic-like unit, which propagated southwards progressively cooling to low-temperature greenschists; (ii) disruption of layers that produced small fishes of weakly deformed rocks, previously interpreted as sedimentary mélanges. Radiometric dating of acid volcanic rocks included in the low-grade shear zone has yielded an age of **337 Ma**, putting an older limit to shearing. At late Variscan time, a brittle left-lateral shear band partially obliterated the previous syn-metamorphic shear zone.

4. Oblique convergence propagated southwards across the SPZ in Late Carboniferous time, though lateral displacements decreased rapidly in favor of shortening. This deformation has been roughly modelled as a transpressional band characterized by 40% shortening and γ=1 shearing. An age of **330 Ma** yielded by a deformed granite at the northern part of the SPZ probably indicates the arrival of deformation at that point, while stratigraphic data suggest that deformation reached SW Portugal at around **310 Ma**.

To conclude, the transpressive OMZ/SPZ boundary shows strain partitioning, with left-lateral displacements concentrated in ductile to brittle shear zones affecting the suture units, and moderately oblique shortening affecting a broad zone of the SPZ foreland.