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Abstract book

Devonian-Carboniferous syn-orogenic sedimentation on SW domains of the Ossa-Morena Zone: implications for the evolution of Variscan Orogeny

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The Variscan Cycle is well represented from Central-Eastern Europe to North America. In the Iberian Massif crops out one of the best-exposed cross-sections revealing the full anatomy of the Variscan Orogeny. This includes the hinterland domains of the Variscan belt, composed of several zones with distinct stratigraphic, tectono-metamorphic, and magmatic features, in addition to the external domains that encompass both continental and oceanic foreland belts. In the SW of Iberia, specifically in the Ossa-Morena Zone - the outermost domain of the Iberian Massif hinterland -, the stratigraphic succession records the northern Gondwana margin's evolution: it notices the incision and development of the Cadomian magmatic arc during the Ediacaran times, and all stages of the of Variscan Cycle, from the rifting episode that began in the Lower Cambrian, culminating in the opening of the Rheic Ocean and correlated basins during Cambrian-Ordovician times, and their closure during the upper Palaeozoic, culminating in the formation of the Pangaea supercontinent. The SW border of the Ossa-Morena Zone is marked by a suture with the oceanic foreland basin, composed of Devonian-Carboniferous succession of the South Portuguese Zone.

From the Ordovician to the lowermost Early Devonian, the sedimentation in the Ossa-Morena Zone occurs in a passive margin setting. In the Terena Basin (Barrancos region), the Early Devonian succession (Lochkovian to early Emsian) is composed of a siliciclastic succession with significant lateral facies variation and shows turbidite features (Terena Formation) towards the top of the succession, which is followed by a sedimentation gap until the uppermost Devonian to lowermost Carboniferous.

However, along the westernmost domains of the Ossa-Morena Zone, several occurrences of limestones were recognized (Odivelas and Pedreira de Engenharia Limestone successions), either related with volcanic rocks or included in Mississippian successions. These carbonate successions are mainly composed of calciturbidites showing syndepositional deformation, sometimes preserving reefal structures, with Emsian to Givetian ages (based on conodont biostratigraphy). The stratigraphic relation between these carbonate units and both basal and uppermost (Mississippian) siliciclastic successions is not clear, but no Upper Devonian series were recognized, indicating a sedimentation gap during this period. The Mississippian Toca da Moura-Cabrela volcano-sedimentary succession (Tournaisian-Visean in age based on palynostratigraphy) is dominated by a low-density turbidite sequence, episodically bioturbated, deposited in a marine basin conditioned by the tectonic setting, showing syn-sedimentary deformation (e.g. slumps and syn- sedimentary normal faults). The

Mississippian succession shows an angular unconformity with the pre-Devonian succession, outlined by a basal conglomerate. During the Pennsylvanian, a shear zone-controlled basin - Santa Susana Basin - is developed in western Ossa-Morena Zone, being characterized by a coarse- to fine-grained siliciclastic succession, with fossil plants and coal deposits, emphasizing their continental origin.

In summary, the Devonian and Carboniferous stratigraphic record of the SW domains of the Ossa-Morena Zone reveals the transition between the passive to active margin, dating the beginning of the Variscan subduction process (Early Devonian) and consequent continental uplift, and the transition to the collisional stages (Mississippian - Tournaisian).

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