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Tectonometamorphic evolution of the Rehamna dome (Marocco)

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The Morocco Variscan belt is considered to be the south-western continuation of the European Carboniferous orogen on the NW Gondwana margin. The Rehamna Massif in the west (belonging to the Coastal Block) is composed of Cambrian to Devonian sediments covering Proterozoic basement and shows only weak deformation. The central and eastern Rehamna parts belong to the Central zone of the western Meseta, formed by Devono-Carboniferous intra-continental basins and by underlying Proterozoic basement. These basins are reworked by late Palaeozoic deformation under Barrovian geothermal gradient and are intruded by felsic magmas.

Three main deformation events (D1, D2 and D3) of variable intensity and geometry were identified. The first forms a flat-lying metamorphic foliation S1, which is deformed by WSW–ENE trending F2 folds with associated sub-vertical S2 cleavage, then heterogeneously reworked by NNE–SSW trending F3 folds with an S3 cleavage moderately to steeply dipping to ESE. Crystallization–deformation relationships in the Barrovian sequence show that biotite, garnet, chloritoid and staurolite grew in the S1 subhorizontal fabric, and that chloritoid and staurolite continued their growth during the early stages of the development of the S3 fabric. Andalusite porphyroblasts around granitoid in-

trusions show either S3 pressure shadows, pointing to the syntectonic nature of the intrusions or are post-tectonic. Crystallization–deformation relationships, combined with mineral chemistry and mineral zoning are combined with pseudosection modelling into P-T-d paths. Based on these P-T-d paths, three main tectonic events have been recognized: 1) Southward thrusting of an Ordovician sequence over the Proterozoic basement, its Cambrian sedimentary cover and the overlying Devono-Carboniferous basin. This event caused subhorizontal shearing and prograde Barrovian metamorphism of the buried rocks. 2) Continuous shortening resulting first in continuation of burial, then in the development of a syn-convergent extrusion of metamorphosed units to form a dome elongated E–W. This was responsible for syn-convergent detachment of the Ordovician upper crustal sequence. 3) The next episode of convergence took place in a ESE–WNW direction orthogonal to the previous one and is characterized by the accretion of the Rehamna dome to the continental basement in the east. Existing Ar/Ar dating shows that the first and the second deformations occurred during the Late Carboniferous to Early Permian (315–290 Ma) and that the third deformation took place during the Early Permian (290–275 Ma).