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Invited review

Tectonic evolution of Variscan Iberia: Gondwana–Laurussia collision revisited



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ABSTRACT

An integrated interpretation of the late Paleozoic structural and geochronological record of the Iberian Massif is presented and discussed under the perspective of a Gondwana–Laurussia collision giving way to the Variscan orogen. Compressional and extensional structures developed during the building of the Variscan orogenic crust of Iberia are linked together into major tectonic events operating at lithosphere scale. A review of the tectonometamorphic and magmatic evolution of the Iberian Massif reveals backs and forths in the overall convergence between Gondwana and Laurussia during the amalgamation of Pangea in late Paleozoic times. Stages dominated by lithosphere compression are characterized by subduction, both oceanic and continental, development of magmatic arcs, (over- and under-) thrusting of continental lithosphere, and folding. Variscan convergence resulted in the eventual transference of a large allochthonous set of peri-Gondwanan terranes, the Iberian Allochthon, onto the Gondwana mainland. The Iberian Allochthon bears the imprint of previous interaction between Gondwana and Laurussia, including their juxtaposition after the closure of the Rheic Ocean in Lower Devonian times. Stages governed by lithosphere extension are featured by the opening of two short-lived oceanic basins that dissected previous Variscan orogenic crust, first in the Lower–Middle Devonian, following the closure of the Rheic Ocean, and then in the early Carboniferous, following the emplacement of the peri-Gondwanan allochthon. An additional, major intra-orogenic extensional event in the early–middle Carboniferous dismembered the Iberian Allochthon into individual thrust stacks separated by extensional faults and domes. Lateral tectonics played an important role through the Variscan orogenesis, especially during the creation of new tectonic blocks separated by intracontinental strike-slip shear zones in the late stages of continental convergence.

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