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Permo-Carboniferous magmatism in the core of Pangaea (Southern Pyrenees): a possible linkage between the Variscan and Cimmerian cycles?

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In southern Europe and the western Mediterranean, Permo-Carboniferous magmatism is well represented in areas of Iberia, the Alps, Sardinia and the Balkan Peninsula. In Iberia, the magmatism that has been related to the Variscan orogeny is associated with syn-orogenic events at ca. 350-315 Ma and post-orogenic at ca. 310-295 Ma. In the southern Pyrenees there is Permo-Carboniferous sedimentary basins with a significant volume of rhyolitic ignimbrites and andesitic flows. The Erill Castell-Estac, Cadí and Castellar de n'Hug basins are spatially associated with the Boí, Montellá and Vielha granites and the Cardet dacitic dykes emplaced in Variscan basement rocks. U-Pb SHRIMP dating of zircons extracted from these granites, an andesitic flow, a dacitic dyke and six ignimbrites, revealed that magmatism was active from ca. 304 Ma to ca. 266 Ma. The scattering of zircon ages in each sample shows that the history of melt crystallization was prolonged and complex. The reported ages of the magmatic activity for the Southern Pyrenees in the range ca. 304-283 Ma (this study) fit in well with the time interval of magmatism related to the early North-dipping subduction of the Western Paleotethys Ocean, the subsequent development of Iberian orocline (Variscan cycle), and the large-scale bending and blocking of the Paleotethys Ocean subduction at East of Iberia.
In paleogeographic reconstructions of the Permo-Carboniferous, Iberia is located in the core of Pangaea to the east of the probable Rheic Ocean suture and near the western end of the subduction zone of the Paleotethys Ocean. The emplacement in Iberia of granites with ca. 310-278 Ma age occurred after the collision of Laurussia and Gondwana, when the subduction of the Rheic Ocean was inactive. From a Variscan-cycle perspective, the Permo-Carboniferous magmatism of the Pyrenees has been considered as post-orogenic. However, global paleogeographic reconstructions put Iberia in between the Rheic Ocean suture and the still active subduction zone of the Western Paleotethys Ocean. Therefore, the Permo-Carboniferous magmatism of Iberia, from a Cimmerian-cycle perspective, may have accompanied the closing of the Paleotethys Ocean. During this stage of the evolution of Pangaea, the east of Iberia was geologically affected by the active subduction zone of the Paleotethys Ocean. The period ca. 310-285 Ma is marked by the development of an orocline that extends from Iberia to Armorica. The northwards subduction of the western corner of Paleotethys probably caused orocline formation and consequent large-scale bending and blocking of Paleotethys subduction immediately east of Iberia. The Permo-Carboniferous magmatism of Iberia, coeval with this tectonic evolution, shows a mixed imprint of subduction and delamination geochemical signatures. Although this may seem controversial, in our view the magmatic activity preserved in the Southern Pyrenees could provide the missing link between the development of the Iberian orocline and the continued subduction of easternmost segments of the Paleotethys Ocean (Cimmerian cycle) during the evolution of Pangaea.