

Evidence for Cambro–Ordovician bimodal magmatism in the Moroccan Meseta: geodynamic implication

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The Goaïda bimodal magmatism, which occurs as gabbro, dolerite and rhyolitic intrusions in the Neoproterozoic basement and Cambrian platform sedimentary series of the Moroccan Meseta, has been ascribed first to the Variscan orogenesis in the late Paleozoic. Here, we provide new LA-ICP-MS U-Pb zircon ages —ranging from c. 512 Ma to c. 484 Ma— of this magmatism that unveil, for the first time in the Moroccan Meseta, the existence of Upper Cambrian–Early Ordovician magmatism. Inherited zircons in these magmatic rocks yield c. 1.2–1.0 Ga to c. 622–550 Ma dates, pointing to their provenance from Stenian–Tonian to Ediacaran crustal sources in the Panafrikan NW margin of the West African Craton buried beneath the exposed Paleozoic Moroccan Meseta. The affinity of this Cambro-Ordovician magmatism is mainly tholeiite to transitional for the mafic rocks and high-K calc-alkaline for the silicic rocks. As shown by trace element and Sr-Nd-Pb isotopic data from this magmatism and its Neoproterozoic granitoid basement rocks, and evidence of the inherited zircons response to the reworking of the Precambrian crust. Because its Cambro-Ordovician age and varying parental magma signature, the Moroccan Meseta Cambro-Ordovician magmatism might be associated with weakening of the continental lithosphere during the early stages of the Cambro-Ordovician rift along the NW Gondwana margin.