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Tracking the southern Tethys margin in NW Africa (Rif belt, Morocco)

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Abstract. Along NW Africa, scarce relics of the Alpine Tethys crust are associated with the Maghrebian Flyschs. In the Rif belt, a string of potential relics extends as tectonic slivers within the stacked external nappes from the Beni Malek serpentinite massif to the Bou Adel gabbro massif. These relics define the transported “Mesorif Suture Zone” (MSZ), whose interpretation is controversial. Here, we report on the large Bou Adel gabbro, based on detailed mapping and sampling. A thin, tectonic envelope of hydrothermally altered basalts followed upward by marbles and volcanoclastic carbonate meta-breccias is identified. The greenschist-facies metamorphism of the marbles is coeval with the imprint of a flat-lying foliation that affects both the clasts and matrix. Geochemical signature of the metabasalts compare with that of the CAMP whereas the 190-196 Ma-old gabbro exhibits composition between E-MORB and OIB. We hypothesize that the gabbro intruded a Late Triassic-Lower Liassic Volcanic Passive Margin that evolved into a magma-poor transform margin. During the Lower-Middle Jurassic rifting climax, normal faulting and metamorphism would have affected the gabbro envelope subsequently overlain by extensional rafts from the proximal margin. The OCT domain (Beni Malek) would have developed later further north. Non-inverted analogs could be found in the Limpopo and Namibia margins.

Keywords: Rif, CAMP, Volcanic Passive Margin, Magma-poor transform margin, Gondwana rifting.