

Petro-structural and geochemical characterization of magmatism of the mining district of Tighza (Central Massif, Morocco)

M. Toumi^{*}, S. Makhoukhi, T. Remmal

GAIA Laboratory, FSAC de Casablanca, Hassan II University, Morocco

^{*}E-mail: toumimohamed1991@gmail.com

The Paleozoic magmatism of the Tighza Mining District (TMD) is a polyphase emplacement ranging from Upper Carboniferous to Middle Permian. It is expressed overall by kilometric extension dykes oriented in the direction of NE-SW regional structuring. The complex is part of the large late Variscan magmatic corridor that runs along the Zyar-Mrirt anticlinal zone east of the Moroccan Central Massif. The study of structural petrology applied to this magmatic complex makes it possible to distinguish three eruptive groups:

An early hypovolcanic complex with intermediate and felsic dykes of microgranites, microgranodiorites and rhyolites, with a mineralogical composition similar to quartz, biotite, orthoclase and plagioclase. Apatite, zircon and iron oxides form accessory minerals. The whole is affected by a strong hydrothermal alteration, particularly chlorite-micaceous with parallel development of oxides and carbonates.

Granitic stocks of hectometric size, circumscribed, and independent, outcrop in a submeridian alignment within a contact metamorphic aureole generated by buried granite, revealed through gravimetry. The two northern stocks at Mispickel and that of the mine are particularly fresh and show a medium granular texture size with biotite, plagioclase ($An_{25-40an}$) with granodioritic homeogenic enclaves and alumina residues. They are larded with stockwerk of quartz veins with scheelite and mispickel.

Lenses of microleucogranites, set up in subequatorial sinistral shear corridors. The texture is porphyritic micrograsp to rhyolitic white quartz, plagioclase ($An_{<15}$) and primary muscovite shows plastic deformation structures. Veinlets of quartz and muscovites in secondary flakes intersect by shifting the primary phases.

Microtonalites, porphyritic micrograsp, with biotite and plagioclase (An_{30-55}) intersect the granite of the mine and are relatively little altered. They are presented as vein occurrences oriented in two NW-SE conjugate directions at WNW and NE-SW.

The first chemical analyzes in major elements and traces, carried out on 13 samples, collected in the different petrographic groups of TMD, allow us already to specify the aluminous character of this magmatism ($A/CNK > 1$ and $A/NK > 1$) with a strong crustal contribution. The hypovolcanic group with the granitic stocks describe a calc-alkaline signature which tends towards an alumino-potassium trend well underlined by the microleucogranites. The microtonalites which are the last ones to be put in place at the middle-upper Permian limit fit into the calc-alkaline line. The focus of this magmatism in a zone of deep crustal rupture activated as soon as the end of the Variscan compression, allows to explain the syncollisional character of this magmatism as reproduced in the geotectonic diagrams.

Keywords: Tighza, magmatisms, geochemistry, geodynamics