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K-Ar chronology and geochemistry of the Miocene magmatism of Collo-Bougaroun and Edough-Cap de Fer areas (NE Algeria). Temporal constraints on geodynamic evolution of the Eastern Algerian margin between 6° and 8°E

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The "Petite Kabylie" corresponds to the eastern Algerian coastal magmatic chain outcropping from Jijel to the west, up to the plain of Annaba to the east. In this area, the Collo-Bougaroun volcano-plutonic complex, of ca. 300 km2, comprises (1) granular rocks, mainly cordierite bearing peraluminous granites, (2) gabbros that occur at the northern and southern parts of Cap Bougaroun pluton where they are associated with ultramafic rocks and form the layered complex of Yadene?; (3) microgranular rocks, mainly microgranites, that outcrop at the eastern part of the Bougaroun pluton, in Collo basin and El Milia, microdiorites in Bouserdoum and some doleritic or microgabbroic metric veins at Cap Bougaroun and (4) of rhyolitic lava in Kef Cheraïa. The Bougaroun complex form a huge elliptical batholite along a major axis of 20km oriented ENE- WSW that intrudes serpentinized peridotites and kinzigites of the Bougaroun basement to the east. This granitic pluton gives time constraints as it induces deformation and contact metamorphism of the Oligo-Miocene Kabyle sediments of Collo-Oued Zhour basin in the south. These sediments reach the Upper Burdigalien which suggests that the lower limit of emplacement of this granite is coeval at least with this age. The majority of these magmatic rocks show subalkaline affinity with strong enrichment (0.13 to 4.13 %) in K2O during fractionation to calc-alkaline and high-K calc-alkaline affinity for the most differentiated rocks. The felsic rocks (granites, microgranites and rhyolites) are marked by a significant crustal contamination (ξNd = -10, I Sr = 0.720, δ18O = 12 ‰ [1], [2]) during their petrogenesis. However, the presence of basic rocks (gabbros and dolerites) that are depleted in K2O (0.13 to 0.44%) provides information on mantle composition and origin of magmas. The geochemical data on these rocks are discussed in the very particular geodynamic context of the northern Algerian margin.Twenty-four 40K-40Ar analyses were performed on whole rock and separated grain minerals (biotite, quartz and feldspar) from some granites. Grains were chosen in 150-300 μm separates. The obtained results from mineral separates from the granites and gabbros scatter between 21 and 16 Ma. These results appear older compared to field observations that fixe the age of pluton intrusion around 16-17 Ma. Several assumptions are made on the possible origin of the possible excess argon, particularly during crustal contamination of magmas and differentiation processes. Syn-late or post-magmatic hydrothermal alteration is also considered. The Chetaïbi-Cap Fer area shows mafic (gabbro, basalt), intermediate (diorite) and felsic rocks (microgranite and rhyolite) that were emplaced either as lava-flows, sills, dykes or laccoliths intruding Miocene sediments. 14 samples were dated by K/Ar whole rock method and in some cases biotite and quartz & feldspar separates. The results show three groups: between 16 and 15Ma, about 14Ma and about 13Ma. We consider that three distinct magmatic events are responsible for their emplacement.These results agree well with the overall geodynamic context of Algerian margin which was structured during three tangential tectonic events, dated respectively 17 Ma, 15 Ma and 9 Ma.

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