Petrography and thermodynamic modeling of eclogites form Ti-N-Eggoleh area (Sérouènout terrane, Central Hoggar, Algeria).

Narimene Berrahmane[1], Amel Bitam-Derridj[4], Sidali Doukkari[1,2], Khadidja Ouzegane[1], Amar Arab[1,3], Gaston Godard[5]

[1]Laboratoire de Géodynamique, Géologie de l'Ingénieur et de Planétologie, FSTGAT-U.S.T.H.B., B.P. 32 El Alia, Dar el Beida, 16111-Algiers, Algeria.
[2]Département des Sciences de la Nature et de la Vie, Faculté des Sciences, Université Alger 1, Rue Didouche Mourad, Alger, Algeria.
[3]Faculté des Sciences de la Nature et de la Vie et des Sciences de la Terre, Université de Bouira (UAMOB), Bouira, Algeria.
[4]Laboratoire des Ressources Minérales et Energétiques. Université M'Hamed Bougara, Faculté des Hydrocarbures et de la Chimie. 35000-Boumerdès, Algérie
[5]IPGP, 1 rue Jussieu, 75238-Paris Cedex 05, France.

The Ti -N-Eggoleh area (Sérouènout terrane, Central Hoggar, Algeria) is mainly made of high-pressure metamorphic rocks including talc–kyanite–quartz whiteschists, chlorite schists, marbles and partially amphibolitized eclogites (Adjerid *et al.*, 2015). The petrographic study of eclogites combined with thermodynamic modeling has revealed three distinct stages of evolution. The earliest eclogitic stage (M1) is materialized by the association of coarse-grained garnet, omphacite, green hornblende, quartz, epidote and rutile. The granulitic stage (M2) is characterized by the occurrence of orthopyroxene at the expense of omphacite, plagioclase and a second generation of brown hornblende. The final amphibolitic stage (M3) is manifested by thin symplectites of amphibole+plagioclase around coarse-grained garnet, omphacite and hornblende.

Garnet shows quite heterogeneous almandine-dominated compositions (X_{Alm} ranges from 0.49 to 0.58). Primary Clinopyroxene has a highest X_{Jd} of 0.25 whereas orthopyroxene has X_{En} values between 0.25 and 0.48. Eclogite-facies amphibole has pargasitic composition with X_{Mg} ranging between 0.74 and 0.86. Late plagioclase, on the other hand, shows compositions with X_{An} = 0.20–0.95.

In order to trace the pressure-temperature evolution, P-T-X_{H2O} pseudosections are calculated in the chemical system Na_2O–CaO–K_2O–FeO–MgO–Al_2O_3–SiO_2–H_2O-TiO_2–Fe_2O_3 (NCKFMASHTO) using THERMOCALC-345. The eclogitic stage (M1) conditions have been estimated at H_2O saturated conditions between 17–20 kbar and 550 –650 °C using the compositions of coarse-grained garnet, omphacite and amphibole. The granulite-facies stage (M2) on the other hand is H_2O under-saturated and P-T conditions have been estimated at 9–11 kbar and 850–900 °C using the compositions of orthopyroxene, Na-rich plagioclase and amphibole. The retrograde path has been traced using plagioclase, diopside and secondary amphibole that yield final conditions around 9 kbar and 600°C.

Adjerid, Z., Godard, G., Ouzegane, K., 2015. High-pressure whiteschists from the Ti-N-Eggoleh area (Central Hoggar, Algeria): Record of the Pan-African oceanic subduction. *Lithos*, 226, 201-216. DOI: 10. 1016/j.lithos.2015.02.013.