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Brecciation and Ca-Na alteration at the Salaki uranium prospect, Northern Cameroon

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Breccias are amongst the most common fault rocks closely associated with hydrothermal vein-type deposits. The Salaki U-occurrence is geologically situated within the early Neoproterozoic back-arc basin regionally termed the Poli Group. The lithology of this area comprises a diversity of rocks including on one hand metamorphic formations (chloritoschists, amphibolites, metatrachytes and epidotite) and igneous rocks (quartz-monzonite, syenite and granodiorite) on the other hand. The Salaki U-prospect is traversed by three fault sets trending NW-SE (N320E), N-S (N350-N10E) and E-W (N80-N95E). Subsidiary to faults are fractures/joints that extend from the faults into the surrounding rocks. The fault and fracture geometry likely formed in response to the NW-SE direction of shortening over the region. As such, this area is probably part of the Riedel faults/fractures system in the region involving the nearby "Vallée des Rhoniers"and Demsa dextral SZ. Mapping of the study perimeter has demonstrated that breccias are widespread in the area and are typically tectonic and fluid-assisted breccias. Tectonic breccias are characterized by intense fracturing along closely spaced brittle micro-shear planes that give the rock a stockwork appearance. In fluid-assisted breccias, fragments are angular in shape and exhibit mosaic and jigsaw textures. The rock fragments are commonly extensively broken and each clast is characterized by frequently branching or arborescent fissures. These fragments are held together by cement precipitated from hydrothermal fluids. Breccias are associated to veins, and all these structures were favored by the reactivation of this dilation zone and acted as channel-ways for hydrothermal fluids bearing uranium. Uranium mineralization was accompanied by an intense Ca-Na metasomatism that pervasively altered the lithologies of the prospect, and these alterations were initiated by veining and brecciation. Apart from Na and Ca alteration, the hydrothermal facies also experienced hematitization and quartz dissolution. Petrographic surveys have revealed that albite, aegirine and riebeckite developed in response to Na alteration while the Ca episode was mostly characterized by the development of calcite and carbonate.
Geochemical study revealed that breccias from Salaki region generally contain low to very low K2O contents and a comparatively high Na2O contents and the high Na2O contents are always associated with high CaO contents. These Ca-Na metasomatic breccias have U contents varying from 1.33 to 2453 ppm. Thorium is constantly low and thus the radioactivity in the prospect is due to uranium.

Key words: Uranium, Breccias, structural control, Ca-Na alteration, Salaki, Cameroon

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