



Litoral Placers of the Amdeh Fm., Eastern Hajar Mts. (Sultanate of Oman)

Bernhard Pracejus, Frank Mattern, and Lujaina Al-Balushi

Earth Science Department, Sultan Qaboos University, PO Box 36, 123 Al-Khoud, Muscat, Sultanate of Oman
(pracejus@squ.edu.om)

The siliciclastic Amdeh Formation (Member 4; Ordovician quartzites) of northeastern Oman, which has been overprinted by low-grade metamorphism, contains a series of fairly small placer deposits that formed in a beach environment. In an unpublished report by Knox (2006; also referenced by Heward, 2016), it is mentioned that several placers show increased levels of gamma radiation. These radiogenic anomalies were re-examined as part of a larger project on uranium mineralisations in Oman. Two of these lensoid placers, extending over a maximum length of some 6 meters and reaching a thickness of ~ 20 cm, yield radiation values for K equivalent to 3.8 - 7.6 %, U 9.1 - 85.5 ppm, and Th 77.2 - 820 ppm (with the highest levels in the center of the larger upper layer). U and Th can be attributed to abundant zircon, while radiogenic K is most likely related to muscovite, contained in the matrix. Common non-radiogenic heavy minerals accompanying zircon are ilmenite, anatase, and hematite. Much of the ilmenite is replaced by sagenitic aggregates of leukoxene (oriented intergrowths of lath-like anatase crystals practically free of iron) or granular leukoxene, while very fine-grained hematite either occupies parts of the original ilmenite or stains rock fragments. In contrast to the work by Knox (2006), the present study did neither identify tourmaline or monazite in thin or polished sections nor by X-ray diffraction, although an enrichment in P (up to ~ 3600 ppm) and LREEs (La, Ce, Pr, Nd; Σ up to ~ 3300 ppm) suggests trace quantities of the latter mineral. Rift shoulder uplift and the associated subsidence in adjacent areas could explain the abundant quartz in both the enveloping quartzites and the placers contained in the basin (Oterdoom et al., 1999; the Am 4 unit is missing on the uplifted shoulder). The crystalline basement, expressed in the form of granitic boulders (in conglomerates) of the Jabal Akhdar massif (Beurrier et al., 1986a and b; Béchenec et al., 1992), may have provided the igneous source for anatase, ilmenite, zircon and the mentioned tourmaline and monazite. Typical metamorphic minerals, such as amphiboles, garnets, epidote or staurolite as found in the metamorphic sole in the southeast of the location were not encountered in the placers, implying that the placers did not originate from metamorphic rocks.