

Stratigraphy of banded iron formation in El Dabbah, Eastern Egypt

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In the Eastern Desert of Egypt c. 700 Ma-old, Iron formations are present within greenstone belts (El-Gaby et al., 1990). Since detailed stratigraphy of the iron formation and its sedimentary environment are not well understood, we have conducted detailed geological research at Wadi El Dabbah in the middle of the Eastern Desert greenstone belt. The middle area is characterized by low metamorphic grade compared to the north and south areas that have high metamorphism with upper greenschist to amphibolite facies conditions (Khalil and El-Shazly 2011).

The El Dabbah area has been divided into four geological sections by a left-lateral fault (N-S strike) and reverse fault (E-W strike). In the northeast and northwest areas, volcanoclastic rocks are deposited horizontally, which include thin BIF in the northwest area. In addition, this area is covered unconformably by the Hammamat Group which is a continental sedimentary succession showing a dome-like fold structure. In the southeastern area, the main rock types are gabbro, massive basalt and coarse-grained volcanoclastic rocks. BIF are randomly occurs in several places. In the southwest area, coarse-grained volcanoclastic rocks, pillow lava, black shale and BIF make alternating layers. Strata are mostly dipping to the north at around 40-60 degrees. In the southwest area, gabbro and thick lava mainly comprises the basement. In the central unit of the southwest area, the continuity of stratigraphy is preserved, and BIF and black shale are interbedded with pillow lava and volcanoclastic rocks.

Our study focused on two well-preserved areas. We performed XRF and REE chemical analysis for powdered rock samples from both areas. We also analyzed C_{org} and $\delta^{13}C_{org}$ of black shales overlying BIF at the other section. C_{org} is 0.07 ~ 0.12 wt % and $\delta^{13}C_{org}$ is -22.5 ~ -23.5 ‰. Trace elements in volcanoclastic rocks around the BIF are indicative of a volcanic arc basalt origin in terms of a Nb-Zr-Y discrimination diagram. The volcanic rocks consist of sparsely vesicular pillow and massive lavas, and sediments of continental origin are not present except for the BIF and black shale. In conclusion, these formations were likely formed near island arc setting. BIF of this area was deposited repeatedly during a resting stage of the volcanic activity.

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