Magnetic prospection of the manganese occurrences of Abu Ramad area, southern Eastern Desert, Egypt

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Abstract: A detailed total intensity ground magnetic survey was carried out in Abu Ramad area, southern Eastern Desert of Egypt for the purpose of prospecting the manganese occurrences of this part of the country. The magnetic data were corrected for the diurnal variations and reduced to the northern magnetic pole. The reduced to the magnetic pole map was qualitatively interpreted first through the magnetic separation by the 9-points Hanning filter into its regional and residual anomalies and second through the magnetic filtering by the frequency filtering into its low pass, high pass and band pass magnetic anomalies, as well as by the Butterworth filtering into its low pass and high pass magnetic anomalies. Moreover, the reduced to the pole map was quantitatively interpreted first through the determination of the apparent magnetic susceptibility of the basement rocks, second through the basement depth determination and third through establishing the basement tectonics. Finally, the integrated magnetic interpretation was adopted for the exploration of manganese occurrences of the studied area.

Accordingly, the reduced to the magnetic pole anomalies were isolated into their shallow (20 m depth) and deep (120 m depth) anomalies. Also, the basement relief features according to either the step faults model or the dykes and sills model reveal six basement belts. Three swells and three troughs, all trending NW–SE parallel to the Red Sea coast. A left-lateral strike-slip fault dissected these belts in the ENE–WSW trend and displaced them with a lateral movement ranged between 60 and 120 m. Moreover, the manganese occurrences of Abu Ramad area are mostly minor accumulations formed as vein-like bodies filling the fracture and fault system of the dip-slip component. Such manganese occurrences accompany the dykes rooted in the subsurface sequence and associate the sills floored the adjacent discontinuities between the veins implied layers, as well as occur at depths ranged between 40 and 60 and probably deeper to 80 m. They are mostly localized in the northern and western parts of the area rather than the southern and eastern ones.

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Key words: prospecting, magnetic anomaly, interpretation of magnetic data, filtering, exploration