Integrated petrographic and rock-magnetic investigation of ferromagnetic separates of metabasites from Oscar II Land, Western Spitsbergen

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Integrated petrographic and rock- magnetic experiments were conducted on two genetically different metabasites (metadolerites and metavolcanics) from Oscar II Land, Western Spitsbergen. The results of investigations allowed for precise identification of ferromagnetic content and determined their origins.

It is worth emphasizing that standard petro-magnetic analyses are limited to defining the mixture of magnetic properties of all ferromagnetic phases in the samples. The main advantage of the presented research was the fact of conducting rock-magnetic and mineralogical observation on samples containing small separated ferromagnetic grains.

Combined petro-magnetic analysis of separates and "whole-samples" indicated that the main ferromagnetic carriers in metadolerites are non-stoichiometric magnetites intergrowths in titanites, magnetites/maghemites occurring with metamorphic sulphides and the last group- pyrrhotites. Metavolcanics samples are rich in magnetites/maghemites and hematites in paragenesis with metamorphic minerals. There is also a small amount of low-coercivity minerals demagnetized in temperatures 150-200 ºC. Such temperature range and chemical composition could be correlated with fine-grained titanomagnetite / titanomaghemite.

The method of separation used in our investigation significantly raised the resolution of ferromagnetic mineral identification. It allowed us to accurately point out ferromagnetic carriers and connect them with particular history stages of investigated rocks. Conclusions about the origin of ferromagnetic mineralization will be essential for our further palaeomagnetic and petrographic interpretations of this region.

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