

ANORTHOSITES AS SOURCES OF MAGNETIC ANOMALIES

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Anorthosites, plagioclase-rich (>90%) igneous rocks, are rarely considered to be strongly magnetic. We are studying the magnetic properties and associated magnetic anomalies of a number of anorthositic bodies, including metamorphosed anorthosites of Archean age from Lofoten, Norway (the Nusfjord Anorthosite), Grenvillian metamorphosed anorthosites from North America (the Marcy anorthosite, Adirondacks, NY and the Morin anorthosite, north of Montreal, Canada) and post-Sveconorwegian (920 ma) unmetamorphosed anorthosites from the Rogaland igneous complex, southern Norway (Egersund-Ogna, Åna-Sira, and Håland-Helleren bodies) and associated Garsak gabbro norite. These anorthosites have marked negative aeromagnetic anomalies, ranging from a few hundred to several thousand nT. Susceptibilities from the anorthosites show a wide range of values from 10^{-2} to 10^{-5} SI; some bodies are consistent throughout, others, like the metamorphosed Marcy anorthosite, show the wide range of susceptibility values from one site to the next. Natural remanent magnetization (NRM) also varies over several orders of magnitude, but includes a significant number of samples with high remanence, greater than 3 A/m in certain anorthosites. Corresponding Q values range from less than 1 to greater than 60, and indicate that the majority of the observed anomalies are remanence-dominated. Rock magnetic measurements (hysteresis, IRM, and temperature-dependent measurements), AF and thermal demagnetization, and optical studies indicate that although magnetite is present in samples with susceptibilities in the 10^{-2} range, hemo-ilmenite dominates in rocks with lower susceptibilities. In all cases the hemo-ilmenite regions produce larger negative anomalies than those areas where magnetite is present.

Anomalies, susceptibility, anorthosite

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