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A Detailed Study on the Magnetic Mineralogy of the Lower Triassic Sedimentary Rocks from Spitsbergen

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A b s t r a c t

The rock magnetic, mineralogical and Mössbauer spectroscopy studies were undertaken on the Lower Triassic sediments from the West Spitsbergen Fold and Thrust Belt (Bellsund) and the foreland of this orogen (Sassendalen) for a better-constrained interpretation of paleomagnetic results. Magnetic mineralogy here only partly depends on the lithology. SEM and Mössbauer spectroscopy indicated the presence of magnetite and pyrrhotite, both the most probably of secondary origin. Thermomagnetic curves of whole-rock samples show that these rocks exhibit almost pure paramagnetic behavior whereas ferromagnetic separates indicate the presence of magnetite. IRM component analysis (Kruiver *et al*. 2001) shows three main contributors – magnetite, pyrrhotite, and titanomagnetite or maghemite to the remanence with the significant contribution of iron oxides. Identified ferromagnetic minerals display a wide range of grain-size and magnetic behavior with the domination of PSD particles following the SD-MD mixing line on the Day-Dunlop plot. However, the minor influence of SP and SD particles is also observed. Although presented here, rock magnetic characteristic of both areas is similar, sites in the fold belt the most likely were remagnetized, whereas those in the foreland carry the primary magnetization. Due to many potential carriers of the magnetic remanence displaying a broad range of grain size and various magnetic properties, the paleomagnetism of Triassic rocks in Spitsbergen might be difficult in interpretation.

Keywords: Svalbard, West Spitsbergen Fold and Thrust Belt, Lower Triassic, magnetic mineralogy, Mössbauer spectroscopy.

References

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