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The anisotropy of magnetic susceptibility (AMS) and paleomagnetic results from Lower Triassic sequence of West Spitsbergen Fold-and-Thrust Belt – case study.

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Ninety-three oriented rock samples from 12 sites (ca. 450 specimens) located in the Lower Triassic Vardebukta Formation were analyzed. The samples were collected from the Hornsund – Sørkapp area in the southern part of West Spitsbergen Fold and Thrust Belt (WSFTB). The aim of this study was to test the anisotropy of magnetic susceptibility (AMS) method for the determination of tectonic paleostress pattern during the formation of WSFTB. The principal ferro- and paramagnetic minerals were also identified and their influence on the magnetic suceptibility was assessed. The NRM structure was determined in an attempt to link the remagnetization episodes with the well recognized tectono-thermal events related to WSFTB evolution.

The results suggest that the magnetic susceptibility is controlled mainly by the paramagnetic minerals evidenced by the wide range of magnetic susceptibility values (20 – 400*10-6 SI). Only in one site, COND1, were the ferromagnetic minerals more dominant. A considerable variation in the shape of the AMS ellipsoids was noted. In eleven sites a normal magnetic fabric of sedimentary origin was detected which was associated with a relatively good clustering of the maximum AMS axes, caused by the tectonic strain. Samples with normal fabric reveal the presence of strong foliation parallel to the bedding plane. The orientation of the magnetic lineation, which indicates the maximum tectonic strain, approximates the regional structural NNW-SSE trend of the WSFTB. These results seem to support an orthogonal compression model for the formation of the WSFTB. Furthermore, the correspondence of the orientation of the maximum AMS axes with regional WSFTB structural trend is in conflict with interpretations assuming a strong strike – slip regime during WSFTB tectogenesis. The remaining two sites had mixed and inverted fabrics, the latter probably arising from the presence of iron-bearing carbonates in the samples.

Preliminary palaeomagnetic results show that the Early Triassic rocks revealed several NRM components with partially overlapping unblocking temperatures. Magnetite and pyrrhotite are main carriers of magnetic information. Determination of the directions of each components is still being processed.