Trialing the anisotropy of magnetic susceptibility (AMS) to determine the West Spitsbergen Fold-and-Thrust Belt Palaeostress pattern

K. DUDZISZ[1]*, R. SZANIAWSKI[1], K. MICHALSKI[1] AND G. MANBY[2]

[1] *Institute of Geophysics, Polish Academy of Sciences – Centre for Polar Studies KNOW (Leading National Research Centre), Ksiecia Janusza 64, 01-452, Warsaw, POLAND, (*correspondence: k.dudzisz@igf.edu.pl)*

[2] *Natural History Museum of London, Great Britain, Cromwell Road, London, UK*

This contribution investigates the extent to which the anisotropy of magnetic susceptibility (AMS) method can aid the definition of the tectonic palaeostress pattern responsible for the formation of the West Spitsbergen Fold-and-Thrust Belt. The magnetic properties, including: hysteresis loops and the magnetic susceptibility variations at high temperatures, of 31 oriented Lower Triassic rock samples from 4 sites (159 specimens) were analyzed. The main purpose was to identify the ferro- and paramagnetic minerals and assess of the extent to which they have influenced the magnetic susceptibility. Magnetite and pyrrhotite are main ferromagnetic minerals present in most sites and the magnetic susceptibility is controlled mainly by paramagnetic minerals. Only in one site, COND1, were ferromagnetic minerals more dominant. In two 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. The orientation of the magnetic lineation, which indicates that of the maximum tectonic strain, approximates the regional structural NNW-SSE trend of the WSFTB. These results appear to support a pure orthogonal compression model for the formation of the WSFTB. The remaining two sites had mixed and inverted fabrics, the latter probably arising from the presence iron-bearing carbonates in the samples.