

Ref.#: Ge\_11

mgwizdala@igf.edu.pl

## ABSTRACT

### **Magnetic susceptibility of seabed sediments in the region of Bellsund fjord (Spitsbergen)**

Magdalena Gwizdała<sup>1</sup> Grzegorz Kusza<sup>2</sup> Piotr Zagórski<sup>3</sup> Leszek Łęczyński<sup>4</sup> Piotr Bartmiński<sup>3</sup> Andrzej Plak<sup>3</sup>

<sup>1</sup>*Institute of Geophysics Polish Academy of Science - Centre for Polar Studies KNOW (Leading National Research Centre), Magnetism Department, Poland,* <sup>2</sup>*University of Opole, Department of Land Protection,* <sup>3</sup>*Maria Curie Skłodowska University in Lublin,* <sup>4</sup>*University of Gdansk, Institute of Oceanography,*

The paper presents the results of selected magnetic parameters analysis, such as the field and mass magnetic susceptibility, in seabed sediments collected in the vicinity of the Bellsund fjord in Spitsbergen. Sediment samples were collected from three marine areas: Josephbukta, Vestervagen and the lagoon of Recherche, based on the prior bathymetric analysis of the seabed, regarding the existing geomorphological system. Sediments collection was performed with the Van Veen grab.

Field magnetic susceptibility of the investigated sediments were measured using MS2 Bartington meter with MS2B Dual Frequency Sensor. The obtained values of field magnetic susceptibility were converted into mass magnetic susceptibility, considering the density of the samples.

Additionally, sediment grain size was measured using laser diffractometer Malvern Mastersizer 2000, after an ultrasound aggregate destruction step.

Despite a small amount of magnetic materials in the deposits from investigated lagoons, a relatively large variation of magnetic susceptibility occurred. The lowest values of magnetic susceptibility from field observations and detailed analysis have been obtained in sediments from Josephbukta ( $\kappa < 8 \times 10^{-5} \text{SI}$ ;  $\chi < 6 \times 10^{-8} \text{m}^3 \text{kg}^{-1}$ ). A twice as high magnetic susceptibility was found in sediments from the lagoon of Recherche ( $\kappa < 16 \times 10^{-5} \text{SI}$ ;  $\chi < 14 \times 10^{-8} \text{m}^3 \text{kg}^{-1}$ ), while the highest values were recorded in sediments from the Vestervagen ( $\kappa < 30 \times 10^{-5} \text{SI}$ ;  $\chi < 22 \times 10^{-8} \text{m}^3 \text{kg}^{-1}$ ). However, a small magnetic anomaly was revealed near this area, between Rubypynten and Asbestodden ( $\kappa = 57.6 \times 10^{-5} \text{SI}$ ;  $\chi < 36.0 \times 10^{-8} \text{m}^3 \text{kg}^{-1}$ ), which indicates the possible presence of ferromagnetic minerals of anthropogenic origin.

A further analysis of those results was conducted in respect to grain size distribution. Basic sedimentation indices were calculated, including sorting, skewness and kurtosis, with a variety calculation methods.

The studies of magnetic parameters of sediments expand the existing knowledge about the natural environment of the polar regions, and also provide information about changes of the sedimentary environment under the influence of anthropogenic factors.

The work was financed by the National Science Centre project No N 306 703840.