

Magnetometry as a tool to estimate the pollution of marine environment around the small shipwrecks (Gulf of Gdańsk)

Magdalena Gwizdała (1), Maria Jeleńska (), and Leszek Łęczyński (2)

(1) Institute of Geophysics PAS - Centre for Polar Studies KNOW, Warsaw, Poland (mgwizdala@igf.edu.pl), (2) University of Gdańsk, Institute of Oceanography, Gdynia, Poland

Shipwrecks may pose a serious source of contamination for marine environment. This is a very important reason to use all available methods to estimate the pollution extent of marine environment due to wrecks presence, even these small. In this paper we present, the results of magnetic analysis carried out on surface sediment samples collected around the small shipwrecks (Munin and Abille) in the Gulf of Gdańsk (Southern Baltic Sea). Data shows a small amount of magnetic materials in the deposits from environment around shipwrecks. However, a relatively large variation of magnetic susceptibility (χ) occurred. In the samples from the area of Abille wreck, the main carrier of magnetic information is magnetite with a small amount of maghemite or hematite. Whereas the samples around Munin wreck divide into two groups, in terms of magnetic mineralogy – magnetite and maghemite. The values of χ were in the range of $5-8 \times 10^{-8} \text{m}^3/\text{kg}$. However, sediments collected around Munin wreck were more diversified. The highest values of magnetic susceptibility have been obtained in sediments on SW of Munin wreck ($\chi = 12.92 \times 10^{-8} \text{m}^3/\text{kg}$), while the lowest values were recorded on NE of shipwreck ($\chi = 3.07 \times 10^{-8} \text{m}^3/\text{kg}$). The direction of spatial variability of magnetic susceptibility were coincided with near-bottom water currents distribution in the western part of the Gulf of Gdańsk. This correlation between the distribution of magnetic susceptibility and hydrodynamic condition around shipwrecks, allows to determine the direction of contaminant transport.