

# Geomagnetic Anomaly Due to Moving Body in Shallow Water

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## Abstract

Wake is hydrodynamic footprint of a vessel at sea. The Earth's magnetic field makes these footprints visible using magnetic sensors. Geomagnetic anomalies induced by the motion of vessels may extend several kilometers and stay up long hours under certain conditions. Physical properties of this geomagnetic anomaly are studied in this paper. A mathematical model is derived to simulate the anomaly in shallow waters. It is shown that the peak of geomagnetic anomaly spectrum is located in the range of frequencies where the corresponding value of the ambient noise spectrum is less significant. In addition, it is shown that there is an optimum depth in which the geomagnetic anomaly has a maximum. Variation of the geomagnetic anomaly with vessel speed is studied and it is shown that higher speed vessels make stronger anomalies in geomagnetic field.

Keywords: *Geomagnetic anomaly, Shallow water, Magnetometer, Vessel, Mathematical model.*

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