

Investigation of the Magnetic Properties and Trace Elements in Sediments from Thermaikos Gulf, NW Aegean Sea

Elina AIDONA^{1,✉}, Simo SPASSOV², Christoforos CHRISTOFORIDIS³,
Manolis EVGENAKIS³, Olga KOUKOUSIOURA⁴, Miltiadis SEFERLIS⁵,
and Despina KONDOPOULOU¹

¹Aristotle University of Thessaloniki, School of Geology, Department of Geophysics,
Thessaloniki, Greece

²Royal Meteorological Institute, Laboratory of Environmental Magnetism,
Dourbes, Belgium

³Aristotle University of Thessaloniki, School of Chemistry,
Laboratory of Environmental Pollution Control, Thessaloniki, Greece

⁴Aristotle University of Thessaloniki, School of Geology, Department of Geology,
Thessaloniki, Greece

⁵The Goulandris National History Museum, Greek Biotope/Wetland Centre, Thermi,
Thessaloniki, Greece

✉ aidona@geo.auth.gr

Abstract

In the present study sediments cores from the inner part of Thermaikos Gulf are examined by means of magnetic properties. The investigated area covers the gulf and the bay of Thessaloniki, the second biggest city of Greece and metropolitan center in the Balkans. The bay of Thessaloniki is a shallow embayment while the gulf of Thessaloniki is a wider marine area. The main characteristic of both areas is the very shallow zone across the western coast resulting from Axios river supply. In order to investigate the anthropogenic impact sampling of the top 2 cm of the surface sediment was carried out on a monthly basis (January–December 2016) at five measurement stations (S1-S5) situated within the investigated area. Measurements of the magnetic susceptibility have been performed on all core samples with a Bartington MS2C sensor in order to identify possible seasonal variations and differences of the magnetic content between the five measurement stations. Magnetization and coercivity data (Ms, Mrs, Bc, Bcr) have been determined using an induction coercivity me-

ter (Jasonov *et al.* 1998). Additionally, DC magnetometry was performed on selected samples with a MPMS3. Finally the concentration of trace elements has been determined for all studied samples using flame atomic absorption spectrometry.

The spatial distribution of the magnetic susceptibility values reveals the presence of a magnetically enhanced zone (stations S2, S3) in the western part of the study area close to the river outfall. These high values appear to be rather constant throughout the whole year, but with few exceptions during spring time. The Day plot confirms the specific character of these two stations as a differentiation toward the MD fraction is obvious. All magnetic measurements are combined with the concentration of the trace elements and their correlation will be discussed.

Keywords: magnetic properties, trace elements, pollution, Greece.

References

- Jasonov, P.G., D.K. Nurgaliev, B.V Burov, and F. Heller (1998), A modernized coercivity spectrometer, *Geologica Carpathica* **49**, 224–225.