



INTEGRATED ANALYSIS OF MAGNETIC, PALEOMAGNETIC AND RADIOMETRIC DATA IN THE LAKE KINNERET AREA (NORTHERN ISRAEL)

L. Eppelbaum (1) , Z. Ben-Avraham (1) and Y. Katz (2)

(1) Department of Geophysics and Planetary Sciences, Tel Aviv University, Ramat Aviv 69978, Tel Aviv, Israel (lev@frodo.tau.ac.il/+972 3 6409282), (2) Paleontological Division of Zoological Museum, Dept. of Zoology, Tel Aviv University, Ramat Aviv 69978, Tel Aviv, Israel

Lake Kinneret (Sea of Galilee) is a main source of fresh water in Israel. The lake is located in the area of complicated tectonic setting at the northern continuation of the Dead Sea Rift. Absence of wells in the lake basin significantly complicates geological-geophysical data analysis. Map of the total magnetic field of the Lake Kinneret area (ship survey) shows a complex pattern of the magnetic field distribution caused by a combined influence of the basalt flows surrounding this lake and magnetic sources occurring this lake. We propose that positive and negative magnetic anomalies recognized in the Lake Kinneret basin correspond to the basalts of normal and reverse magnetization, respectively. These anomalies in the lake were investigated using modern procedures developed specially for complicated geological conditions: oblique magnetization, rugged relief and an unknown level of the normal field. Applying these procedures (improved versions of characteristic point, tangent and areal methods) quantitative parameters of the targets were determined and their classification was performed. A 3-D modeling of the magnetic field has been successfully carried out for refining data obtained at the previous stage and to computing effects due to proposed geological boundaries and bodies. Detected reverse correlation between the total magnetic field intensity and bottom relief in the eastern part of the lake (S - N direction) indicates presence of reversely magnetized basalts in the bottom or near-bottom section. Absence of significant magnetic anomalies in the central part of

Lake Kinneret was explained by subsidence of basalts within the pull-apart basin to a depth of approximately 1.2-1.3 km. A compiled paleomagnetic map of the basalt associations framing the Lake Kinneret basin was correlated with the paleomagnetic zones revealed in the lake. The recognized paleomagnetic zones in the lake basin mostly are in accordance with the western and northern framing of Lake Kinneret and have some disagreement with the eastern and southern framing. Analysis of radiometric and paleomagnetic data allowing to conclude that in the western part of Lake Kinneret are developed the Early Pliocene basaltic associations. A paleomagnetic profile S - N direction crossing central part of the studied area indicates that the western part of the Lake Kinneret depression maybe interpreted as an inversion trough formed at the area of Pliocene uplift in the northern part of Galilee.