



Reconstruction of Missing Lithology Using Frequency-Domain Electromagnetic and Well Logging Data at Ein Gedi, Dead Sea

Linjing Cheng (1), Uri Basson (2), Ziv Ben-Avraham (1,3), and Michael Lazar (1)

(1) University of Haifa, Leon H. Charney School of Marine Sciences, Department of Marine Geosciences, Haifa, Israel (mlazar@univ.haifa.ac.il), (2) Geosense Ltd., 24 Natan Yonatan St., Netanya, Israel (uri@geo-sense.com), (3) Tel Aviv University, Department of Geosciences, Tel Aviv, Israel (zviba@post.tau.ac.il)

A frequency-domain electromagnetic (FDEM) study was conducted near Ein Gedi in the Dead Sea in order to try to reconstruct missing lithology at a depth range of 0-10 m from an International Continental Scientific Drilling Program (ICDP) borehole. The multiple frequency signals (in-phase and quadrature) were filtered and calibrated, and furthermore inverted to resistivity depth sections. In order to imitate the missing lithology, resistivity depth sections having similar resistivity distribution with the location of borehole were chosen for evaluation. Comparison of gamma ray data from the borehole with the calculated resistivity depth sections shows that there exists highly similar trends between the two datasets. A sequence of three-four main sedimentary layers was reconstructed for the upper part of the borehole. Results show that these layers are saturated with Dead Sea brine, with the bulk of evaporites mainly being located at depths between 1.8 m and 4.2 m. This study shows that it is possible to provide a resistivity view of the subsurface and a spatial distribution of sediments using this geophysical approach.