



A magnetotelluric traverse across the Dead-Sea Transform and the Dead Sea pull-apart basin

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The Dead Sea Transform (DST), which separates the Arabian from the African plate, is one of the largest active strike-slip faults in the world. At the Dead Sea the transform fault forms a large pull-apart basin with a thick accumulation of sediments. In 2006, seismic and magnetotelluric (MT) data were acquired along a 100 km long profile, crossing the Dead Sea pull-apart basin over the Lisan peninsula. This study aims to reveal the crustal and upper mantle structure of the DST fault system and its pull-apart basin resulting from a complex interplay of structural, sedimentologic and geomorphologic processes. Here, we present preliminary results obtained from the MT data.

Overall, 148 MT stations were deployed along the profile with a denser site spacing within the Dead Sea basin and increased site spacing towards both ends of the profile. The period range of the observations was 0.001s to 1000s. At all stations we recorded three magnetic field components and two electric field components.

At most MT sites, apparent resistivity and phase curves indicate 2D and/or 3D effects at periods longer than 1s. The MT stations located in the Dead Sea basin have extremely low apparent resistivity values (< 0.1 Ohmm) particularly in the short-period range (0.001s to 1s). Farther away from the basin to the west and east, the data show increasing apparent resistivity curves.

Data acquisition was accomplished with two independent teams which allowed us to operate with up to 10 sites recording simultaneously in Jordan and Israel. This gives us a great flexibility to use remote reference processing with many combinations of sites. Data quality of single-site processing is generally good, but in populated areas along the profile, noise is evident. At these sites the remote-reference technique may help to overcome bad data quality. Eventually, 3D inversion of the data will be necessary in

order to model 3D features like the highly conductive brines of the Dead Sea and a salt diapir which was found in boreholes.