



## **The DESIRE Airborne gravity project in the Dead Sea Basin and 3D numerical gravity modeling**

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This geo-scientific research focuses on the geological setting of the Dead Sea Transform (DST) and the Dead Sea Basin (DSB) and its resulting pull-apart basins. Since the late 1970s, crustal scale geophysical experiments have been carried out in this region. However, the nature of the crust underlying the eastern and western shoulders of the DSB and underneath the DST itself is still a hotly debated topic among researchers. To address one of the central questions of plate tectonics – How do large transform systems work and what are their typical features? – An international geoscientific Dead Sea Integrated Research project (DESIRE) is being conducted by colleagues from Germany, Israel, Palestine, and Jordan.

In order to provide a high resolution gravity database that support 3D numerical modeling and hence a more comprehensive understanding of the nature and segmentation of the DST, an airborne gravity survey as a part of the DESIRE project has been carried out from February to March 2007. The airborne gravity survey covered the DST from Elat/Aqaba in the South to the northern rim of the Dead Sea. The low speed and terrain-following helicopter gravity flights were performed to acquire the highest possible data quality. In total, 32 north-south profiles and 16 west-east profiles crossing the DST have been measured. Most of the profiles concentrated in areas that lacked terrestrial gravity data coverage, e. g. over the shoulders of the DSB. The airborne gravity data are merged with existing conventional (terrestrial) data sets to provide a seamless gravity map of the area of interest.

The results of the 3D gravity modelling based the GPS analysis, magnetic field characters, seismic researches and analysis of earthquake data allow us to propose that (1) the DSB is divided into two tectonic blocks by the region between the Lisan peninsula and the southern margin of the northern DSB and (2) the tectonic system in the DSB is defined as a counter-clockwise rotating pull apart basin due to the 'Riedel flaking', by which the northern DSB is rotated counter-clockwise from the region and the southern DSB to the opposite direction. The salt diapir below the Dead Sea is suspected to be migrated from the Lisan peninsula to present region by the rotation of the northern DSB, while the Sedom diapir is extended to the SE direction. The Almacik flake along the North Anatolian fault, Turkey is probably another example of such basin.