Geology and tectonics concerning the Dead Sea rift Israel

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Abstract

The ERS1/2 tandem mission opended a new dimension to detect the tectonic framework and especially activ tectonic movements along the Gulf of Aqaba and the Wadi Araba. Data sets before and after the earthquake of November 1995 were studied using the differential interferometry approach. In preparation data of Landsat-TM and SIR-C/X-SAR data were evaluated additionally, for studying the tectonic framework extensively. It could be shown that radar data are an excellent tool for the detection of structural elements especially in areas were faults are covered by loose sediments. recent small scale displacements caused by earthquakes can be detected using the phase information of the radar signal.

The investigations are concentrated mainly on the northern coastal plains of the Golf of Aqaba and the Wadi Araba. The test site is part of the Aqaba-Levant-Structure situated in the Israel/Jordan/Egypt triangle. It is an activ fracture zone with continuous seismic activity. Existing faults developed parallel and vertically to the major stress component are reactivated and vertical and horizontal movements can be observed. Displacements can be expected twice or even more times per year. ERS-1/2 data were studied to detect reactivated fracture zones and corresponding displacement caused by the 1995 earthquake. First results of the ERS-1/2 interferometry application concerning the main fracture zones were demonstrated and displacements of several cm will be discussed.

For the overall understanding of the process and the interpretation of remote sensing data especially the interferometrically processed SAR data, small scale geological, tectonic, soil and land-use maps and DTM´s have to be set up. The relevant parameters are extracted from various optical and microwave remote sensing data (in addition to ERS e.g. Landsat-TM, SPOT, MOMS-02) and completed by ground-truth data. The scientific objectives presented focus mainly on the characterization of lithological and soil parameters as well as landuse to monitor dynamic physical surface properties, for e.g. estimation of erosional features