PRELIMINARY KINEMATIC MODEL
FOR THE GULF OF SUEZ, EGYPT,
USING GEODETIC AND SEISMIC OBSERVATIONS

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Abstract

The Suez Rift has been re-evaluated from recent three GPS measurements and earthquake data analysis. The GPS analysis reveals local principal strains along the southern part taking a NE-SW contraction. However, it takes a NNE-SSW direction in the northern part with tensile principal strains. Throughout the central part of the gulf, the principal strains tend to be in the ENE-WSW direction due to right lateral movement.

The Gulf of Suez can be divided into three seismic provinces. Generally, earthquake activity markedly increases from north to south. Slip vector analyses were carried out for 23 available earthquake focal mechanisms along the Gulf of Suez. In the southern part, the slip vector is generally trending ENE-WSW and NE-SW. However, in the northern part the direction of the slip vector varies from NNE-SSW to NE-SW. The central region represents a seismic gap between the northern and southern provinces with slip vectors of a NE-SW trend.

Contrary to the previous tectonic studies, compressional field has been detected from GPS analysis and focal mechanism solutions of a few earthquakes. This raises from the highly complicated motion of Sinai subplate relative to African plate to the postseismic viscoelastic relaxation of the ductile shallow layers after the occurrence of November 1995 earthquake.

Key words: Gulf of Suez, Global Positioning System, fault plane solutions, slip vectors, tectonic implications.