

Geodynamics Behaviour of Greater Cairo as Deduced from 4D Gravity and Seismic Activities

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Abstract : Recent crustal deformations studies in Egypt are applied on the most active areas with relation to seismic activity. Temporal gravity variations in parallel with the geodetic technique (GPS) were used to monitor recent crustal movements in Egypt since 1997. The non-tidal gravity changes were constrained by the vertical component of surface movements derived from the GPS observations. The gravity changes were used to understand the surface tectonics and geodynamic modelling of the Greater Cairo region after the occurrence of an earthquake of 1992. It was found that there is a certain relation showed by increasing of gravity values before the main seismic activity. As example, relative considerable increase of gravity values was noticed for the network between the epochs of 2000 and 2004. Otherwise, the temporal gravity variations were reported a considerable decrease in gravity values between the two campaigns of 2004 and 2007 for the same stations. This behaviour could explain by compressive deformation and strain build-up stage before the South western Cairo earthquake (July 31, 2005 with magnitude of 4.3) and the stress release stage occurred after the main event. The geodetic measurements showed that, the estimated horizontal velocities for almost of points are 5.5 mm/year in approximately NW direction.

Keywords : temporal gravity variations, geodynamics, greater Cairo, recent crustal movements, earthquakes

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