

## **EGYPT**

### **Mitigation of Natural Events Disasters in Egypt using Seismic and GPS Data**

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During the last century till present NRIAG is doing a great effort to mitigate earthquake disasters in Egypt. It has been estimated that, during historical time more than 50 million people have lost their lives in earthquakes during ground shaking, such as soil amplification and/or liquefaction, landslides and tsunamis or its immediate aftereffects, as fires. The distribution of population takes generally no account of earthquake risk, at least on a large scale. An earthquake may be large but not destructive; on the other hand, an earthquake may be destructive but not large. The absence of correlation is due to the fact that, great number of other factors entering into consideration: first of all, the location of the earthquake in relation to populated areas, also soil conditions and building constructions. Soil liquefaction has been identified as the underlying phenomenon for many ground failures, settlements and lateral spreads, which are a major cause of damage to soil structures and building foundations in many events. Egypt suffered from numerous of destructive earthquakes as well as Kalabsha earthquake (1981, Mag 5.4) near Aswan city and the High dam, Dahshour earthquake (1992, Mag 5.9) near Cairo city and Aqaba earthquake (1995, Mag 7.2). As the category of earthquake damage includes all the phenomena related to the direct and indirect damages, the Egyptian authorities do a great effort to mitigate the earthquake disasters. The seismicity especially at the zones of high activity is investigated in details in order to obtain the active source zones not only by the Egyptian National Seismic Network (ENSN) but also by the local seismic networks at, Aswan, Hurghada, Aqaba, Abu Dabbab and Dabbaa. On the other hand the soil condition, soil amplification, soil structure interaction, liquefaction and seismic hazard are carried out in particular urbanized areas and in the region

near the source zones. All these parameters are integrated to obtain the Egyptian building code which is valid to construct buildings resist damages and consequently mitigate the earthquake disasters. Since the year of 1994 till now, the geodetic observations by means of Global Positioning System (GPS) were applied instead of the terrestrial ones to cover some other regions of the country. These regions include Sinai, Gulf of Suez, Greater Cairo, Aswan and the Middle part on the River Nile. Data adjustment and analysis of the repeated GPS campaigns from the different networks prevailed significant movements which may help in more understanding the geodynamics of these regions. In the meantime, GPS measurements of crustal motions for 189 sites extending east-west from the Caucasus Mountains to the Adriatic Sea and north-south from the southern edge of the Eurasian plate to the northern edge of the African plate were carried out for the period from 1988 till 2010. Estimate of plate motions at stations located at different plates were determined.