

Earthquake Relocations and Constraints on the Lateral Velocity Variations along the Gulf of Suez, Using the Modified Joint Hypocenter Method Determination

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Abstract : Hypocenters of 250 earthquakes recorded by more than 5 stations from the Egyptian seismic network around the Gulf of Suez were relocated and the seismic stations correction for the P-wave is estimated, using the modified joint hypocenter method determination. Five stations TR1, SHR, GRB, ZAF and ZET have minus signs in the station P-wave travel time corrections and their values are -0.235, -0.366, -0.288, -0.366 and -0.058, respectively. It is possible to assume that, the underground model in this area has a particular characteristic of high velocity structure in which the other stations TR2, RDS, SUZ, HRG and ZNM have positive signs and their values are 0.024, 0.187, 0.314, 0.645 and 0.145, respectively. It is possible to assume that, the underground model in this area has particular characteristic of low velocity structure. The hypocentral location determined by the Modified joint hypocenter method is more precise than those determined by the other routine work program. This method simultaneously solves the earthquake locations and station corrections. The station corrections reflect, not only the different crustal conditions in the vicinity of the stations, but also the difference between the actual and modeled seismic velocities along each of the earthquake - station ray paths. The stations correction obtained is correlated with the major surface geological features in the study area. As a result of the relocation, the low velocity area appears in the northeastern and southwestern sides of the Gulf of Suez, while the southeastern and northwestern parts are of high velocity area.

Keywords : gulf of Suez, seismicity, relocation of hypocenter, joint hypocenter determination

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