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Focal depth assessment in Central Alborz

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Several earthquake studies from earth structure and focal mechanism projects to understanding active tectonic features need accurate hypocenters. Different factors like errors in measuring arrival times, inaccurate velocity model, configuration and number of recording stations and distribution and number of the recorded phases can influence the final solution. Various techniques have been developed for reducing some of these effects. Two of these techniques are estimating and removing station corrections or joint inversion for hypocenters and velocity structure. Determination of focal depth from regional networks can be inaccurate. On the other hand accurate depths are important in Central Alborz for regional seismic risk analysis. This region is a high seismic risk area surrounded by many active faults within which about one fifth of the country population is living. Reliable focal depth determination depends on different factors and the standard error for depth (erz) is a rough statistical measure. So based on a predefined criterion we have selected a set of Central Alborz earthquakes recorded by Tehran Telemetric Seismic Network (TTSN) from 1996 to 2004 and then we have tested each event solution for stability and uniqueness of focal depth. The uniqueness test has examined the solutions for secondary rms residual minima which can cause them to converge to depths other than the best rms depth. The stability test has examined the dependence of final depth on the initial trial depth. Results of the both tests are presented by suitable drawings and are quantitatively and qualitatively assessed.