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Earthquake Locations and Three-Dimensional Crustal Structure in Southeastern Sicily (Italy)

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In the present study we used the absolute and differential P- and S- wave data to invert Vp, Vp/Vs on a 3D grid of nodes and event locations in southeastern Sicily (Italy). The inversion code TomoDD (Zhang and Thurber, 2003) was used by combining ca. 13000 absolute travel times and ca. 20000 catalog-derived differential times of about 450 earthquakes. These events, with magnitude ranging between 1.0 and 4.2, were recorded between 1994 and 2003 by a local network, consisting of nine digital 3-component stations. The results of the inversion have been compared with those derived by the application of SimulPS14 program (Thurber, 1983; modified by Eberhart-Phillips, 1993 and Eberhart-Phillips and Reyners, 1997). A good correlation between velocity anomalies and main tectonic faults was found. We also estimated the absolute differences between the standard locations and those from the DD location method based on 1D velocity model (Waldhauser, 2001), standard tomography (Thurber, 1983), and DD tomography (Zhang and Thurber, 2003).