

Interpretation of Seismic Tomographic Images From Local Earthquake Data

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The earthquake tomography is a most powerful tool for imaging the inner earth. Generally we obtain seismic velocity variations both laterally and vertically beneath any station array. Tomographic images usually reflects some features of geological and structural units in any study region. In the travel time tomography, there are three major outcomes; VP, VS, and VP/VS images. Each of them represents different characteristic properties of the inner earth.

In this study, interpretation of the tomographic images obtained from the Denizli basin (western Turkey) where the geothermal potential is high is given. One- and three-dimensional VP and VP/VS structure of the Denizli basin have been determined by using the travel times of the 635 recorded earthquake data and a local earthquake tomography method. Then high-resolution 3-D VP and VP/VS seismic velocity models for the upper 20 km of the crust beneath the Denizli basin and surroundings, and also accurate hypocenter locations were calculated. From the tomographic results, geometry of the basin, structures with high and low seismic velocities, the fault zones, gas/fluid filled formations and pathways of hydrothermal system in the basin were tried to interpret. Also a correlation between earthquake occurrence and tomographic anomalies were concluded.