

The Seismic Velocity and Attenuation Structure beneath the Tatun Volcanic area, Taiwan

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We have investigated the structure beneath the Tatun volcanic zone north of Taipei metropolitan area of Taiwan, area of five million people. We used the data collected from a seismic network deployed for 5 years over the volcanic zone. This plus another data from Taiwan regional networks allow us to carry out tomographic inversions for V_p , V_p/V_s and Q_p structures beneath the Tatun volcanic zone. Based on our results and other geological, tectonic, and seismic findings, we reconstruct the structural evolution of the crust in the Tatun volcanic zone, and discuss the implication to the surrounding faults, fractured zones, and discuss potential future volcanic activities. From the tomographic results, there appear to exist a tube-shaped, highly fractured ancient magma passage with high seismic velocities that parallel to the Chinshan fault, and magma passage extends to the southeast at the depth about 20 km. This structure suggests plutonic intrusion passage beneath the Tatun volcano group that may have been associated with the earlier subduction of the Philippine Sea plate, melting of the subducted plate at depth has generated the magma intrusion that has brought about the Tatun volcanic activities. The high seismicity today also implies a highly fractured crust due to the hydrothermal activities and induced crustal stress. The hydrothermal fluid-rich upper crust as indicated by the low V_p/V_s ratio may have important bearing on the potential hazards associated with the two active faults cutting through both the Taipei Basin as well as the Tatun volcanic groups.

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