A study in tectonic structure in Taiwan in the susceptibility domain

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3-D velocity-susceptibility models were constructed by using the velocity retrieved from seismic tomography transferring into susceptibility through characteristics of minerals and/or rocks determined by Vp and the Vp/Vs ratio in Taiwan. Simulated magnetic anomalies computed from those models via forward methods were compared with the magnetic anomaly map retrieved from field prospection to determine a double constrained model. Profiles sliced from the determined model were utilized to examine well-known tectonic structure reported in the previous studies to confirm the feasibility of the velocity-susceptibility transformation. The determined model shows earthquakes often located in the low-susceptibility in the western side of Taiwan. In contrast, no clear relationship between earthquake locations and susceptibility can be found in volcanic areas. Aseismic areas in the southern part of the Central Mountain Range are dominated by intrusion of igneous with high susceptibility. The Philippine Sea plate subducting beneath the Eurasian plate at the latitude of about 24.5˚ in the eastern side of Taiwan also can be revealed by a downward high-susceptibility zone. In short, the 3-D velocity-susceptibility model provides a novel view of the dominant susceptibility and heat on tectonic structure and geological evolution.

Keywords: Magnetic anomaly, Velocity tomography, Magnetic susceptibility

