



Seismic Velocity Anomalies beneath Tatun Volcano Group, Northern Taiwan

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Volcanic eruption has been a natural disaster for human society. Taiwan is located in the Pacific Ring of Fire. Although there is no obvious phenomenon of volcanic activity in Taiwan, some volcanoes need to be monitored, especially the Tatun Volcano Group (TVG), which exhibits very active hydrothermal activity, is located on the tip of southwestern Ryukyu arc. TVG is about 15 km north to Taipei, capital of Taiwan, and is nearby two nuclear power plants along the northern coast of Taiwan. If TVG erupts, there must be a serious impact and damage to Taiwan.

Since TVG is located within the Yangmingshan National Park, any artificial seismic source is not allowed to estimate possible eruption site and the degree of volcanic disaster. Instead, we use natural seismic waves generated by earthquakes to image the possible velocity anomaly of magma chamber and/or hydrothermal system beneath TVG. We systematically compare the differences of arrival times generated by some local earthquakes and recorded at 42 seismic stations in 2014 for finding any low-velocity zone within the crust. The results show that the arrival times always appeared significant delay at some particular seismic stations, such as Chi-Hsin-Shan (CHS), Siao-You-Keng (SYK) and some other stations at TVG, no matter where the earthquakes occurred. It implies that possible low-velocity zones, which could be the location of magma chamber and/or active hydrothermal system, exist beneath the CHS and SYK areas. This feature is generally consistent with the clustered micro-earthquakes in the shallow crust beneath the CHS area in the last decade.