

The magma system of Tengchong volcanic area from local earthquake tomography

Fei Deng^{1,2}, Qingju Wu¹

1. Institute of Geophysics, China Earthquake Administration, Beijing, 100081
2. Graduate School of Oceanography, University of Rhode Island, Narragansett, RI 02882

Tengchong volcano is one of the active volcanoes in mainland China. It is located on the southeastern margin of the collision zone of Indian-Asia, and it erupted during 1465-1620. Many researches show that low-velocity anomalies and magma chambers exist beneath the Tengchong volcano in the crust. However, the location, size and exact quantity cannot be determined at present. In recent years, we have built a dense passive seismic array around the volcanic crater, which included 9 permanent stations and 6 temporary stations. This small-scale array will help us get a higher-resolution velocity results, and have a better understanding of distribution of the magma reservoir and crustal structure.

The stations recorded about 2800 earthquakes from 2008 to June 2015 which were used in this study. The local tomography method is ray tracing method by program Simulps14 which simultaneously solves for 3D velocity structure and earthquake locations.

The result of P-wave velocity shows possible volcano chambers somewhere and in some depth. The distribution of magma chambers shows of my study in the figure 1. From the figure 1 we can see a complete magma system, which includes two remnant cold and solidified chamber, and a main magma heat flow beneath the Tengchong basin. The magma heat flow may be the heat resource and connected to the two magma chamber in the upper crust, one of them (low-velocity zone) agrees with the higher geothermal field, which is associated with the melt accumulation beneath 8km, its shape shows the magma chamber's trend and size. Besides low velocity zone, there are 2 high-velocity zone. They are interconnected from the depth 20km. Those high-velocity anomalies represent extinct magma bodies or cool and solidified remnant magma system.

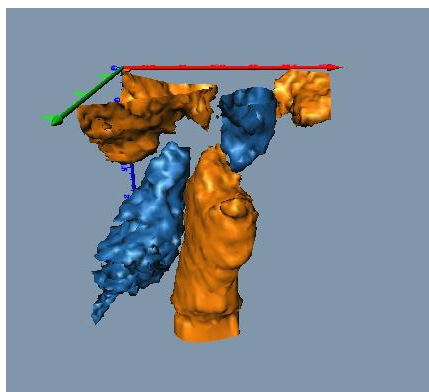


Figure 1 Magma System of study area

(Yellow indicate low-velocity which are associated with accumulation hot and melted materials or magma chambers; the blue materials indicate the is cold and solidified remnant magma system)