

Explore the geothermal structure in northeast Taiwan by seismic data and tomography

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Abstract

The Philippine Sea plate subducts northwestward under the Eurasian plate along the Ryukyu Trench in the northern Taiwan. The Ryukyu subduction zone, which extends from Japan to Taiwan, terminates westward beneath Ilan plain (northern Taiwan). The active volcanic front located 80-100 km above the Ryukyu slab favors the emplacement of back arc basin volcanic rocks. Combination with three different ages of the tomography result, which are Rau (1995), Lin (2004) and Kao-Chen (2012), show the geothermal structure in northeast Taiwan. An inclined high-velocity zone coincides with the Wadati-Benioff zone, as defined by seismicity, is interpretation as the Ryukyu slab. A low-velocity zone lies within the Eurasian mantle on the top of the western Ryukyu slab, at depths ranging between 20 and 100 km. We suggest that the water-rich effect formed by dehydration processes from the sediments, oceanic plate and mantle above the Ryukyu slab. The low-velocity zone rises up and interfere with the Okinawa Trough back arc basin magmas formed. Then magmas pass through veins or narrow conduits upward to the crust.

References

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