

Geochemistry of peridotite and basalts from Yap trench: implication for its tectonic evolution

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On the east side of the diamond shape Philippine Sea Plate, it is the trench system which concludes Izu-Bonin-Mariana trench, Yap trench, Palau and Ayu trench, there is the deepest trench in the world. The Yap Trench, together with the Palau Trench, is located at the southern end of the long chain of trench-arc systems. At the ultra deepest bottom, there is not only unique depositional and diagenetic environment, but also frequent geologic activity caused by plate subduction such as serpentinization, gas release and volcanic earthquake. The Yap and Palau Trenches differ from the Izu-Bonin-Mariana (IBM) Trenches to the north. On seismology, it is markedly lower at Yap and Palau with no evidence of a Benioff zone compared with IBM which has well-developed Benioff zones. The distance between the arc and the trench axis is less than 50 km, much less than those found for other arc-trench systems and it lacks active arc volcanism, which maybe the consequence of the Cenozoic collision with the Caroline Ridge. Moreover, the Yap trench is very short which is from 7°30'N to 11°30', and there is a typical trench-trench junction existing near 11°7' where Mariana trench intersect as a perpendicular angle, and its northern part is the deep valley named North Yap Escarpment. Some researchers suggested that subduction at the Yap Trench may have been terminated by collision of the Caroline Ridge. However, recent studies suggest that the Yap subduction zone is still active. In the inner slope of the Yap Trench at about 6000m deep, ultramafic and gabbroic rocks were observed and considered as the similar one to those exposed in the Parece Vela basin. Since lower crustal and even upper mantle sections of the PSP are exposed on the inner slope of the Yap Trench, it is extremely important for correctly interpreting the petrological and chronological data collected along that arc. There are still very little samples and data from Yap trench, more are needed to understand the geology of it. In this paper, we will report some new samples and its petrology and geochemistry of new peridotite and basalts collected by manned submersible of China 'JiaoLong' at more than 6000m depth from the inner slope of Yap trench, and discuss its evolution implication for the PSP arc system.

Keywords: Geochemistry , Peridotite , Yap trench

