

## **Geochemical constraints on the nature of Yap arc basement rocks and its evolution history**

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Yap arc experience complex plate interactions and tectonic events since its initiation. Metamorphosed rocks predominate on the Yap Islands, instead minor arc volcanics exist, and thus differs markedly from most of the volcanic arcs of the western Pacific, such as Mariana Arc. In this study, we present major-trace elements and Sr–Nd–Pb–Hf isotopic compositions of amphibolites in the Yap arc. The formation age of the studied amphibolites were dated at  $21.37 \pm 0.88$  Ma by in-situ SIMS U–Pb titanite dating, which precisely constraints the timing of collisional event between Caroline Plateau and proto-Yap Arc. Yap metamorphic basement rocks show the remarkable difference in mineral assemblages, geochemical compositions and isotopic characteristics, which can be divided into three different origins: (1) N-MORB type basalts from Parece Vela Basin (PVB) crust; (2) OIB type alkaline basalts from subducted Caroline Plateau, (3) Island Arc Tholeiite of proto Yap arc. These rocks originated in different tectonic settings eventually formed distinct metamorphic complexes and nested on Yap arc as the result of Caroline Plateau collision at about 21.37 Ma. We update the evolution history of Yap Arc and Southern PVB. (1) Early stage subduction from about 30 to 23 Ma; (2) Plateau-Arc collision at 23 to 20 Ma; (3) Rejuvenated subduction at 11 to 7 Ma. This work was financially supported by the National Natural Science Foundation of China (91858206, 41876040), the Strategic Priority Research Program of the Chinese Academy of Sciences (XDA220500101), and the Senior User Project of RV KEXUE (KEXUE2018G09).