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Subduction records of Paleo-Tethys Ocean of Tibetan Plateau: Evidence from High Pressure Metamorphic Rocks of Hongjishan Area, Midwest of Qiangtang

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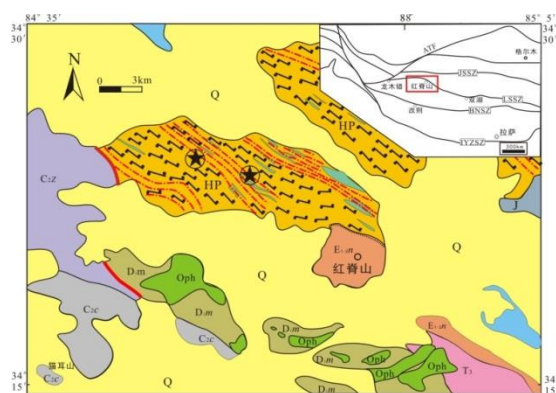


Fig.1 Simplified geological map of Hongji Mountain and adjacent area(after Ref.4)

The metamorphic belt of high pressure and low temperature in central Qiangtang is a high pressure metamorphic belt with the largest internal extension scale and the best outcrops exposed. The high-pressure metamorphic rocks of eclogite and blueschist which are found in the target belt are considered to be the products of plate subduction and collision^[1]. Based on systematic geochemistry and isotope chronology work, this paper mainly studies the blueschist in Hongjishan area which located in Midwest of Qiangtang(Fig.1). This paper aims to restore the protolith types, definite the characters of source area and reduce the tectonic evolution process. The protoliths of the blueschist in the target area are of alkaline basalt and sub-alkaline basalt, among which the former ones have high value of TiO_2 (2.86% ~ 4.84%) which belong to basalt with high-level Ti content and being rich in LREE [(La/Yb) N = 11.42 ~ 20.05] and high field strength element (HFSE). The geochemical characteristics are similar to OIB's^[2]. While the sub-alkaline basalt possess features of low TiO_2 (1.74% ~ 1.81%) , comparably small amount of REE and being slightly enriched in LREE [(La/Yb) N = 2.49 ~ 2.81] . This geochemical characteristic is identical to that of typical E-MORB^[3]. The isotope composition of Sr and Nd reflects that magma is from enriched mantle ($\epsilon Nd(t) = -0.2 \sim 3.8$, $(^{87}Sr/^{86}Sr)_i = 0.70487 \sim 0.70842$). The geochemistry data above show that the basic protolith of blueschist in Hongjishan area originates form intercontinental rift-limited ocean basin. According to LA-ICP-MS zircon dating, the ages of relevant magmatic events are 272.4 ± 3.6 Ma、 288.3 ± 1.9 Ma and 304.2 ± 2.3 Ma which represent the time when protolith of blueschist in target area develop. On the basis of geological background and what has been researched before, it is believed once continental crusted in early Permian in Hongjishan area and it was motivated

by the subduction of Paleo-Tethys Ocean which caused back-arc spreading later. Consequently, intercontinental rift - limited ocean basin was formed and, together with major oceanic basin, turned into converged-compressional environment in Indosinian period. Hence, in late Triassic epoch, the metamorphic belt of high pressure and low temperature in the centre of Qiangtang was formed.

References:

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