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Palaeo-Tethys ophiolites in the Qiangtang Block, north Tibet, China

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The Qiangtang Block is a major tectonic unit of the Tibetan Plateau, but geological studies have been severely limited by the poor accessibility due to its high elevation (>5000 m) and rudimentary road network.

Palaeozoic ophiolitic mélanges have recently been documented in the middle of part of the Qiangtang Block, where they occur in the west and east Gangma Co and Guoganjianian areas [1,2]. These ophiolitic mélanges are composed of serpentinite, pyroxenite, isotropic and cumulate gabbros, basalt, hornblendite and plagiogranite. Most rocks have been metamorphosed to greenschist or blueschist facies grade.

Whole-rock geochemical data show signatures consistent with all the mafic rocks being formed in an oceanic-ridge setting, while positive whole-rock $\varepsilon_{Nd}(t)$ and zircon $\varepsilon_{Hf}(t)$ values suggest that the parental magmas were derived from a long-term depleted mantle source [1-2].

Zircon U-Pb dating of gabbros and plagiogranites yielded ages ranging from 437 to 501 Ma for the west Gangma Co [2], 345 to 357 Ma for east Gangma Co and 345 Ma for the Guoganjianian ophiolitic mélanges [2-3].

The occurrence of the ophiolitic mélange suites suggests that components of a Palaeozoic ocean basin (=Palaeo-Tethys?) is preserved in the middle of the Qiangtang Block and may represent a western extension of the Sanjiang ophiolite that occurs in the east margin of the Tibetan Plateau. Taken together they could mark the trace of the main Palaeo-Tethys ocean basin, which probably opened in the Middle Cambrian, and continued to grow throughout the Palaeozoic. The ocean was closed in the Middle to Late Triassic as inferred from the metamorphic ages recorded in the eclogites and blueschists that were derived from these ophiolites.

The Palaeo-Tethys Ocean was probably formed by the breakup of the northern margin of Gondwanaland, with southward subduction of the proto-Tethys oceanic lithosphere along the northern margin of the supercontinent.

References:

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