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## **Early Paleozoic magmatic rocks in the north-central Tibetan Plateau, China: an Andean-type arc magmatism along the Gondwana margin**

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The early Paleozoic (ca. 530–470 Ma) was a key period in the tectonic evolution of Gondwana. During this time, the amalgamation of the various components of the Gondwana supercontinent was completed, and subduction of the oceanic slab along the peri-Gondwana margin commenced [1, 2]. The final assembly of the eastern Gondwana is generally believed to have occurred between ca. 570 Ma and ca. 510 Ma, with subduction along the Gondwana proto-Pacific margin initiated from ca. 580 Ma to 550 Ma. However, the matter of whether the Gondwana proto-Tethyan margin was an active continental margin in the early Paleozoic remains controversial

The South Qiangtang and Lhasa terranes, located in the central part of the Tibetan Plateau, have commonly been considered to represent microcontinents of the Gondwana supercontinent along the northern margin of the proto-Tethyan margin in the early Paleozoic. Recently, Early Ordovician granites (ca. 486-480 Ma) [3] and Middle Cambrian rhyolites (ca. 525-510 Ma) [4] were recognized from the South Qiangtang and Lhasa terranes, respectively. The granites and rhyolites are interpreted as resulting from partial melting of Proterozoic metasedimentary rocks with mantle-derived magma contributions. Contemporaneous magmatic rocks in the early Paleozoic have also been recognized in other microcontinents along the Gondwana proto-Tethyan margin. Their geochemical features suggest a subduction affinity.

The proto-Tethyan margin of Gondwana used to be regarded as a passive margin in the early Paleozoic, based on the following: (1) early Paleozoic Andean-type magmatism was rare along the proto-Tethyan margin of Gondwana, especially along the Australian proto-Tethyan margin; (2) the Mandi basalts (ca. 496 Ma) in the Himalaya terrane were assumed to have been emplaced in an intraplate extensional setting; (3) the lack of early Paleozoic metamorphism and deformation along the peri-Tethyan margin of Gondwana; and (4) a Cambrian–Ordovician angular unconformity, which is widespread within the Himalayan orogeny and which was interpreted to be the record of a regional event in the northern Indian continent. However, new geologic and detrital zircon data have shown that the Lhasa terrane came from the Australian proto-Tethyan margin, and that early Paleozoic Andean-type magmatism took place in the Lhasa terrane. In fact, the early Paleozoic magmatism was rather extensive along the proto-Tethyan margin of Gondwana [3-5]. Furthermore, coeval metamorphism and deformation have now been identified in the present-day Himalayan orogen, such as from Pakistan, NW India to Nepal, and on the southern Tibetan Plateau. Recently, the Cambrian–Ordovician angular unconformity has also been discovered in the Lhasa and Baoshan terranes, and it is similar in character to the coeval angular unconformity that exists throughout the Himalayan orogen. We suggest, therefore, that there is abundant evidence for the presence in the early Paleozoic of an active continental margin along the proto-Tethyan margin, following on from the final assembly of the Gondwana supercontinent.

*References:*

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