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Northern Continental Margin of the Gondwanaland in Early Paleozoic: insights from restoration of two orocline orogens in the Proto-Tethyan Tectonic Domain

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The global models of Early to Late Paleozoic plate reconstruction reveal that many Chinese continental blocks were isolated blocks in the Panthalassa Ocean. However, these reconstructions have no good constraints in geology. Recent geological and geochronological constraints imply that all the Chinese continental blocks had an assembly event in about 400 Ma. We selected two important orogens, i.e., the Central China Orogen between the North and South China blocks, and the Himalayan Orogen, for establishing the Early Paleozoic tectonic evolutionary history. We propose that there are two orocline orogens in the Proto-Tethyan Tectonic Domain. 1) In the Central China Orogen, the Kuangping-North Qilian Ocean represents one major branch of the Proto-Tethyan Ocean, it is closed in Siliurian and curved to extend along the North Qaidam and then to the North Kunlun Orogen around the eastern end of the Qaidam Block. The subduction polarity is southward which is remained in the North Qinling and West Kunlun, the North Qaidam margin and the North Kunlun aligned in one “S” shape. 2) In the Himalayan Orogen or Tibet Plateau, there are many Early Paleozoic I-type plutons in the Weste Qiangtang and Lhasa terranes and ophiolites of 540-410 Ma age extending westward to Iran and Turkey and southward to North India and Australia and some Silurian high-pressure granulites along the Longmu co-Shuanghu, Changning-Menglian, Chiang Mai/Inthanon, Chanthaburi, Bentong-Raub faults in one opposite “C” shape. The subduction polarity is also southward. However, the subduction polarity is northward along the Simao Block south of the Indosinian Block and the South China Block. Two orocline orogens are merged as one “∑” shape in West China.

Oroclines are common related to assembly of many micro-continents in many orogens and subduction zones. These micro-block-related plate reconstructions are very complex and difficult. Many geological data to yield their tectonic evolution are necessary. If we restore all the present-day bended terranes in China as one string of island arcs as the present-day Andean Island Arc, we can find that the present-day configuration of Early Paleozoic China geological fragments, which were originated and dispersed from the northern continental margin of the Gondwanaland, displays as two orocline orogens. Coevally the South China and North China blocks collided with the Gondwanaland at the end of Early Paleozoic. Especially the detrital zircon age spectra of the Early Paleozoic strata in these fragmented blocks show different affinities with the Gondwanaland. The North China Block had not a close affinity with the Gondwanaland before Early Paleozoic, possibly originating from the close position of the Siberia Craton. But other fragments were peri-Gandwanaland. After Early Paleozoic, these fragments were drifted away from the Gondwanaland toward the northern hemisphere during the break-up of the Pangea.