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Permian sequences and faunas in the peri-Gondwanan region and their palaeogeographical and tectonic implications

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The rifting and drifting of different tectonic blocks in the peri-Gondwanan region has long been one of the most hotly-discussed issues among geoscientists. Extensive investigations during the past decade indicate that numerous sections with carbonate and clastic deposits containing abundant Permian faunas are distributed in the Himalayan region and the Indus-Tsangbo Suture Zone in southern Tibet. A detailed comparison of faunal affinities among different tectonic blocks in different stages in the Permian Period suggests that nearly all blocks in the peri-Gondwanan region including the Qiangtang, Baoshan, Tengchong, Lasha and the Himalaya Tethys Zone are characterized by containing diamictites and typical cold-water faunas in the pre-Artinskian time, therefore were probably in a relatively high-latitude area and attached to the northern margin of Gondwanaland. By the end of late Sakmarian or early Artinskian time, warm-water faunas first occur in the Baoshan and Tengchong blocks in western Yunnan, which probably implies that those blocks began to drift away from the peri-Gondwanan margin and they moved to a relatively warm temperate zone in the Late Guadalupian (Middle Permian), as indicated by widespread distribution of warm-water faunas and carbonate deposits. The earliest warm-water faunas occurred in the Midian in the Lasha Block, which suggest a slightly later rifting and/or climatic amelioration than the Tengchong and Baoshan blocks. Numerous exotic blocks between the Lhasa Block and the Himalaya Tethys Zone containing abundant Middle Permian fusuline faunas and compound rugose corals also indicate a different palaeontological contents and palaeobiogeographical affinities between the Lhasa Block in the north and the Himalaya Tethys Zone in the south. By the Late Permian (Lopingian) time, these palaeontological and palaeobiogeographical disparities became more evident, therefore strongly suggest that the Lhasa Block probably rifted away from the peri-Gondwanan region in the early Middle Permian, a much earlier open time of the Neotethys, not Triassic as previously suggested.

Keywords: Permian, tectonic blocks, peri-Gondwanan region, faunas, rifting, drifting