The break-up of the Indian subcontinent from Gondwana: constrain by detrital zircon U-Pb dating of mid-Paleozoic-early Cenozoic strata in eastern Nepal

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The rifting and the amalgamation of earth landmass is a continuous process. The assembly of the Gondwana lasted from \textasciitilde730 \text{Ma} to 500 \text{Ma}, and most of the mass is covered by glaciation at the southern hemisphere. Afterthought experienced multiple episodes of rifting and collision of small ribbon shape microcontinents. The extra-peninsular Gondwana sequence is discontinuous in the Himalayan orogenic belt while peninsular Gondwana sequence is broadly distributed in numerous intracratonic basins of peninsular India. The detrital zircon U-Pb ages from Permo-Carboniferous sequence peak at \textasciitilde1164 with a subordinate peak at \textasciitilde1305 \text{Ma}. This result emphasised that the sediments were mainly sourced from the Stenian magmatism in Albany-Fraser orogeny or the East Africa-Nibua and eastern coast of India, and southwest Australia. Also, the unit also contains sporadic volcanic unit (Baraha Volcanics). The Saptakoshi Formation, uncomfortably overlain the Khokha Diamictite, yield the peaks at \textasciitilde522 \text{Ma} and 941 \text{Ma} with a younger peak at \textasciitilde113 \text{Ma} with some older peaks at \textasciitilde1811 and 1917 \text{Ma}. This younger detritus possibly sourced from the Rajhmahal basalt (~115-120 \text{Ma}) while the remaining grains show a similar trend to the underlying Diamictite and overlying Tamrang Formation. Additionally, the Tamrang Formation have peaks at \textasciitilde976 \text{Ma}, and 1716 \text{Ma}, identically identical to the Greater Himalayan sequence. The U-Pb age distribution of these three units coincide with the Tethys Himalaya further brings the possibility that either they share the same provenance or recycled from the Tethys Himalaya till Permian and onwards there was input from the Lhasa terrane, South Qiangtang terrane, and Indo China blocks.