An early Paleozoic silicic large igneous province in NE Gondwana: a preliminary synthesis

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Five major oceans (Iapetus, Rheic, Proto-Tethys, Paleo-Tethys and Paleo-Asian) formed during or after assembly of the Gondwana continent. However, the relationship between them is poorly understood, largely due to the complex and disputed evolution of NE Gondwana in the early Paleozoic. Here we present a summary of early Paleozoic tectono-thermal events in the NE Gondwana and discuss their tectonic settings. Early Paleozoic magmatic rocks are widely distributed in the Himalaya, Lhasa, Southern Qiangtang, Baoshan, Sibumasu and Tengchong terranes, and their ages were loosely constrained to be ca. 530-430 Ma. However, after a critical review of these dating results, we propose the magmatic rocks were mostly formed between ca. 500-460 Ma. Although bimodal, they are dominated by granitoid rocks distributed over an area of >2500 km × 900 km. Thus, they constitute a typical silicic large igneous province. Almost all granitoid rocks were derived from partial melting of sedimentary rocks, but a few show A-type characteristics. Coeval amphibolite-facies metamorphic rocks yield ages of 490-465 Ma. A sedimentary hiatus marked by either a disconformity or angular unconformity coeval with the major magmatic flare-up period is evident in all terranes. Thus, present evidence doesn't favor either the conventional Andean-type subduction model, in which these magmatic rocks reflect subduction of Proto-Tethys oceanic lithosphere beneath the northern Gondwanan margin, or a post-collision setting, in which extension is associated with the collapse of the Pan-African orogeny in NE Gondwana. The tectonic setting for this magmatic province is tentatively related to a plume in a far-field subduction zone.