Formation and forward propagation of the Indosinian Nanpanjiang foreland basin and foreland thrust belt in SW China

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Nanpanjiang Basin (also called the Youjiang Basin or Dian-Qian-Gui Basin in literatures), the foreland basin of the Indosinian orogenic belt, is located on the boundary belt between the South China and Indochina Blocks. This foreland basin is characterized by a transition from the Early Triassic shallow-marine carbonate platforms to Middle and Upper Triassic continental facies clastic rocks and reworked by the subsequent Indosinian foreland thrusting and deformations. The development of the Indosinian foreland fold-and-thrust belt remains underappreciated in part because of the loose constraints of the transition from basin deposition to deformation and erosion. In this study, we present two geological cross-sections that synthesized field geological investigations, together with the structural interpretation of three seismic profiles, and LA-ICP-MS detrital zircon age constraints. The results reveal that the thrust belt is characterized by fault-related folds with duplex and imbricate thrusts, which yield the NNE-trending regional shortening estimate of \(-36\%\). The new constraints indicate that the Nanpanjiang foreland basin formed before 237 Ma (D\textsubscript{1}) was overridden by the following NNE-ward progressive deformations, including 237-225 Ma thick-skinned thrusts (D\textsubscript{2}), 223-183 Ma thin-skinned thrusts (D\textsubscript{3}), and after that entire basin-involved deformation (D\textsubscript{4}). Subsequently, D\textsubscript{1} was re-deformed and superimposed by the Middle to Late Jurassic NNE-striking fault-related fold system (D\textsubscript{5}). D\textsubscript{1}\textsuperscript{1-4} reveals a NNE-verging propagation in-sequence foreland thrusting which overrode the foreland basin and the corresponded NNE-ward progressive foreland basin during the Indosinian.