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New insights into Early Paleozoic tectonism of South China from structural geology, U-Pb geochronology and $^{40}\text{Ar}/^{39}\text{Ar}$ thermochronology

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The early Paleozoic orogeny in South China, involving significant crustal contraction, is manifested by a regional Late Devonian unconformity, ductile shearing, metamorphism, folding, and voluminous Silurian plutonism. Despite many advances, the paucity of structural data inhibits our ability to delineate the related synorogenic structural framework. This in turn leads to uncertainty regarding how the orogeny involved and its geodynamic origin. To address the uncertainty and improve understanding of early Paleozoic tectonism, we conducted structural coupled with thermochronological and geochronological studies in the Jiangnan Orogen and the north Cathaysia. Early Paleozoic deformation, according to our results, corresponds to combined E-trending dextral and northwest-directed thrust shearing that was variably partitioned in anastomosing high-strain zones under greenschist facies conditions in the Jiangnan Orogen, and involves pervasive sinistral shearing along NE-SW shear zones under greenschist to amphibolite facies conditions in the north Cathaysia. Combined dating by U-Pb and $^{40}\text{Ar}/^{39}\text{Ar}$ shows that such deformation commenced at ~451 Ma, terminated around 420 Ma and was followed by cooling through ~450-350°C at ~400-370 Ma. Synthesis of our data with previous work allows tracing an early Paleozoic orogen that extends through the Jiangnan Orogen into the north Cathaysia, with the Jiangnan Orogen marking its core and the southeast Yangtze acting as its foreland fold-and-thrust zone. This orogen shows prominent NW-SE contraction related to the intracontinental convergence between the Yangtze and Cathaysia Blocks, externally induced by the amalgamation of South China and Australia during final assembly of Gondwana.

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