

The tectonic setting and connection of Hainan with other plates during Mesoproterozoic: Evidence from bimodal igneous rocks in Hainan

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The Baoban Complex outcropped in South Hainan is the only Mesoproterozoic unit within the Cathaysia Block. It's the key for tracking the tectonic environment and paleogeographical location of Cathaysia Block in supercontinent Columbia.

Our data show that the gneissic granites, metadiabases, metagabbros and plagioclase amphibolites synchronously crystallized at 1445–1420 Ma. The gneissic granites are mainly composed of monzogranites and granodiorites and show I - type geochemical affinity, with $\epsilon_{\text{Nd}}(t)$ ranging from -2.4 to -0.7, $\epsilon_{\text{Hf}}(t)$ from +0.1 to +6.6 and $\delta^{18}\text{O}$ from 6.1 to 8.7, respectively, suggesting a crustal origin. Three subgroup metabasites are identified, involving OIB-, E-MORB-like and modified MORB, with $\epsilon_{\text{Nd}}(t)$ of +6.8~+6.9, +5.5~+5.9 and ~+5.1, and $\epsilon_{\text{Hf}}(t)$ of +10.5~+12.7, +10.3~+12.4 and +9.7~+12.5, respectively. The coeval felsic and mafic rocks in South Hainan constitute the bimodal magmatic assemblage in a rift setting, resembling to those in West Laurentia, suggesting the South Hainan had been involved in the fragmentation of Columbia and might be close to West Laurentia at ~1.43 Ga.

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