

Wang, Y.-J., Zhu, W.-G., Li, Z.-X., Zhong, H., Bai, Z.-J., Leng, C.-B., and Xu, J.-B., 2023, Two episodes of late Mesoproterozoic magmatism in the southwestern Yangtze Block, China, and their association with Grenville-aged orogenic cycles: GSA Bulletin, <https://doi.org/10.1130/B36604.1>.

## Supplemental Material

**Figure S1.** Representative field photos and microscopic photographs of mafic rocks in this study. (A–B) The ~2-m-wide Tong'an mafic dike intrudes the purplish-gray slate of the Third Member of Tong'an Formation at a high angle. (C–D) Microscopic photographs of the Tong'an mafic dikes and the Boka dolerites. Amp—amphibole, Bt—biotite, Chl—chlorite, Cpx—clinopyroxene, Pl—plagioclase.

**Figure S2.** Plot of whole-rock  $\varepsilon_{\text{Nd}}(t)$  versus age (Ga) for the Boka dolerites, Lanniping gabbros, and Tong'an dikes. Coeval mafic-felsic rocks are shown for comparison. Mafic rocks have the same sources and abbreviations as those in Figure 3. Data of felsic rocks come from Zhu et al. (2016) and Wang et al. (2019). Data of the Lanniping gabbros come from Yang (2016).

**Figure S3.** Covariations of the high field strength elements (e.g.,  $\text{TiO}_2$ , Th, Nb, Nd, Eu, Yb), compatible element (e.g., Ni), and large ion lithophile elements (e.g., Ba and Sr) relative to Zr contents for the Boka dolerites, Lanniping gabbros and Tong'an dikes. Data of the Lanniping gabbros from Yang (2016) are also shown.

**Figure S4.** Covariations of  $\text{SiO}_2$ ,  $\text{TiO}_2$ ,  $\text{Fe}_2\text{O}_3^{\text{T}}$ , CaO,  $\text{Al}_2\text{O}_3$ ,  $\text{CaO}/\text{Al}_2\text{O}_3$ ,  $\text{P}_2\text{O}_5$ , Ni, and Cr relative to MgO contents for the Boka dolerites, Lanniping gabbros, and Tong'an dikes. Minerals including olivine (Ol), clinopyroxene (Cpx) and plagioclase (Pl) are also plotted. HTB represents average Emeishan high-Ti basalts (Bai et al. 2019b). Ap—apatite; Ilm—ilmenite. The line separating the peridotite melts from the pyroxenite melts in D follows the function of  $\text{CaO} = 13.8 - 0.274 * \text{MgO}$  (wt%) (Herzberg, 2006). Note that compositions of the Lanniping gabbros are controlled by two different trends of mineral accumulation. Sample LNP1217 from Yang (2016) represents the exact Lanniping sample with least volume of cumulus minerals.

**Figure S5.** Th/Nb versus  $\text{TiO}_2/\text{Yb}$  plot for the late Mesoproterozoic mafic rocks in the southwestern Yangtze Block. The diagram is modified from Pearce et al. (2021). Mafic rocks have the same sources and abbreviations as those in Figure 3. MORB—Mid-ocean ridge basalt, OIB—Ocean Island basalt, EM-OIB—enriched mantle-rich OIB, OPB—Oceanic plateau basalt, IAB—Island arc basalt, BABB—Back-arc basin basalt, FAB—Forearc basalt, SZLM—subduction-modified mantle, Trans.—transitional. Sample LNP1217 from Yang (2016) is specially marked.

**Table S1.** Cameca secondary ion mass spectrometry (SIMS) zircon and baddeleyite U-Pb isotopic analyses for the late Mesoproterozoic mafic rocks from the Huili-Dongchuan area, southwestern Yangtze Block.

**Table S2.** Major-element (wt%) and trace-element (ppm) data of the late Mesoproterozoic mafic rocks from the southwestern Yangtze Block.

**Table S3.** Sm-Nd isotopic compositions of the late Mesoproterozoic mafic rocks from the southwestern Yangtze Block.

**Figure S1**

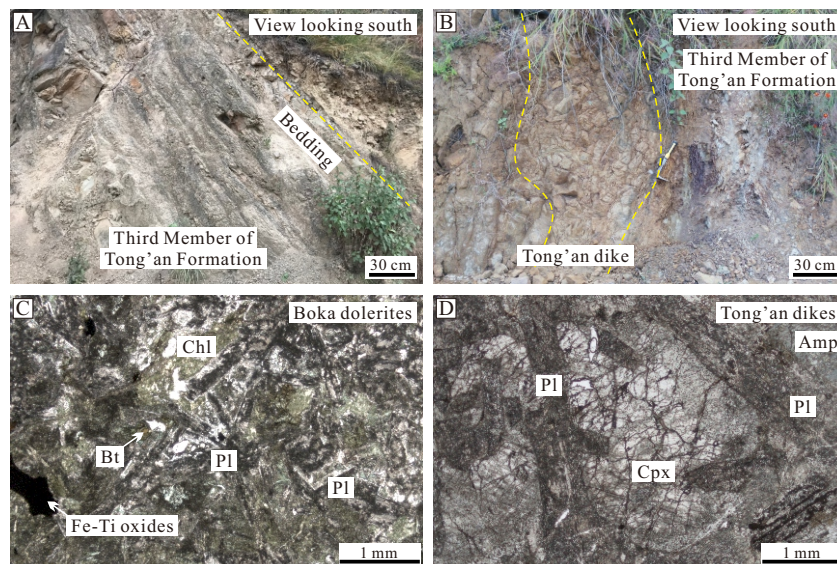


Figure S2

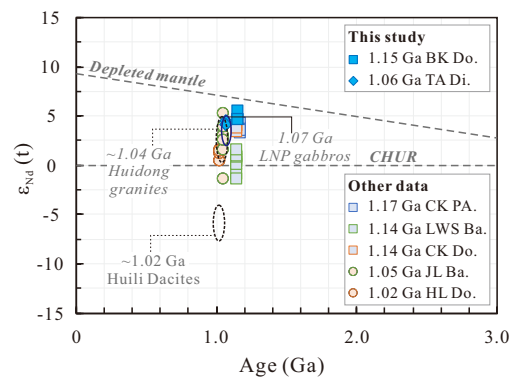


Figure S3

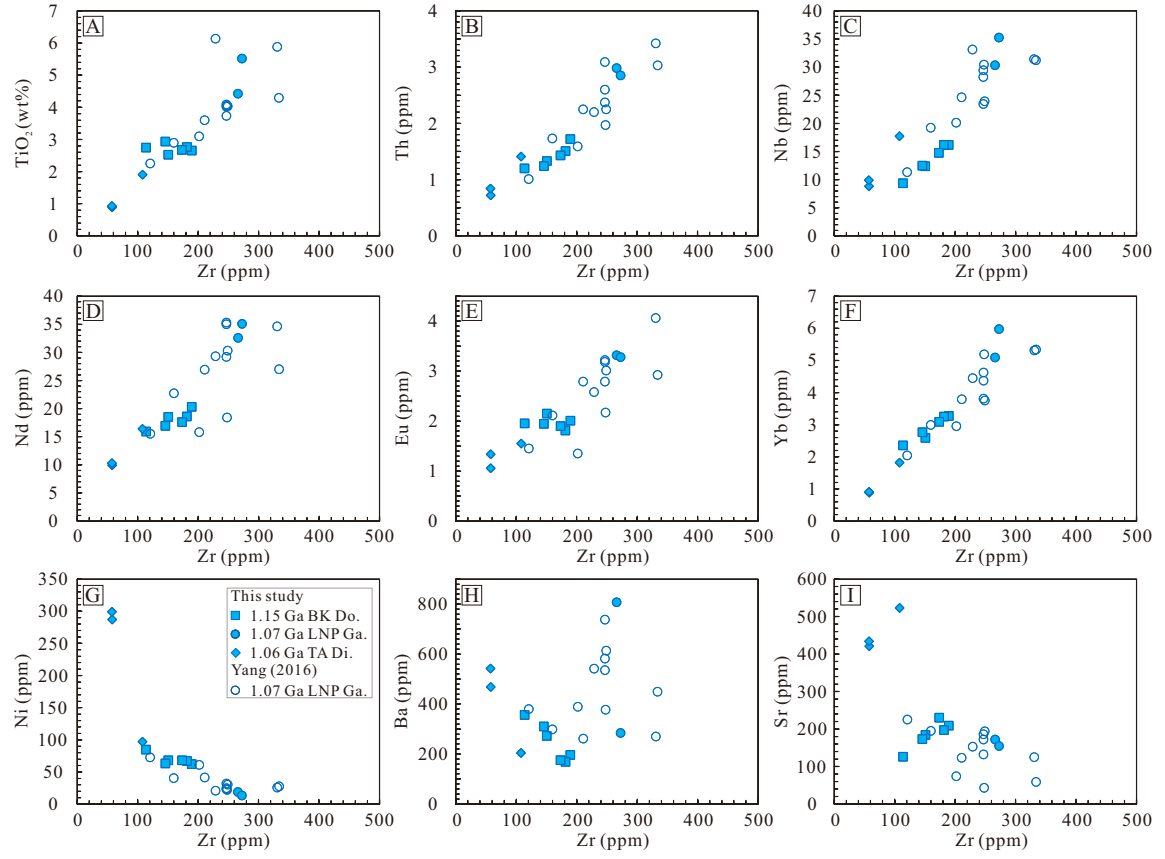
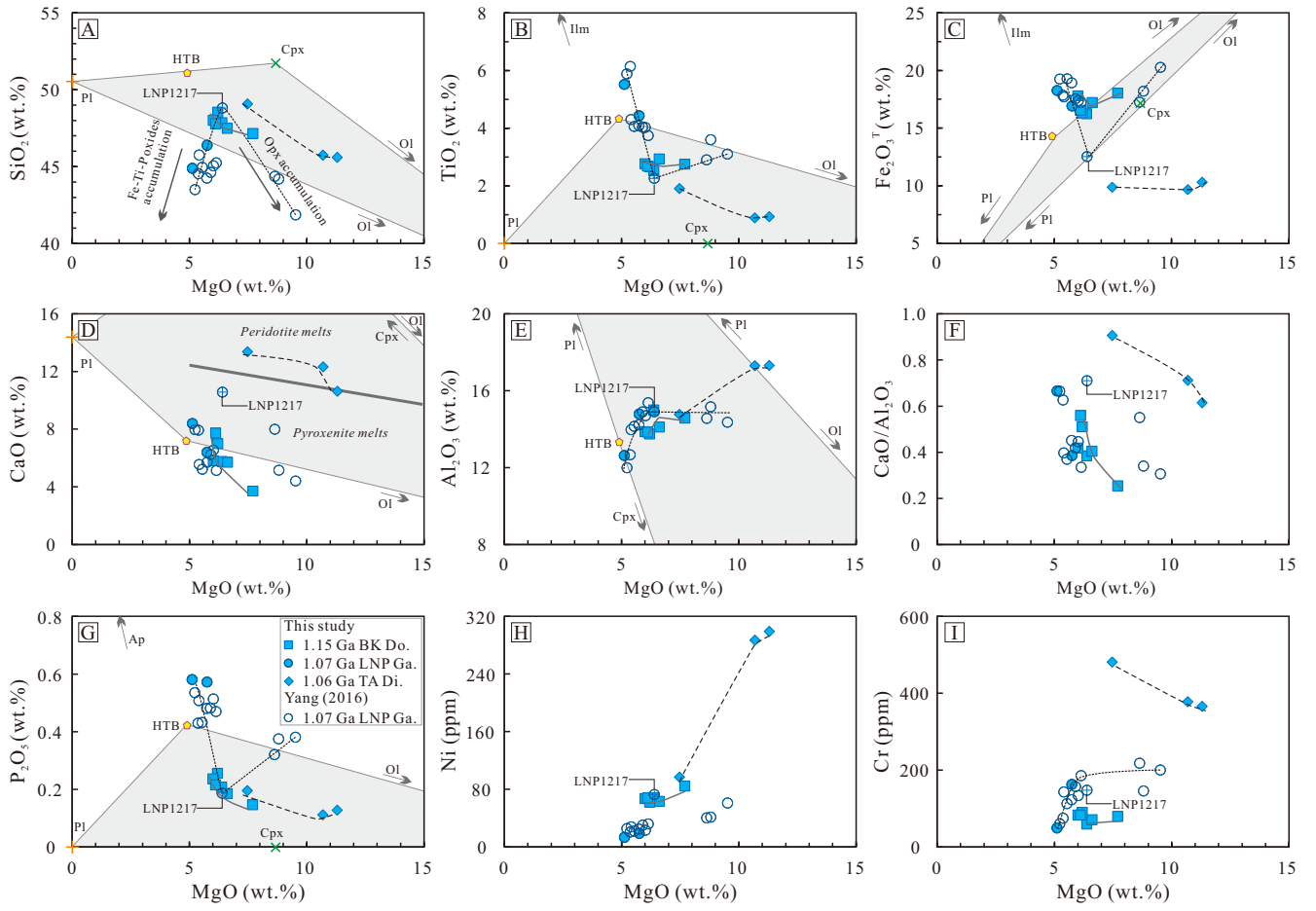


Figure S4



**Figure S5**

