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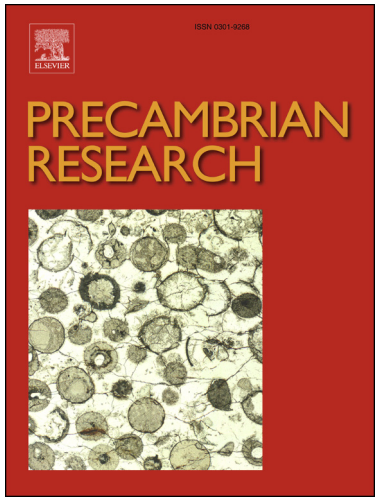

The late-Paleoproterozoic I- and A-type granites in Lüliang Complex, North China Craton: new evidence on post-collisional extension of Trans-North China Orogen

Jiao Zhao, Chengli Zhang, Xiaojun Guo, Xinyu Liu

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Abstract The late-Paleoproterozoic granitoids from Lüliang Complex can provide pivotal constraints on the amalgamation process between Eastern and Western blocks of North China Craton along the Trans-North China Orogen. LA-ICP-MS zircon dating gives emplacement ages of 1854± 20 Ma for the Huijiazhuang granite, 1830±21 Ma for the Xiyupi granite vein and 1760±20 Ma for the Dacaoping porphyritic granite, respectively. The Huijiazhuang granite and Xiyupi granite dyke have variable SiO_2 (66.71-74.31 wt.%), high K_2O (5.09-6.35 wt.%), low P_2O_5 (0.02-0.16 wt.%), Al_2O_3 (13.92-15.31 wt.%), right inclined REE patterns with medium negative Eu anomalies, enrichment in LILE, depletion in HFSE, especially Nb, Ta, consisting to high-K I-type granite in a post-collisional setting. The Sr/Y (7.36-59.95), $\varepsilon_{Nd}(t)$ (-5.7 to -4.1) with T_{DM} (2381 Ma to 2570 Ma) from whole rock Sm-Nd isotope and $\varepsilon_{Hf}(t)$ (-9.6 to 2.3) with T^{C}_{DM} (2360 Ma to 3070 Ma) from zircon Lu-Hf isotope suggest that they are produced by partial melting of slightly thickened Neoarchean-Paleoproterozoic basement materials (including both meta-sedimentary and meta-igneous rocks). The Dacaoping porphyritic granites are characterized by high SiO_2 (70.83-74.30 wt.%), K_2O (4.84-5.60 wt.%), $FeO^T/(FeO^T+MgO)$ (0.86-0.92), "seagull-type" REE pattern with strong negative Eu anomaly (δEu=0.16-0.35) and higher 10000*Ga/Al (2.99-3.36), HFSE (Zr+Nb+Ce+Y=378-583 ppm), showing an affinity of A_2-type granite. They have low Sr/Y (1.17-8.62), $\varepsilon_{Nd}(t)$ (-6.1 to -6.4) with T_{DM} (2690 Ma to 2776 Ma) from whole rock Sm-Nd isotope and $\varepsilon_{Hf}(t)$ (-7.9 to -5.2) with T^{C}_{DM} (2775-2938 Ma) from zircon Lu-Hf isotope, indicating a result from the melting of thinned Neoarchean calc-alkaline intermediate basement. Taking into account the temporal-spatial distributions of late-Paleoproterozoic rocks in the Trans-North China Orogen, it suggests a post-collisional extension occurred during 1.89-1.76 Ga and the crust is thinned visibly since 1.82 Ga.

The late-Paleoproterozoic I- and A-type granites in Lüliang Complex, North China Craton: new evidence on post-collisional extension of Trans-North China Orogen

Jiao Zhao [a], Chengli Zhang [a,*], Xiaojun Guo [b], Xinyu Liu [a]

[a]*State Key Laboratory of Continental Dynamics, Department of Geology, Northwest*