Geophysical Research Abstracts
Vol. 19, EGU2017-3985, 2017
EGU General Assembly 2017

Crustal development of the North China Craton constrained by geochemical and isotopic data on Neoarchean and Paleoproterozoic granitoids, Inner Mongolia

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The North China Craton is the oldest continental fragment in China. It contains magmatic rocks as old as 3.8 Ga, but is dominated by crustal components that formed in the Neoarchean at ca. 2.7 and 2.5 Ga, and also includes Paleoproterozoic rocks dated at 1.9-1.8 Ga. The craton has been incorporated into Precambrian supercontinents, although it's exact position within, as well as the overall configuration of, these supercontinents is poorly understood. New geochemical and geochronological data on granitoids from the northern margin of the craton at Siziwangqi in central Inner Mongolia further constrain craton evolution with respect to Neoarchean and Paleoproterozoic supercontinent cycles. The granitoids comprise a tonalite-trondhjemite-granodiorite (TTG) association with crystallization ages of 2.52-2.49 Ga and inherited zircon crystals as old 2.7 Ga, and alkali feldspar granites with ages of 2.47 and 1.87 Ga. Geochemically, the rocks are metaluminous to peraluminous and belong to the calc-alkaline (TTG) and subalkaline to alkaline (alkali feldspar granite) series. The TTG granitoids are characterized by light LREE enrichment, a weak positive Eu anomaly, and flat heavy HREE profiles. The alkali granite is also enriched in the LREE but has a strong positive chondrite-normalized Eu anomaly and displays weak HREE enrichment. Our compositional and geochronological data, integrated with regional data, indicate that in the Neoarchean the North China Craton constituted part of an accretionary convergent plate margin that lay on the edge of a an older continental mass (possibly within the Kenor supercraton). The Paleoproterozoic alkali feldspar granite was associated with collisional assembly of the craton into the Nuna (Columbia) supercontinent.