Goldschmidt 2023 Abstract
https://doi.org/10.7185/gold2023.17569

# Neoarchean and Paleoproterozoic magmatism in the Xing'an Massif, eastern Central Asian Orogenic Belt: Association of supracrustal components with deep processes

**MR. CHENYANG SUN, PH.D**

Northwest University

Presenting Author: chenyang.sun@nwu.edu.cn

The Central Asian Orogenic Belt (CAOB), as the largest accretionary orogen on Earth, is revealed that its crustal growth mainly occurred during the Phanerozoic. However, this scenario has undergone revision based on many discoveries of Precambrian magmatism. Here, we report the newly discovered Neoarchean and Paleoproterozoic magmatism in the Xing'an Massif, with the aim to shed light on the early crustal development of the eastern CAOB and to further constrain the geodynamic mechanism.

Neoarchean (~2.6 Ga) monzogranites are the oldest A-type granites in the eastern CAOB and are further classified as peraluminous A1-type granites. They were mainly derived from the partial melting of sedimentary rocks, mainly metapelites, in a physicochemical environment of high temperature and low pressure, which is accompanied by the upwelling of asthenospheric mantle and remelting of the upper crust during the Neoarchean. Paleoproterozoic magmatism consists of 1.88 Ga monzogranites, 1.84 Ga granitic pegmatites, and ~1.8 Ga basaltic andesites. ~1.8 Ga granitoids were mainly derived from the partial melting of thickened lower crust. More detailedly, 1.88 Ga monzogranites were derived from the hybrid melt produced by the interaction of mafic rocks in lower crust and some ancient metabasalts that had earlier undergone low-temperature alteration in supracrust, whereas 1.84 Ga granitic pegmatites, showing peraluminous K-rich features, highlight extensive interactions of supracrustal sediment melt and mafic rocks may have occurred during the magma extraction in lower crust. Subduction is considered to be an important process of bringing supracrustal components into the lower crust. Such components have positive buoyancy relative to the upper mantle, and they rise to the bottom of continental arc crust and then get involved in the remelting process of the lower crust. The ~1.8 Ga basaltic andesites are Nb-rich, which derived from the partial melting of the slab-melt metasomatized mantle wedge, but the magma source was also previously modified by slab-derived fluids and sediments.

Both Neoarchean and Paleoproterozoic magmatism in the region reveal the significant contribution of supracrustal components to deep magmatic processes, which, along with crustal reworking, promoted the crustal maturation.

This study was financially supported by the China Postdoctoral Science Foundation (2021M702646, 2022T150526).