# Geochemical and geochronological evidence for an Early Neoproterozoic crystalline basement in the South Beishan Orogenic Belt, southernmost Central Asian Orogenic Belt

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The South Beishan Orogenic Belt (SBOB) in the southwestern Central Asian Orogenic Belt (CAOB) is thought to be an eastern extension of the Eastern Tianshan Orogen. Up to now, it has been suggested to consist of a well-preserved Paleozoic magmatic and sedimentary sequence with a possible Neoproterozoic basement. We provide new geochemical and geochronological data for gneissic granites of the SBOB in order to constrain its tectonic evolution and setting. The gneissic granitoids belong to the high-K, calc-alkaline series and are characterized by an enrichment of light rare earth elements (LREE) and large ion lithophile elements (LILE), a depletion of Nb, Ta, Ti, Sr, and Ba and a positive Pb anomaly. The petrography and geochemical signatures reveal an I-type granite affinity and are in accordance with typical Andean Arc granites. Zircon grains, yielding 206Pb/238U magmatic crystallization ages of 933 ± 2 Ma and ~900 Ma for the Shibanshan and Huaniushan arc granites, respectively manifest the presence of an Early Neoproterozoic Precambrian crystalline basement in the SBOB. Zircon εHf(t) values range from -16.1 to 10.2, indicating that juvenile material and reworked ancient crust were involved in the source of the gneissic granites. Furthermore, in conjunction with studies of the adjacent regions, the results of the present study suggest that during Precambrian times the SBOB neither belonged to the nearby Dunhuang Block or the Tarim Craton, but has a common affinity with the Central Tianshan Arc Terrane. It is also suggested that the ca. 900 Ma plutons originated from the mixing of juvenile material with older crust in an Andean-type active continental arc setting during the assembly of Rodinia. Thus the SBOB plays a key role in understanding the tectonic evolution of the CAOB.