Geochemical constraint on high-pressure mafic granulite formation in the Dunhuang block, Northeastern Tarim Craton

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High-pressure (HP) mafic granulites provide important insight into the generation and evolution of continental collision-related orogenic belts and the lower continental crust. The whole-rock geochemistry and Sr-Nd isotope composition of early Paleozoic HP mafic granulites from the Dunhuang block, north-eastern Tarim Craton, are the topic of the present study. Major and trace element compositions reveal a basaltic composition of the protolithic rock. Geochemical data such as high Th/Yb ratios, moderately fractionated REE patterns ([La/Yb]N = 0.74-1.95), and the absence of negative Nb-Ta anomalies imply that these basalts originated in a back-arc basin tectonic setting. Positive εNd(0) values of up to +4.4 indicate that the basaltic protolith was derived from a depleted mantle source and the depleted mantle Nd model age of 2.1 ± 0.2 Ga (n=17, 1σ) may represent the maximum protolith age. In accordance with the widespread occurrence of Archaean TTG gneisses and Paleoproterozoic metasedimentary rocks, we suggest that a Paleoproterozoic back-arc basin system formed at the continental margin of the Dunhuang Block prior to the early Paleozoic collisional orogeny between the north-eastern Tarim Craton and the southern Central Asia Orogenic Belt (CAOB).