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北山造山带南部早古生代构造演化: 来自花岗岩的约束

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摘要:

北山造山带是中亚造山带的重要组成部分, 处于天山造山带和索仑缝合带之间的关键构造位置, 对认识中亚造山带的构造演化和古亚洲洋的最终闭合具有重要意义。本文选择北山造山带南部早古生代桥湾糜棱岩化花岗岩和金塔钾长花岗岩进行了LA-ICP-MS锆石U-Pb年代学、LA-MC-ICP-MS锆石Hf同位素和地球化学研究。结果表明, 桥湾糜棱岩化花岗岩和金塔钾长花岗岩均形成于~430Ma, 岩浆结晶锆石的二阶段Hf模式年龄分别为2.14~2.37Ga和1.32~1.72Ga。样品中含有少量继承锆石, 继承锆石的Hf同位素特征与北山南部新元古代花岗质片麻岩类似。在地球化学组成上, 两者均具有高的SiO<sub>2</sub>含量(73.18%~75.00%), 弱过铝质, 富集Rb、U、K等元素, 亏损Ba、Nb、Ta、和Sr、P、Ti等元素的特点, 类似于北山南部其它早古生代钾长花岗岩。它们的岩浆均起源于北山南部古老地壳基底的部分熔融, 金塔钾长花岗岩可能还有幔源岩浆或新生下地壳的贡献。这同时也暗示了北山南部石板山地块与敦煌地块具有显著不同的地壳基底组成。结合敦煌地块早古生代高压麻粒岩的研究结果, 我们认为北山南部早古生代岩浆活动可能与敦煌地块向北山南部石板山地块的碰撞、俯冲作用有关, 反映了中亚造山带南缘的北山造山带在早古生代经历了造山带中微陆块与周缘克拉通碰撞拼贴的造山事件。

英文摘要:

The Beishan orogenic collage represents a major part of the southern Central Asian Orogenic Belt (CAOB), which is a tectonically significant region between the Tianshan orogen and the Solonker Suture Zone. It would provide important clues for examining the accretionary orogenic processes of the CAOB and the final closure event of the Paleo-Asian Ocean. In this work, we present LA-ICP-MS U-Pb zircon dating, LA-MC-ICP-MS zircon Hf isotopic and geochemical results for the Early Paleozoic granites from the Qiaowan and Jinta areas in the southern Beishan and to revisit their tectonic setting and the Early Paleozoic tectonic evolution of the southern Beishan. The Qiaowan granite in the Baidunzi-Qiaowan shear zone is variously deformed, consisting of quartz, K-feldspar, plagioclase (An=21~27), biotite and amphibole. Biotite grains are compositionally similar and have relatively low TiO<sub>2</sub> contents, and amphibole is blue-green with compositions of ferro-pargasite. The Jinta syenogranite is not deformed, medium- to fine-grained, consists of quartz, K-feldspar, plagioclase and biotite. Plagioclase exhibits oscillatory zoning. The Qiaowan mylonitic granite and Jinta syenogranite have a similar age of ~430Ma, with two-stage zircon Hf model ages of 2.14~2.37Ga and 1.32~1.72Ga, respectively. The inherited zircon cores in them exhibit Hf isotope compositions similar to those of the Neoproterozoic granitic gneisses in the southern Beishan. Both the Qiaowan mylonitic granite and Jinta syenogranite show high SiO<sub>2</sub> (between 73.18% and 75.00%) and weakly peraluminous, they are enriched in Rb, U and K, and depleted in Ba, Nb, Ta, Sr, P and Ti, which can be compared with other Early Paleozoic syenogranites for the southern Beishan. They are suggested to derive from a Paleoproterozoic-Mesoproterozoic crustal source in the southern Beishan, while the Jinta syenogranite also has a depleted mantle or new crust contribution, indicating that the basement rocks of the Shibanshan block in the southern Beishan do not resemble those of the Dunhuang block. We suggest, in accordance with the studies of the Early Paleozoic HP granulite in the Dunhuang block, that the Early Paleozoic magmatism in the southern Beishan is the result of the collision and continued convergence between the Dunhuang and Shibanshan blocks, and that the Beishan orogenic collage underwent Early Paleozoic accretionary and collisional orogenic processes involving microcontinents within the orogen and the surrounding cratons.

关键词: [早古生代花岗岩](#) [石板山地块](#) [敦煌地块](#) [碰撞造山](#) [北山造山带](#)

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