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阿拉善变质基底中的早二叠世岩浆热事件——来自同位素年代学的证据

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摘要:

在阿拉善变质基底中发现了大量的早二叠世的弱变形花岗岩类。采自阿拉善东部的闪长质片麻岩(AL0705-1)、含石榴英云闪长质片麻岩(AL0709-1)、英云闪长岩(AL0718-1)、条痕状黑云斜长片麻岩(AL0822-1)和片麻状花岗岩(AL0822-3)的锆石U-Pb年龄分别为 $270 \pm 1.6\text{Ma}$ 、 $276 \pm 1.8\text{Ma}$ 、 $269 \pm 2.4\text{Ma}$ 、 $276 \pm 2.4\text{Ma}$ 和 $287 \pm 2.5\text{Ma}$ 。采自阿拉善变质基底西部的花岗闪长质片麻岩(AL0805-1)、闪长质片麻岩(AL0805-4)、粗粒花岗闪长质片麻岩(AL0810-1)和中粒闪长质片麻岩(AL0810-2)的锆石LA-ICP-MS U-Pb年龄分别为 $284 \pm 3\text{Ma}$ 、 $289 \pm 3\text{Ma}$ 、 $276 \pm 2\text{Ma}$ 和 $279 \pm 2\text{Ma}$ 。尽管早二叠世花岗岩的岩石类型和化学成分不同,但它们都形成于 $269 \sim 289\text{Ma}$ 一个较短的时间范围,属于同一期岩浆热事件的产物。早二叠世花岗岩的形成年龄与基底变质岩中角闪石 $^{39}\text{Ar}$ - $^{40}\text{Ar}$ 的坪年龄 $277 \sim 288\text{Ma}$ 近于一致,表明这期岩浆热事件对基底变质岩产生了改造,使角闪石等变质矿物的Ar-Ar同位素体系发生了重置。在阿拉善变质基底中大量早二叠世花岗岩类侵入体的发现表明,阿拉善变质基底在古生代晚期受到中亚造山带碰撞造山作用的强烈影响和改造。

英文摘要:

Abundant weakly-deformed granitoids of Early Permian have been discerned in the Alxa metamorphic basement. The zircon LA-ICP-MS and SHRIMP U-Pb dating of the dioritic gneiss (AL0705-1), garnet-bearing tonalitic gneiss (AL0709-1), tonalite (AL0718-1), streaky biotite-plagioclase gneiss (AL0822-1) and gneissic granite (AL0822-3) collected from the eastern part of the Alxa metamorphic basement gives the ages of  $270 \pm 1.6\text{Ma}$ ,  $276 \pm 1.8\text{Ma}$ ,  $269 \pm 2.4\text{Ma}$ ,  $276 \pm 2.4\text{Ma}$  and  $287 \pm 2.5\text{Ma}$ , respectively. While zircons of the granodioritic gneiss (AL0805-1), dioritic gneiss (AL0805-4), coarse granodioritic gneiss (AL0810-1) and mesograned dioritic gneiss (AL0810-2) collected from the western part of the basement yield ages of  $284 \pm 3\text{Ma}$ ,  $289 \pm 3\text{Ma}$ ,  $276 \pm 2\text{Ma}$  and  $279 \pm 2\text{Ma}$ , respectively. Notwithstanding the different rock types and chemical compositions, all these Early Permian granitoids formed in a short time gap from  $269\text{Ma}$  to  $289\text{Ma}$ , suggesting they were of the same magmatic event. In addition, the ages of the granitoids are approximately identical to the  $^{39}\text{Ar}$ - $^{40}\text{Ar}$  plateau ages of hornblendes from the metamorphic rocks in the basement, indicating that the Ar-Ar isotopic system of hornblende from the metamorphic rocks had been reset in the Early Permian magmatic event. The occurrence of the voluminous granitoids of Early Permian in the Alxa metamorphic basement demonstrates that the basement had been strongly involved and reworked in the collision orogeny of the Central Asian Orogenic belt in the Late Paleozoic.

关键词: [花岗岩类](#) [早二叠世](#) [锆石U-Pb年代学](#) [阿拉善变质基底](#) [中亚造山带](#)

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