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丹凤地区秦岭岩群片麻岩锆石U-Pb年龄: 北秦岭地体中-新元古代岩浆作用和早古生代变质作用的记录

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摘要:

秦岭岩群被认为是出露于北秦岭地体内最古老的前寒武纪基底岩石,记录了北秦岭造山带的地壳形成和演化历史。本文报道丹凤-西峡地区五件秦岭岩群片麻岩锆石U-Pb年龄结果,限定其形成和变质时代,探讨北秦岭地体的构造归属。定年结果表明,岩浆成因锆石颗粒的年龄集中在1400~1600Ma左右和850~950Ma左右,记录两期主要岩浆活动。6粒锆石具有变质成因特征,低Th/U比值(<0.03), $^{206}\text{Pb}/^{238}\text{U}$ 年龄变化在510~465Ma之间,加权平均值 $477 \pm 18\text{Ma}$ 。这一古生代变质叠加时代与北秦岭地体南北缘高压变质作用时代基本一致,说明秦岭岩群遭到北秦岭造山带俯冲-碰撞造山过程的变质作用。秦岭岩群主要形成于中元古代晚期至新元古代早期,基底岩石缺乏早元古代和太古代岩浆活动的记录。在岩浆作用时代上,北秦岭地体与广泛发育新元古代中-晚期岩浆作用的扬子陆块北缘有差别,也不同于晚太古代-早元古代的华北陆块南缘,可能是中-新元古代形成的独立微陆块。

英文摘要:

The Qinling Group is considered as the oldest basement rocks of Precambrian exposed in the North Qinling terrain and records crustal formation and evolution of North Qinling orogenic belt. In this study, zircon U-Pb ages of five gneiss samples collected from Danfeng-Xixia area are reported in order to constrain the time of formation and metamorphism of this rock group and discuss the tectonic provenance of the North Qinling terrain. Analytical results of the zircon dating show that zircon grains of magmatic origin yield ages clustering in about 1400~1600Ma and about 850~950Ma, recording two major magmatic activities. Six zircon grains of metamorphic origin with low Th/U ratios of <0.03 give $^{206}\text{Pb}/^{238}\text{U}$ ages ranging from 510 Ma to 465 Ma with a weighted mean value of $477 \pm 18\text{Ma}$, recording Early Paleozoic metamorphic overprint. This metamorphism is temporally coincident with the high pressure metamorphism distinguished in both the northern and southern margins of the Qinling terrain, indicating that Qinling Group underwent metamorphism during the North Qinling orogenic process in Early Paleozoic. Qinling Group formed mainly in Late Mesoproterozoic to Early Neoproterozoic and no magmatic events of Paleoproterozoic and Archean were recorded in the basement rocks. In the view of the formation time of the magmatic activities, the North Qinling terrain can be discriminated from the Yangtze block characterized of strong magmatism of Late Neoproterozoic along the northern margin and also from the North China block that is composed of Late Archean to Paleoproterozoic basement rocks along the southern margin. The North Qinling terrain would be a microcontinent with distinguishable evolution in Mesoproterozoic to Neoproterozoic.

关键词: [秦岭群](#) [片麻岩](#) [锆石年龄](#) [新元古代](#) [构造属性](#)

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