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宁芜盆地火山-次火山岩的锆石U-Pb年龄、Hf同位素组成及其地质意义

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摘要:

宁芜火山盆地是长江中下游重要的火山盆地之一,在盆地内自下而上依次发育龙王山组、大王山组、姑山组和娘娘山组火山岩和若干个同源次火山岩或小侵入岩体。本文对宁芜盆地火山-次火山岩进行了详细的锆石U-Pb年龄和Hf同位素地球化学研究。研究表明,大王山组粗安岩锆石U-Pb年龄为 $130.3 \pm 0.9\text{Ma}$, 姑山组两个粗安岩锆石U-Pb年龄分别为 $128.2 \pm 1.3\text{Ma}$ 和 $128.5 \pm 1.8\text{Ma}$, 另外三个侵入岩年龄分别为 $127.1 \pm 1.2\text{Ma}$ 、 $128.3 \pm 0.6\text{Ma}$ 和 $128.2 \pm 1.0\text{Ma}$,均为早白垩纪。综合前人成果,认为长江中下游地区火山盆地内火山活动的时限在135~124Ma之间,不存在侏罗纪岩浆活动。宁芜盆地火山岩和侵入岩的锆石 $^{176}\text{Hf}/^{177}\text{Hf}$ 值在0.282502~0.282673范围内, $\epsilon_{\text{Hf}}(t)$ 变化为-6.9~-0.7,显示岩浆源自于岩石圈富集地幔部分熔融并在上升过程中受地壳物质的混染,为岩石圈伸展环境的产物。

英文摘要:

The Ningwu (Nanjing-Wuhu) volcanic basin is one of the most important volcanic basins in the Middle and Lower Reaches of the Yangtze River area, China. It comprises four volcanic units, sub-volcanic rocks and several small intrusion rocks. The four volcanic units, which are, in an ascending order, Longwangshan Formation, Dawangshan Formation, Gushan Formation, Niangniangshan Formation. Detailed zircon U-Pb age and Hf isotope measurements were done on the igneous rocks from Ningwu volcanic basin. The zircon U-Pb age is $130.3 \pm 0.9\text{Ma}$ for Dawangshan Formation, $128.2 \pm 1.3\text{Ma}$ and $128.5 \pm 1.8\text{Ma}$ for Gushan Formation. The zircon U-Pb age for three intrusion rocks are $127.1 \pm 1.2\text{Ma}$, $128.3 \pm 0.6\text{Ma}$ and $128.2 \pm 1.0\text{Ma}$, respectively. The results show that all the igneous rocks formed in the Early Cretaceous. Compared with the existed data of other volcanic basins, it can be concluded that there were no Jurassic volcanic activities in all volcanic basins in the Middle and Lower Reaches of the Yangtze River area, and the volcanic activity was happened from 135Ma to 124Ma. Zircon Hf isotope analyses of the igneous rocks show relatively homogeneous Hf isotopic compositions, which are between 0.282502 and 0.282673. And these zircons have $\epsilon_{\text{Hf}}(t)$ values from -6.9 to -0.7. These results show that the parental magmas were mainly derived from an enriched mantle and partly mixed with the lower continental crust rocks, controlled by the environment of the Lithosphere extension.

关键词: [宁芜盆地](#) [锆石U-Pb年龄](#) [Hf同位素](#) [火山岩](#)

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