

Geochemistry and tectonic implication of A-type granites in mid Nanling range, South China

PEI-RONG CHEN¹ XIN-MIN ZHOU REN-MIN HUA AND XI-SHENG XU

State Key Laboratory of Mineral Deposit Research,
Department of Earth Sciences, Nanjing University,
Nanjing 210093, China 1 boprcen@public1.ptt.js.cn

The Nanling Range located between N23°31' and N25°30', is an east-west trending mountain system. There are lots of granitoids (dominated with S-type) closely related with ore deposits such as W, Sn, Bi, REE, U and so on.

A-type granites were found in recent years in mid Nanling, e.g. Zaibei pluton and Pitou pluton. The two plutons have the Rb-Sr isochron ages of 176.9 ± 1.1 Ma and 178.2 ± 0.8 Ma, with initial $^{87}\text{Sr}/^{86}\text{Sr}$ values of 0.7089 and 0.7097, respectively. They are K-feldspar granites, and consist of K-feldspar 50-62% plagioclase (An=7-15) 12-22% quartz 28-30%, biotite 1-3% and minority of amphiboles, few aegirine and arfvedsonite. The melano-minerals occur interstitially between feldspar and quartz.

Zaibei and Pitou plutons are characterized by metaluminous (Al_2O_3 : 11.50%-13.63%, A/CNK: 0.94-1.08) rich in silicon (SiO_2 : 71.06%-76.74%) and alkali ($\text{Na}_2\text{O}+\text{K}_2\text{O}$: 7.93%-9.80%) high FeO^T/MgO ratio (9.60-145.00) and low contents of CaO and MgO (0.10%-1.16% and 0.01%-0.25%, respectively). They are also rich in rare earth elements (REE: $271.37-724.97 \times 10^{-6}$) and high field strength elements (HFSE), with Y of 30.44 to 209.20×10^{-6} Zr of 121.1 to 201.6×10^{-6} and Nb of 28.50 to 38.30×10^{-6} .

Zaibei and Pitou plutons have the geochemical characteristics similar to A₂-type granite. Furthermore, they have a close relationship with bimodal volcanic rocks temporally and spatially. The bimodal volcanic rocks in mid Nanling region formed during 158 to 179 Ma. Its acid end-member rhyolite has the geochemical characteristics of intraplate granitic rocks and the basic end-member basalt exhibits the characteristics of intraplate tholeiite or intraplate alkali basalt. Therefore, we suggest that the extensional break-up of the lithosphere in Nanling region took place during Jurassic time.

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Cretaceous age of the Sihetun vertebrate assemblage (western Liaoning, NE China): the evidence of Ar-Ar ages

W. CHEN^{1,2} Y. ZHANG² Q. JI² L. D. ZHANG² AND X. X. HE²

¹Institute of Geology and Geophysics, Chinese Academy of Science, Beijing, China (chenwenf@public3.bta.net.cn)

²Institute of Geology, Chinese Academy of Geological Science, Beijing, China (zhangyan@cags.net.cn)

Introduction

In recent years, amounts of fossils of primitive birds and feathered dinosaurs are found in Sihetun, western Liaoning Province, NE China. The isotopic dating results of these fossils are very different, from 124.60 ± 0.25 Ma (Swisher et al., 1999) to 145.3 ± 4.4 Ma (Lo et al., 1999). We use the stepwise heating and the laser microprobe $^{40}\text{Ar}/^{39}\text{Ar}$ technique to date the rarefossils-bearing lake sediment rock and its underlying three cycles basaltic rocks.

Results and Discussion

The laser $^{40}\text{Ar}/^{39}\text{Ar}$ isochronal age of the feldspar in basalt sample formed during the first volcanic cycle is 132.9 ± 1.5 Ma. The $^{40}\text{Ar}/^{39}\text{Ar}$ plateau age of the second and third volcanic cycle basalt is 130.6 ± 0.5 Ma and 127.7 ± 0.2 Ma, respectively. These age data show that the fossil age is not older than 128 Ma.

The lake sedimentary layer bearing precious fossil contains rhyolite tuff, lake pillow lava (whose horizon is a little higher than that of the primitive birds and feathered dinosaurs) and a later cycle volcanic rock invading through the lake sedimentary layer. The sanidine laser $^{40}\text{Ar}/^{39}\text{Ar}$ isochronal age of them is 127.4 ± 1.3 Ma, 126.1 ± 1.7 Ma and 123.9 ± 1.5 Ma, respectively. These three age data indicate the fossil age of primitive birds and feathered dinosaurs is older than 124 Ma.

Conclusions

The fossil age of the Sihetun vertebrate assemblage is between 124-128 Ma and the age of Yixian formation containing fossils is assigned to Early Cretaceous.

References

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