Subduction times of oceanic crust along the Jinshajiang suture zone, Tibetan plateau, SW China

W. CHEN[1,2], Y. ZHANG[1] AND G.Y. SUN[1]

[1]Laboratory of Isotope Geology, Institute of Geology, Chinese Academy of Geological Science, Beijing (chenwenf@public3.bta.net.cn)
[2]Institute of Geology and Geophysics, Chinese Academy, Beijing

Introduction

The central part of the Tibetan Plateau is consists of the Kunlun Terrane, Bayanhar Terrane, Qiantang Terrane and Lhasa Terrane . The Jinshajiang suture zone lies between the Bayanhar Terrane and the Qiantang Terrane. For a long time, the subduction times of oceanic crust along the Jinshajiang suture zone have been disputed. We try to give a times limit for the subduction of oceanic crust by dating of the ophiolite, IAG and CCG type granite using Ar-Ar and SHRIMP U-Pb isotope geochronological methods.

Results, Discussion and Conclusions

In the Jinshajiang suture zone, it lasted only a span of 9 Ma from the start of subduction (marked by the eruption of andesitic magmas and intrusion of intermediate rock of IAG type at about 227 Ma) to the end of subduction, consumption of oceanic crusts and the collision of terranes (marked by the fast cooling of intermediate-acid rocks at about 218 Ma). This implies that either the oceanic crusts between the Qiangtang and Bayan Har terranes were small sized, or they subducted at a very fast speed along the Jinshajiang suture zone. It also explains why there were isotope chronological records in the intrusive rocks of the Kunlun terrane for such large tectonic events like collisions between the Lhasa and Qiangtang terranes and between the Himalayas and Lhasa terranes, and why very few evident chronological records were left in it for the collision between the Qiangtang and Bayan Har terranes along the Jinshajiang suture zone. Because the collisions between these three terranes took place almost simultaneously or even overlapped at a time, chronological information on the collisions in the Jinshajiang suture zone became blurred or indistinct.

Acknowledgements

This work was supported by the Natural Science Foundation of China (40373033) and Project of China Gelogical Survey (200020190118-2; 200413000033).

Ar-Ar dating for greenschist-facies metavolcanics in the Dabie orogen: Implication for the accretionary wedge of continental subduction

T.-S. GAO[1,2], J.-F. TANG[2] AND Y.-F. ZHENG[1]

[1]School of Earth and Space Sciences, University of Science and Technology of China, Hefei 230026, China (tsgao@ustc.edu.cn)
[2]Anhui Institute of Geological Survey, Hefei 230011, China

It has hotly been debated whether sporadic low-grade metamorphic rocks in the interior of UHP metamorphic zones experienced the same history of subduction to mantle depths. Greenschist-facies metavolcanic and metasedimentary rocks were discovered to occur within UHP eclogite-facies zone in the Dabie orogen of east-central China, with the dyke-like intrusion of coesite-bearing eclogite. The metavolcanic rocks are mainly interbedded with metaconglomerate, sericite phylite, sericite-feldspar-quartz schist and silty slate. The occurrence of dyke-like coesite-bearing eclogite within the metavolcaniclastics resulted in the controversial conclusion that the eclogite and host metavolcanics shared the same UHP metamorphic history. This is in conflict with the fine-grain nature of metavolcanics. Whole-rock Ar-Ar dating for these low-grade rocks may provide a resolution.

Two metavolcanic samples were selected from ash-bearing metasilicate layers at Ganghe in the Dabie terrane. Ar-Ar isotope data on sample GH-1 yield a reasonable isochron with an age of 785.0±4.7 Ma (MSWD = 0.37) and an initial $^{40}Ar/^{36}Ar$ ratio of 280.2±31.7. The main plateau is composed of 5 to 10 steps with 91.86% of total released ^{39}Ar, corresponding to a plateau age of 783.3±0.9 Ma. The other sample (BX-1) yields an Ar-Ar isochron age of 769.5±3.1 Ma (MSWD = 0.57) with an initial $^{40}Ar/^{36}Ar$ ratio of 308.9±16.7. The main plateau is composed of 3 to 10 steps with 97.36% of total released ^{39}Ar and corresponds to a plateau age of 771.0±0.6 Ma. Because of the low closure temperature of Ar diffusion in silicates, these mid-Neoproterozoic ages indicate that in the process of the Triassic continental subduction, the low-grade metamorphic rocks did not suffer the high-grade metamorphism under UHP eclogite-facies conditions, so that the Ar isotopic system was not disturbed since the volcanic eruption at the mid-Neoproterozoic. Therefore, the volcanic rocks were scraped off from the upper part of subducting Yangtze Block by obduction of the North China Block, and suffered only the greenschist-facies dynamic metamorphism. They essentially correspond to the accretionary wedge of continental subduction.