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Fission Track Analysis on Junggar Basin peripheral orogen and Its Geological Significance

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Central Asian Orogenic Belt is the world's Phanerozoic crustal growth and transformation of the most significant areas. It is a giant suture zone formed by Paleo-Asian Ocean subduction which located in between the Siberian Plate and Sino-Korean, Tarim Plate.Northern Xinjiang is located in the southern section of Central Asian Orogenic Belt. Today It presents a basin and range landscape. Junggar Basin is located between the Altai Mountain and Tianshan(Figure 1). Paleozoic tectonic evolution of northern Xinjiang to become a hot research topic, however, following the closure of the Paleo-Asian Ocean tectonic evolution of intracontinental, in particular Uplift history of the margin of the Junggar Basin is not clear. This paper attempts by the margin of the Junggar Basin, Late Paleozoic magmatic rocks of the apatite, zircon fission-track studies, to reveal the law of uplift of margin of the Junggar Basin since the Mesozoic.

Fig. 1 Simplified structural map of the Junggar basin and adjacent regions (modified from Xiao *et al.*, 2001; Li,2006).1-plate border; 2- north Tianshan suture Zone; 3- south Tianshan Suture Zone; 4- research region; 5- sampling location,Siberia Plate;a Eastern Junggar Orogen;Kazakhstan Plate;a Westen Junggar Orogen; Junggar Block; Tarim Plate

Fig.2 Apatite and zircon fission track age histogram of Junggar Basin peripheral

There are many late Paleozoic granite rocks around in Junggar Basin. These rocks become to perfect material to research uplift history of Junggar Basin peripheral through the apatite and zircon fission track dating techniques.

The selected sample mainly granite edge of the Junggar Basin. This study analyzes a total of 17 apatite samples, three samples of zircon. Fission-track ages histogram figure 2shows that the peak age of apatite fission-track concentrated in the 60-70Ma and 100-130Ma, whilst zircon ages concentrated in the 120-130Ma. Data results show two major uplift events.

Apatite fission track age and sample elevation relationship between the diagrams figure 3show that between age and height did not have a good linear relationship, indicating the margin of the Junggar Basin has a complex thermal history of rock.

Fig. 3 Relation between fission track age of apatite and altitude

Fig. 4 Thermal histories of typical samples based on the reverse modeling.PAZ represents apatite partial annealing zone. The upper left corner of each graph indicate the sample code, track the length of the measured and simulated track length, the measured and simulated Pooled age Pooled age, as well as the KS test and the age of fitting parameters GOF. When the KS values and GOF values larger than 0.5, is generally believed that a better simulation results.

Samples zircon, apatite fission track annealing zone through time is different. According to this law, using apatite - zircon mineral pairs lawwe had estimated the uplift rate. At the same time, we also had carried out some samples

of the thermal history modelingfigure 4. The results show that both sides of the Junggar Basin has a different uplift history. The northwestern margin of Junggar Basin, started its rapid uplift with 154.1 m / Ma in the 120-90Ma. However, the eastern margin of the Junggar Basin started rapid uplift with 79.5m/Ma rate in the 90-60Ma. Different rock of the northwestern margin of Junggar Basin has undergone in turn uplift event since the Cretaceous period from the edge of the Junggar Basin to the mountains of Zaire. It shows that the northwestern margin of the Junggar thrust fault system thrust to the basin with overstep propagation type.

Key words Central Asian Orogenic BeltJunggar basinFission trackThermal history modelling;