A Big Earth Data Platform for Three Poles

**Apatite fission track evidence of the Proto Tibetan Plateau**

1、Description

The growth process of the Tibetan Plateau has always been the focus of debate at home and abroad, which is of great significance for evaluating different growth models. In recent years, one of the focuses of debate is whether the "original Tibetan Plateau" exists and its scope. Sedimentological evidence and provenance analysis show that the topographic growth occurred in Qiangtang terrane and North Lhasa terrane as early as Cretaceous. However, paleontological and PALEOELEVATION evidences show that the topographical height of the central part of the plateau was formed in the Eocene Miocene. In order to solve this problem, we conducted apatite fission track studies in the Qiangtang terrane in the hinterland of the Qinghai Tibet Plateau. Because crustal thickening usually leads to topographic uplift and relief changes, thus accelerating denudation, the cooling events recorded by fission track are often strong indirect evidence of crustal thickening. The median apatite fission track age of Mesozoic sandstone samples is 40.1 ± 2.6 to 129 ± 3 Ma, with peak ages of ~ 45 Ma and 100-120 ma; The fission track age of the Eocene granite is 38.3 ± 1.3 Ma and 27.4 Ma respectively ± 1.6 Ma。 The uncorrected closed track length is 9.26 ± 39 to 14.11 ± zero point two four μ m. The corresponding relationship between age and age presents a typical "boomerang" trend, which reveals that the regional cooling time is earlier than 100 mA. The results of hefty thermal history inversion reveal that the growth process of the central part of the plateau can be divided into two stages: the first stage, the early Cretaceous (140-100 MA) cooling process reveals the crustal thickening in the central part of the plateau, which may be caused by the horizontal subduction of Bangong Nujiang Tethys ocean. At this time, the prototype of the plateau was formed in the middle and south of Qiangtang terrane; In the second stage, the former Tibet Plateau was gradually formed in the middle of the plateau from Eocene to Oligocene. The spatial distribution characteristics of Cenozoic low temperature thermochronology data in the central plateau show that there is no obvious East-West change, so the lower crustal flow model may be difficult to explain the growth process of the central plateau. On the contrary, the discrete and uniform distribution pattern of low temperature thermochronology data is consistent with the model of continental subduction and lithospheric mantle delamination. Combined with the regional deformation characteristics, the formation mechanism of the former Tibet Plateau includes upper crust shortening, continental crust subduction and deep mantle delamination.

2、Keywords

Theme：Rocks/Minerals,Tectonics,plate tectonics,apatite
Discipline：Solid earth
Places：Tibet
Time：Early Cretaceous

3、Data details

1.Scale：None

2.Projection：

3.Filesize：0.06MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：35.2 | - |
| west：87.0 | - | east：90.0 |
| - | south：33.5 | - |

5、Time frame:None--None

6、Reference method

References to data:

ZHANG Jiawei, HAN Zhongpeng, LI Yalin. Apatite fission track evidence of the Proto Tibetan Plateau. A Big Earth Data Platform for Three Poles, doi:10.1111/ter.124942021

References to articles:

Zhang, J., Li, Y., Xu, M., Dai, J., & Pang, J. (2020). New apatite fission track evidence from the northern qiangtang terrane reveal two﹑hase evolution of central tibet. Terra Nova.

7、Supporting project information

Second Tibetan Plateau Scientific Expedition Program

8、Data resource provider

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