A Big Earth Data Platform for Three Poles

**Numerical simulation of boundary driven convection and lithospheric thinning in Craton**

1、Description

The contents include: there is a sudden change of lithospheric thickness between the old Craton and the adjacent young active belt, Small scale mantle convection (boundary driven convection) can be induced by the transverse difference of temperature and density between the two. The boundary convection caused by the lithospheric step between the craton and the active zone and its role in the lithospheric thinning of the craton are discussed by using two-dimensional thermo mechanical numerical simulation method, When the density of the craton lithosphere is relatively high, the high-intensity craton lithosphere has a strong ability to resist boundary driven convection, and the thinning of the craton lithosphere is limited to the edge. However, the low-intensity craton lithosphere has a weak ability to resist boundary driven convection, When the density of the cratonic lithosphere is relatively small, no matter the strength of the cratonic lithosphere is high or low, the low density of the cratonic lithosphere can well inhibit the influence of boundary driven convection, The lithospheric thinning of the Archean North China Craton was confined by Phanerozoic active zones. The lithospheric thinning of the craton first occurred in the northern and Eastern margins and experienced a slow process, We believe that boundary driven convection may play an important role in the lithospheric thinning process of the North China Craton, especially in the initiation process of lithospheric thinning, but we can not rule out the joint action of other multiple mechanisms

2、Keywords

Theme：Lithospheric thinning,numerical simulation,Edge-driven convection,Tectonics  
Discipline：Solid earth  
Places：Global  
Time：no

3、Data details

1.Scale：None

2.Projection：

3.Filesize：1.64MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：90.0 | - |
| west：-180.0 | - | east：180.0 |
| - | south：-90.0 | - |

5、Time frame:2021-06-15 16:00:00+00:00--2021-06-17 03:59:59+00:00

6、Reference method

References to data:

CHEN Lin. Numerical simulation of boundary driven convection and lithospheric thinning in Craton. A Big Earth Data Platform for Three Poles, doi:10.11888/Geo.tpdc.2715212021

References to articles:

刘丹红, 陈林. (2020). 边界驱动对流与克拉通岩石圈减薄: 二维热-力学模拟. 中国科学: 地球科学, 50, 258–273, doi: 10.1360/SSTe-2019-0025。  
  
Liu, D., Chen, L. (2019). Edge-driven convection and thinning of craton lithospheree: Two-dimensional thermal-mechanical modeling. Science China Earth Sciences, 62, 2106–2120, https://doi.org/10.1007/s11430-019-9371-0

7、Supporting project information

The deep process and resource effect of major geological events in Yanshan period

8、Data resource provider

name: CHEN Lin  
unit:   
email: chenlin@mail.iggcas.ac.cn