A Big Earth Data Platform for Three Poles

**Numerical simulation map of the effect of lithospheric heterogeneity on continental rift**

1、Description

Main contents: the continental lithosphere has extensive heterogeneity, but its role in continental rifting is not clear. The effects of lithospheric heterogeneity on the continental rift model are studied using two-dimensional thermo mechanical simulation. Heterogeneity is mainly manifested in the lateral inhomogeneous continental lithosphere, which has a cold western (CW) and a hot Eastern (he) lithosphere. A series of experiments were carried out to explore the influence of lithospheric thermal state, weak zone and extension velocity on continental rift. The main results and implications are as follows: (1) on the he side, the extension of the cwh-e lithosphere always leads to the formation of wide rifts, while the CW side is not deformed（ 2) The existence of weak lithosphere in CW can lead to the formation of wide rift in the East and deep and narrow rift in the West（ 3) The thermal state of the lithosphere strongly influences the rift types and lithospheric deformation patterns. When the crust is extremely hot (tmoho = 900 ℃), a wide rift first appears on the he side, and then a narrow rift forms on the CW side. The extensional velocity mainly affects the time of rift formation, but has no significant effect on the type of rift. Many rift basins developed in the North China Craton (NCC) since the early Cenozoic in response to the subduction and retreat of the Pacific plate. The east of the North China Craton is dominated by wide rifts, while the west of the North China Craton is dominated by narrow rifts. The coexistence of these two types of rifts in the North China Craton is the result of lateral lithospheric heterogeneity, including the pre-existing weak lithospheric regions.

2、Keywords

Theme：numerical simulation,Tectonics,Lithospheric heterogeneity,Continental rift
Discipline：Solid earth
Places：North China Craton
Time：the early Cenozoic

3、Data details

1.Scale：None

2.Projection：

3.Filesize：1.0MB

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--2021-06-16 16:00:00+00:00

6、Reference method

References to data:

CHEN Lin. Numerical simulation map of the effect of lithospheric heterogeneity on continental rift. A Big Earth Data Platform for Three Poles, doi:10.11888/Geo.tpdc.2715192021

References to articles:

Wang, K., Chen, L., Xiong, X., Yan, Z.Y., & Xie, R.X. (2020). The role of lithospheric heterogeneities in continental rifting: Implications for rift diversity in the North China Craton. Journal of Geodynamics, 139, 101765

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