

TWO PHASES OF EXTENSION IN NORTH CHINA SINCE THE MESOZOIC: A NUMERICAL STUDY

Feng Lin

Dr. Mian Liu, Thesis Supervisor

ABSTRACT

The North China Craton was formed around 1.8 Ga by collision and amalgamation of the Eastern and Western blocks. It remained tectonically stable since then until the Mesozoic, when its eastern part experienced widely distributed extension and volcanism. This distributed extension waned during the early Cenozoic, and was replaced by localized extension (rifting) in the western part of the North China Craton. I have developed a series of viscoplastic finite element models to investigate the causes of these two phases of different continental extension in North China. My results show that the Mesozoic-early Cenozoic widely distributed extension requires a thin and hot lithosphere, which is probably the result of delamination or thermal erosion of the lithospheric root under the eastern part of the North China Craton. The localized rifting during the late Cenozoic in the western part of the North China Craton indicates a relatively cold and thick lithosphere. Furthermore, preexisting lithospheric weakening is needed to explain the formation of the Late Cenozoic rift zones within the relatively thick lithosphere. These preexisting weakening zones may be inherited from the Paleoproterozoic collision that formed the North China Craton.