

The crustal growth and evolution of North China Craton: revealed by Hf isotopes in detrital zircons from modern rivers

CHUNRONG DIWU*, YONG SUN AND WANG QIAN

State Key Laboratory of Continental Dynamics, Department of Geology, Northwest University, Xi'an, 710069, China

*E-mail address: diwuchunrong@nwu.edu.cn

The outstanding questions is how to quantitatively estimate the rate of growth of the continental crust and the proportion of juvenile material added to the crust at any given time during its evolution. In recent years, the U-Pb and Hf isotopic composition of detrital zircons provide an effective and simple approach to constrain the periods and rate of continental growth. In order to characterize the crustal growth history of North China Craton, 187 detrital zircons in two sand samples from the lower reach of Jing River and the Luo River were measured for U-Pb and Lu-Hf isotopic compositions by LA-MC-ICPMS. Compared with the global continental crust, the North China Craton shows a characteristic of episodic continental growth rate. For instance, about 60% of the present crustal volume of the North China Craton was generated in the between Mesoarchean and late Neoproterozoic (3.0 to 2.5Ga). Since then, the continental crust keeps a stable rate of growth and completely formed at the end of the Neoproterozoic (600Ma). It indicates that the present crustal of the North China Craton was mainly growth during Archean and Proterozoic, and the juvenile additions to the continental crust are almost negligible during Phanerozoic. Combined with the available studies and the early Precambrian crust growth curves of based on U-Pb ages, two-stage Hf crust formation ages (T_{DM2}^C and T_{NC2}^C) and $\epsilon_{Hf}(t)$, our results also reveal that ~ 2.7 Ga and ~ 2.5 Ga are the most prominent time of magmatism and the period of continental rapidly growth, respectively. Indicating that the North China Craton has been experienced obviously two episodes crustal growth.

Acknowledgments: This study was financially supported by the National Basic Research Program of China (2012CB416606) and the National Natural Science Foundation of China (41272004).