



LA-ICP-MS Detrital Zircon U-Pb Age of Ruyang Group in the Southern Margin of the North China Craton and Its Geological Significance

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Citation: Zhang et al., 2019. LA-ICP-MS Detrital Zircon U-Pb Age of Ruyang Group in the Southern Margin of the North China Craton and Its Geological Significance. *Acta Geologica Sinica* (English Edition), 93(supp.2): 288–289.

Abstract: Xiong'er rift trough has attracted much attention as a representative area of Mesoproterozoic-Neoproterozoic strata in the southern margin of North China craton. By using the LA-ICP-MS method, this study focuses on U-Pb ages of detrital zircons from the bottom of Xiaogoubei Formation and Yunmengshan Formation of Ruyang Group in Daimeishan of Henan. Results show that the detrital zircon ages of Xiaogoubei Formation (sample DMS-1) range from 1720 Ma to 2727 Ma, the youngest detrital zircon age near the harmonic line is 1720 ± 65 Ma and the main peak age is 2547 Ma, the second peak ages include 2178 Ma and 1832 Ma (Fig.1). The detrital zircon age of the Yunmengshan Formation in the overlying strata (sample DMS-17) is between 1700 and 2724 Ma, the youngest detrital zircon age near the harmonic is 1700 ± 55 Ma and the main peak age is 2083 Ma, the second peak ages include 1771 Ma and 2512 Ma (Fig.2).

Combining the previous research results, we consider that the lower age limit of Xiaogoubei Formation is ~1720 Ma, and the lower age limit of Yunmengshan Formation is ~1700 Ma.

Between Xiong'er Group and Xiaogoubei Formation of Ruyang Group, i.e. between 1750 Ma and 1720 Ma.

In this paper, the U-Pb age distribution histogram of detrital zircons from Xiaogoubei Formation (sample DMS-1) - Yunmengshan Formation (sample DMS-17) is plotted (Fig.3). The age distribution ranges from 2.75 to 2.4 Ga (peak to 2.5 Ga), 2.4 to 1.95 Ga (peak to 2.1 Ga), 1.95 to 1.7 Ga (peak to 1.8 Ga) and the range and peak values of zircon age distribution are similar to those of single samples of Xiaogoubei Formation (sample DMS-1) and Yunmengshan Formation (sample DMS-17) to some extent (Fig. 3). Results show that the Xiaogoubei Formation and Yunmengshan Formation have the same provenance, which come from the late Neoarchean, early Paleoproterozoic, middle Paleoproterozoic, late Paleoproterozoic and early Neoproterozoic respectively. At the same time, the detrital zircon age peaks of the two samples have a good response relationship with the former Cambrian geological events in North China Craton: Detrital zircon age of ~2.7 Ga

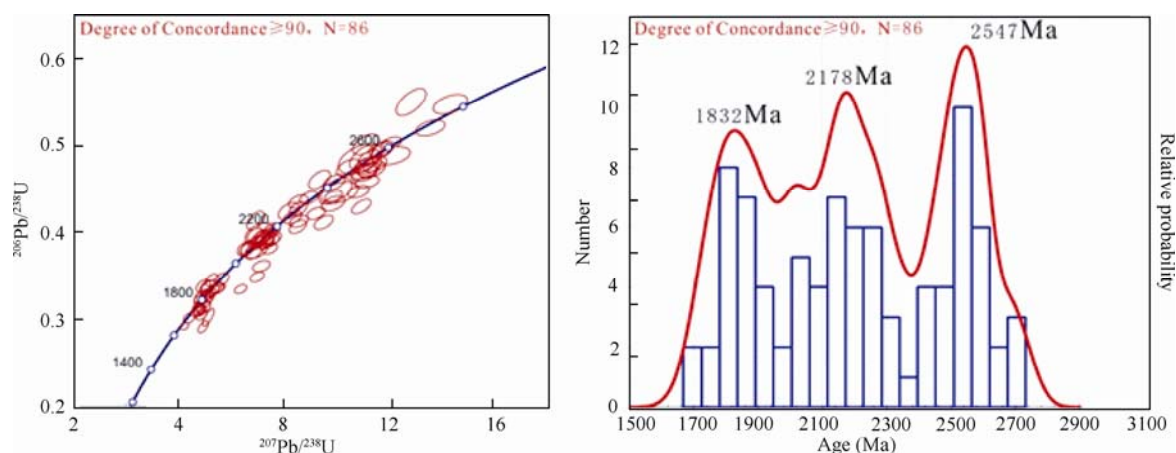


Fig. 1. U-Pb Harmonic curve and histogram of age distribution of clastic zircons from the Xiaogoubei Formation (sample DMS-1) in the Daimeishan area, Henan Province.

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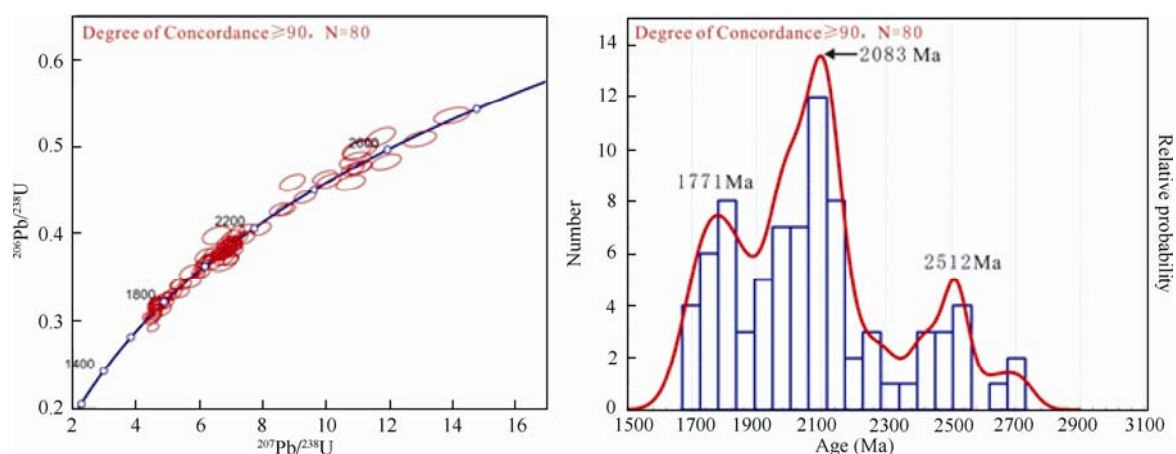


Fig. 2. U-Pb Harmonic curve and histogram of age distribution of clastic zircons from the Mesozoic Yunmengshan Formation (sample DMS-17) in Daimeishan area, Henan Province.

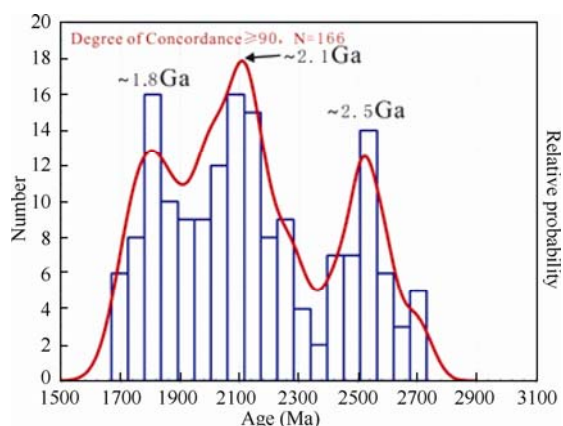


Fig. 3. Column diagram of U-Pb age distribution of detrital zircons from Xiaogoubei Formation (sample DMS-1) and Yunmengshan Formation (sample DMS-17).

mainly reflects the crustal growth of the craton. The peak age of ~2.5 Ga reflects the evolution of the North China cratonization. Detrital zircon age of 2.4~1.9 Ga mainly reflects the Paleoproterozoic rift event. Detrital zircon age of 1.95~1.8Ga is mainly related to the orogenic activities of the three rift belts of Fengzhen, Jiaoliao and Shanxi-Henan. Detrital zircon age of 1.8~1.75Ga mainly reflects the development period of the Xiong'er rift trough and foreshadows the beginning of the Middle Proterozoic rift event in the North China Craton.

Key words:

Key words: Zircon LA-ICP-MS U-Pb dating; Xiaogoubei

formation, Yunmengshan Formation, Ruyang group, Xiong'er rift trough, North China Craton

Acknowledgments: This work is granted by the National Science and Technology Major Project of China (No. 2016ZX05004-001).

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