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## Basement nature of Junggar basin in the NW China: zircon U-Pb-Hf isotope evidence from the Carboniferous pyroclastics of borehole samples

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Junggar basin or terrane is located in the Northwest China and surrounded by Tianshan Mountains on the south and Arantai to Altai Mountains on the north. The basement of the Junggar basin has long been controversial over the Precambrian continental or juvenile crust and the Early Paleozoic oceanic crust or island-arc complex (Xiao et al., 2011; He et al., 2013; Xu et al., 2015). Here, we selected the Carboniferous pyroclastic samples from the Db-1 and Y-1 wells in the Junggar basin for zircon U-Pb and Hf isotopic analyses to probe the basement nature of the basin. All the analyses were conducted at the State Key Laboratory of Continental Dynamics, Northwest University, China.

U-Pb-Hf isotopic analyses on 309 zircon grains from the Carboniferous pyroclastic rock samples from Db-1 and Y-1 wells in the Junggar basin were carried out by LA-ICP-MS. The analyzed results reveal the following evidence: 1) all the zircons present an age range from 303 Ma to 1447 Ma and show a magmatic origin with typical magmatic growth zonation and Th/U ratios from 0.4 to 1.8; 2) the youngest and largest population of the concordant zircon ages presents a weighted mean age of  $331.8 \pm 7.9$  Ma (MSWD=6.6) in accordance with the peak age of 330 Ma and the Hf model age ( $T_{DM}$ ) of 366 Ma, indicating the pyroclastic rocks were mainly formed in the Early Carboniferous; 3) the older and subordinate population of the concordant zircon ages displays an age range of 420-536 Ma with the peak at ca. 490 Ma, corresponding to the  $T_{DM}$  range of 438-545 Ma. Besides, the sample from well Db-1 has the oldest four concordant zircon ages of 559 Ma, 885 Ma, 1410 Ma and 1447 Ma, well approaching to the  $T_{DM}$  range of 963-1469 Ma. All of the Pre-Carboniferous zircons ought to be the inherited zircons captured from old continental crust rocks and the oldest zircons undoubtedly provide an indicator of a Precambrian basement in the deep of the basin. Also, the host rock types of the zircons are identified as the dolerites, syenites, basalts and granites by CART tree classification (Belousova et al. 2002), and almost all the zircons are fallen into the continental zircon range in U/Yb vs. Hf and Y diagrams (Grimes et al. 2007).

Above all, the crystallization ages and Hf  $T_{DM}$  ages of the zircons from the pyroclastic rocks display a similar age range of 303-1469 Ma with  $^{176}\text{Hf}/^{177}\text{Hf}$  ratios from 0.282219 to 0.283066 and positive  $\epsilon_{\text{Hf}}(t)$  values from 4.6 to 17.8. It can be, therefore, suggested that the basement of the Junggar basin is mainly dominated by the juvenile crust with a multi-stage reworking process during the Late Precambrian to Early Carboniferous, implying there was a continental crust basement older than 1447 Ma in the ancient Junggar terrane.

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