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Zircon U-Pb dating and implications of the TWL conglomerate deposits in the South margin of the Ordos basin, North China Block*

Chen, G., Zhang, W.L., Shi, X.L., Hao, H., Kang, Y. and Gao, L.

Department of Geology, Northwest University, Xi'an, P.R. China, 710069. Email: chengang@nwu.edu.cn

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The South margin of the Ordos Basin (S-OB) is commonly regarded as the western part of the South-sector of North China Block (S-NCB), involved in the multiple orogeny of the North Qinling Belt (NQB). Detailed investigation has revealed that the NQB mainly consists of the S-NCB to the north and the north Qinling terrain (NQT) to the south (Dong et al. 2014). However, the correlation between the NQT and NCB, as well as the tectonic affinity of the NQT, is still controversial. Tangwangling (TWL) conglomerate, outcropped in the S-OB, is bordered by the northern unconformable overlying Permian and the southward overthrust fault onto the Ordovician. As lack of exact biochronology records, the sources and age (the late Precambrian or the Ordovician?) of the TWL conglomerate has long been disputed, which is important for understanding the correlation between the NQT and NCB. Here, LA-ICPMS zircon U-Pb dating of 4 sandstone samples from the TWL conglomerate was carried out at the State Key Lab. of Continental Dynamics, Northwest University, P R China, to qualify the conglomerate deposit age and sources, as well as its tectonic implications.

Most of the analyzed zircons of the 4 sandstone samples from the TWL conglomerate deposits show rounded or oval shapes with CL imaging oscillatory zones and Th/U values of 0.4-2.01, suggesting a magmatic origin. All the concordant zircons ($n=325$) show broadly similar age patterns and a wide range of ages between 744 Ma and 2696 Ma. The largest population of zircons exhibits ages of 1449-2209 Ma ($n=225$) with a dominant peak at 1.8 Ga, and the subordinate populations display ages of 2274-2696 Ma ($n=49$), 1005-1412 Ma ($n=15$) and 744-943 Ma ($n=6$), respectively corresponding to the peak ages of 24.5 Ga, 11.8 Ga and 0.8 Ga. This age spectrum, compared with that of the NCB and NQB, indicates that the detritus of the conglomerate were mainly sourced from the basement of the NCC and subordinately from the late Precambrian complex of the NQB. Also, there are the youngest three zircon ages of 744 ± 8 Ma, 809 ± 8 Ma and 816 ± 13 Ma with a mean age of 790 ± 7.9 Ma in the lowermost sample, suggesting the timing of the conglomerate deposits to be later than 780 Ma. The age spectra of this study samples are similar to that of the Sinian Zhengmuguang tillite exposed in the west Ordos basin and absent the

dominant peak-aged 454 Ma zircons of the Ordovician Pingliang formation outcropped in the S-OB, implying that the TWL conglomerate probably represents the late Neoproterozoic extensional faulted deposits in the west part of the S-NCB.

All above data reveal that the TWL conglomerate, sourced bidirectionally from the NCB and NQB, was developed locally in an extensional faulted continental margin along the S-NCB amalgamated with the NQT as a whole during the late Neoproterozoic time. It can be therefore supported that the south margin of the NCB experienced post-collisional extension succeeded by the Neoproterozoic Grenvillian post-orogenic process in the NQB as reported by [Shi et al. \(2013\)](#) and [Dong et al. \(2014\)](#).

References:

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- [2] Shi, Y. and Yu, J.H. et al. (2013) *Precambrian Research* 231: 19–60

