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U-Pb dating of Detrital Zircons and Its Geological Significance from Upper Triassic Yanchang Formation in the Southwestern Margin of Ordos Basin

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Located in the intersection point of Qinling and Qilian orogenic belts, the southwestern margin of Ordos basin has become a hot topic because of its complex tectonic background and abnormal facies change[1]. Due to multiphase deformation in this area, the strata of late Triassic suffered severe denudation and the original basin is non-existent, which makes many arguments still exist about the provenance of Yanchang Formation and its development.

A combined study of CL imaging, LA-ICP-MS U-Pb dating and trace element analysis was carried out for detrital zircons from wells Kts-03, Kts-09 and Rsh-04 in the southwestern margin of Ordos basin, which is used to investigate changes in sediment provenance through time and to correlate them with major tectonic phases in the range. The results show that the detrital zircons are mostly magmatic in origin, with some minor metamorphic input. The U–Pb detrital zircon ages range widely from 231 to 3018Ma and can be statistically divided into five main groups: 231–529Ma(20%), 603–1225Ma(15%), 1361–2200Ma(45%), 2350-2700Ma(15%) and 2761–3018Ma (5%).

Data analysis associated to already published sedimentary and geochronology information indicate that the study area kept the stable tectonic background and was dominated by braided fluvial and alluvial fan depositional systems in early-middle Triassic[2]. At that period, the sediment provenance mainly came from Caledonian magmatic rocks and the early Palaeozoic strata of North Qilian Mountains and West Qiling. According to the sediment provenance and basin–range pattern evolution of the study area, the late Triassic can be generally divided into three stages: (1) during the early stage (231-223Ma), the study area was under the regional dextral strike slip dynamic environment and there were mainly sediment provenance from Hercynian provenance of north margin of Ordos, Fupin complexes on northwestern margin of Ordos and Songpan-Garze basin; (2) In the middle stage (223-218Ma), the extrusion from Qinling orogenic belts began to strengthen and there were mainly sediment provenance from Qinling orogenic belts on southwestern margin of Ordos, which was different from sediment provenance of Songpan-Garze basin. Meanwhile, Baoji-wudu aulacogen began to close; (3) In the late stage(218-210Ma), since the stress from Qilian orogenic belt also increased, Qinling orogenic belt was uplifted intensively and Baoji-wudu aulacogen was closed.

References:

[1] Wang Z Q et al. (2009) *Geology*, 1527-1546

[2]Fu J H et al. (2005) *Journal of Palaeogeography*, 34-44

