Paleogeographic framework and Paleo-sedimentary environmental restoration in the Lower Part of Yanchang formation in Triassic of Ordos Basin, China

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Ordos basin is a craton basin, rich in coal, oil and natural gas resources. The Yanchang formation includes the lower part (Chang 10- Chang 8 oil bearing intervals) and the upper part (Chang 7- Chang 1 oil bearing intervals) in which we found many hydrocarbon-rich depressions. The sedimentary period of Chang 10-Chang 8 formation is the transition stage from the North China Craton depression basin to Ordos basin due to the influence of the Indosinian movement. Previous studies mainly focused on the the interior of the present residual basin rather than the peripheral of the basin.

Twenty five outcrops out of Ordos basin and one hundred drilling cores in the basin are used and multiple methods including microscope, SEM observation, the major-trace elements analysis; zircon U-Pb geochronological studies and seismic profile interpretation are applied to study the paleoredox, paleosalinity, paleoclimate and provenance of the the lower part of the Yanchang formation in the Ordos basin.

It is concluded that: (1) the main characteristics of the sedimentary facies about Chang 10 is rivers-deltas- shore-shallow lacustrine. The sedimentary facies of Chang 9 has the features of “multi-deltas surrounding the lake” with a transitory lake transgression. The main characteristics of Chang 8 is that the rivers became more powerful and the area of lake increased.(2) based on the zircon U-Pb age structure comparision beween the lower part the Yanchang formation and its periphery old land, the results indicate that it has consistent source, which are mainly northern and southern margin of Huabei block. However, the north-east Alashan old land and south Qinlin-Qilian tectonic belts may just supply few detrital sediments.(3) according to the seismic interpretation, we have found a large number of synsedimentary fault. Seismites developed in Chang9 and Chang8 and turbidite developed in Chang9. The distribution of the synsedimentary fault, seismites and turbidite can cetify that the structure activity was more active in the sedimentary period of the Yanchang formation.