

Diagenetic facies and distribution of favorable reservoirs in the Upper Triassic Xujiahe formation, Sichuan Basin, Central China

LUO ZHONG^{1,2}, ZHU RUKAI^{1,2}, BAI BIN^{1,2},
ZHOUCUANMIN^{1,2} AND ZHANG XIANGXIANG^{1,2}

¹Research Institute of Petroleum Exploration and Development, PetroChina, Beijing, 10083, China

²State key laboratory of enhanced oil recovery, Beijing, 10083, China

(*corresponding author:yk@petrochina.com.cn)

The upper Triassic Xujiahe formation in Sichuan basin, central China, is divided into six members from Xu1 to Xu6 in an ascending order. The Xu1, Xu3 and Xu5 members develop argillaceous deposits of shore-shallow lacustrine-palustrine depositional system, with some coal and thin sandbodies. The Xu2, Xu4, and Xu6 members develop braided river delta depositional system, dominating large sandbodies, with some conglomerates.

With the observations of outcrops, core, and epoxy-impregnated thin-sections, plus analysis of SEM and XRD results, five types of diagenetic facies have been proposed for the two depositional systems.

1. In braided river delta depositional system, compositional maturity of sandstones is high, with abundant rigid grains. Four diagenetic facies develop, including clay coats-intergranular pore facies, quartz overgrowth authigenic clay-micropore facies, quartz overgrowth fracture facies, and carbonate cement tight facies.

2. In shallow lacustrine-palustrine depositional system, compositional maturity of sandstones is low, with dominant ductile grains such as phyllite, volcanics and carbonates, resulting in compaction-carbonate cementation tight facies.

3. Existence of rigid grains, chlorite or illite coats, dissolution of K-feldspar and volcanic rock fragments, and fractures are favorable for the formation of effective reservoirs.