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# Diagenesis and reservoir-quality evolution of fluvial and lacustrine-deltaic sandstones: evidence from Jurassic and Triassic sandstones of the Ordos basin, northwestern China

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The reservoir quality of Jurassic and Triassic fluvial and lacustrine deltaic sandstones of the intracratonic Ordos Basin (NW China) is strongly influenced by depositional setting and related eogenetic and mesogenetic modifications. The fluvial sandstones have higher average He-porosity and air permeability (14.8% and 12.7 mD, respectively) than the deltaic sandstones (9.8% and 5.8 mD, respectively). In addition to extensive mechanical compaction, eodiagenesis (220-97 Ma; depth $\leq$ 2000 m; T $<$ 70oC) resulted in silicate dissolution and kaolinite formation in the Jurassic fluvial sandstones, and in smectite infiltration and minor calcite and siderite cementation in the Triassic fluvio-deltaic sandstones. Pervasive eogenetic carbonate cementation ($>$ 20 vol.%) in the deltaic facies occurs preferentially along key sequence stratigraphic surfaces, such as parasequence boundaries. Mesodiagenesis (97-65 Ma), which occurred initially during rapid subsidence to depths of 3700-4400 m, resulted in the albitization of plagioclase and dickitization of kaolinite, quartz overgrowths, chlorite, illite, ankerite ($\delta$13C = -2.4‰ to +2.6‰; $\delta$18O = -21.5‰ to -10‰) and calcite ($\delta$13C = -4.7‰ to +3.7‰; $\delta$18O = -21.8‰ to -13.4‰). Oil emplacement (approx. 95 Ma) retarded cementation by quartz and carbonate and, to a much smaller ex-

tent, formation of dickite, illite and chlorite. Inhibition of quartz cementation was also due to the presence of chlorite fringes around detrital quartz grains. Dickitization of eogenetic kaolinite together with the short residence time at maximum burial temperatures (105-124oC), have retarded the albitization of K-feldspars and illite formation, and hence promoted permeability retention. Meteoric-water telodiagenesis, which occurred since 23 Ma ago and is still ongoing at depths shallower than 2 km ($T < 70$oC), has resulted in slight dissolution of carbonate and feldspars, and in the formation of kaolinite