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Genesis and distribution pattern of carbonate cements in lacustrine deep-water gravity-flow sandstone reservoirs in the third member of the Shahejie Formation in the Dongying Sag, Jiyang Depression, Eastern China

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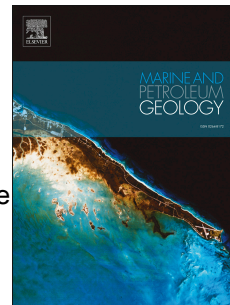
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# □ Genesis and distribution pattern of carbonate cements in lacustrine deep-water gravity-flow sandstone reservoirs in the third member of the Shahejie Formation in the Dongying Sag, Jiyang Depression, Eastern China

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**Abstract:** The lacustrine deep-water gravity-flow sandstone reservoirs in the third member of the Shahejie Formation are the main exploration target for hydrocarbons in the Dongying Sag, Eastern China. Carbonate cementation is responsible for much of the porosity and permeability reduction in the lacustrine deep-water gravity-flow sandstone reservoirs. The sandstones are mainly lithic arkose with an average framework composition of  $Q_{43}F_{33}L_{24}$ . The carbonate cements are dominated by calcite, ferroan calcite, ankerite and a small amount of dolomite. The calcite and ferroan calcite are mainly poikilotopic blocky crystals, while the dolomite and ankerite are mainly euhedral rhombohedra crystals filling intergranular and intragranular pores. The relatively positive  $\delta^{13}C$  values (-2‰ to +3.9‰) of the carbonate cements in the sandstone reflect a mainly inorganically sourced carbon. From 32 Ma to 25 Ma, the pore water was rich in bicarbonate and  $Ca^{2+}$  due to carbonate dissolution in mudstone,

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