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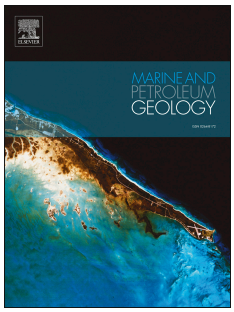

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Effect of formation overpressure on the reservoir diagenesis and its petroleum geological significance for the DF11 Block of the Yinggehai Basin, the South China Sea

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Abstract: Overpressure is an essential factor that controls the accumulation and distribution of oil and gas. In this study, we systematically studied the effects of overpressured fluid activities on the diagenesis and diagenetic evolution of reservoirs in the DF11 Block of the Yinggehai Basin, the South China Sea. The employed methods included thin-section observation, scanning electron microscopy, geochemical analysis of formation water, and C-O isotopic study. The formation water in the DF11 Block was classified as $NaHCO_3$-type continental sedimentary water, showing high HCO_3^- content and extremely low concentrations of Ca^{2+} and Mg^{2+}. The formation overpressure drove the carbonate ion-bearing thermal fluid flowing into the top boundary of the overpressure. The carbonates ions were re-precipitated from the fluid due to decreasing pressure and temperature. As a result, a tightly plugged zone that consisted of high carbonate cement content was formed. On the other hand, the overpressure reduced the sources of carbonate cement and limited the secondary growth of