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Coupling of faulting and hydrocarbon accumulation in Baiyun sag based by basin modelling

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Enormous hydrocarbon potential has been evaluated in the Baiyun sag in the continental shelf of the northern South China Sea. Faults are widespread around the sag and have profound effects on hydrocarbon migration and accumulation. Fault activities control the sedimentation of source rocks in the early stage, regulate the range of reservoirs in the middle stage, and dominate the seals and traps in the late stage. This paper makes attempt to present the controls of faults on hydrocarbon migration and accumulation with methods of faulting analysis and shale gauge ratio (SGR). Results show that faulting episodes couple well with the generations of hydrocarbon. Overpressure due to hydrocarbon generation may result in the acceleration of faulting activities at 18.5Ma. Active faults act as the perfect conduits of hydrocarbon vertical migration. Shale smear is much more credible in reflecting the sealing ability of motionless faults than the sheer faulting activity analysis. In the study region, most of the traps are positive structures consisting of anticlines and faulting anticlines. Hydrocarbon accumulation in the south faulting areas tends to be more favorable than in the north. The major expulsion stages are 23.8-16.5Ma and13.8-10.5Ma.