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Earthquakes in Longmenshan and Hydrocarbon Accumulation in Western Sichuan

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It has been known that earthquake may result in the change of oil and gas well production. After Wenchuan earthquake in 2008, in Sichuan, China, the production of gas wells in Longmenshan foreland basin showed sharply change., and at the same time, a few new emerging nature gas seepages were observed in Sichuan Basin. One of the gas seepages is far away from the epicenter zone for about 100 km. The facts indicate that huge earthquake may lead to fast hydrocarbon migration in a large range. Earthquakes occurred frequently in geological history. So, we guess that earthquakes may play key role in the secondary hydrocarbon migration and accumulation, and that may exist an "earthquake-induced" hydrocarbon migration and accumulation mechanism. The mechanism of "earthquake-induced" hydrocarbon migration may include: (1) co-seismic ruptures as fluid flow channel, (2) co-seismic ruptures as low pressure area pumping pore fluid, (3) seismic wave as additional impulse driving force. In addition, Seismogenic stress is also an important force driving pore fluid migration. Earthquake-induced oil and gas rapid migration may lead to two opposite results. If the co-seismic ruptures reach the surface, it will lead to the reservoirs destruction and the gas dissipation. If the co-

seismic ruptures connect the deep reservoir and the shallow high-porosity rocks, it will lead to a secondary hydrocarbon accumulation in the shallow reservoir.

Under the guidance of the "earthquake-induced" hydrocarbon migration and accumulation hypothesis, we constructed a conceptual model to explain the hydrocarbon reservoir distribution in the Western Sichuan. According to the model, earthquakes in Longmenshan have result in reservoirs destruction in Longmenshan, and secondary accumulation in Longmenshan foreland basin.

Lots of large oil and gas fields worldwide are adjacent to earthquake zones. "Earthquake -induced" hydrocarbon migration and accumulation may be is common worldwide.

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Key words: earthquake, hydrocarbon accumulation

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