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## **Timing, Possible Causes and Impact on Reservoir Distribution of the Onset of Major Late Paleozoic Glaciation on Gondwana: Evidence from the Midcontinent, USA**

An abrupt increase in the magnitude of sea-level changes in the Late Mississippian had a significant impact on reservoir type and distribution in unconformity-bounded sequences in the Illinois Basin. Direct evidence of late Paleozoic glaciation on Gondwana from glacial deposits suggests that geographically extensive continental glaciation began some time in the early Namurian (Latest Mississippian) but the exact timing and characteristics of the onset of glaciation are poorly understood. Indirect evidence preserved in the sequences suggests that there was an abrupt three-fold increase in the magnitude of sea-level changes during the greenhouse to icehouse transition in the late Viséan. An abrupt change from carbonate-dominated sequences bounded by disconformities with little evidence of erosion to mixed carbonate-siliciclastic sequences bounded by unconformities with deep incised valleys was likely produced by a three-fold increase in the magnitude of sea-level fluctuations. Reservoirs occur in ooid tidal sand ridges in the HSTs of the carbonate-dominated sequences and in TST incised-valley fills and quartz tidal sand ridges in the overlying mixed carbonate siliciclastic sequences.

The increase in the magnitude of sea-level fluctuations was likely driven by an increase in continental ice volume. A possible explanation for this abrupt change is a closing of the equatorial seaway between North America and Gondwana, which would have led to an abrupt change in oceanic and atmospheric circulation patterns that could have caused a major increase in continental glaciation. This increase in amplitude should affect all same-aged marine strata and have a significant impact on reservoir type and distribution world-wide.