

Lower McMurray Formation sinkholes and their fill fabrics: effects of salt dissolution collapse-subsidence across the northern Athabasca oil sands deposit

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Abstract

Numerous sinkhole collapse and sag structures are scattered across the sub-Cretaceous paleotopography of both the western and eastern segments of the giant Bitumont trough and beyond, which underlie the northern Athabasca oil sands deposit. Many of these pre-Cretaceous sinkholes remained inactive during the Aptian and were filled by lower McMurray sediments, but others were enlarged with reactivated Devonian salt dissolution at depth during lower McMurray deposition. Some of these sinkholes were initiated during the lower McMurray interval without precursor pre-Cretaceous sags. Other sinkholes sagged towards the close of the lower McMurray interval and were truncated by middle McMurray deposition. The morphogenesis of sinkholes during the lower McMurray deposition demonstrates continued dissolution of Middle Devonian salt beds into the Lower Cretaceous.