

Hydrogeological Characterization of the Red River Formation, Williston Basin, Canada-USA

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The distribution of oil fields in the Red River Formation of the Williston Basin extends from the thermally mature area where the basin's richest source rock has generated oil. Hydrocarbons might have migrated long distances within the formation as indicated by production (Lantry Field, South Dakota) and oil stains (southwestern Manitoba).

Migration in the basin in response to hydrodynamic forces has been discussed by others. However, its modification due to buoyancy has never been considered on a basin-wide scale. Results indicate that oil production outside the mature source rock zone occurs where buoyant forces dominate or at least as important as driving forces derived from the effect of topographic relief, therefore buoyancy plays an important role in long-range migration. Other areas with similar driving force distribution are not productive because they either are too far from the source rocks or lie in areas under unfavourable hydrodynamic conditions.