

BIOTURBATION INFLUENCE ON RESERVOIR QUALITY: A CASE STUDY FROM THE LOWER TRIASSIC MONTNEY FORMATION OF THE WESTERN CANADIAN SEDIMENTARY BASIN, BRITISH COLUMBIA, CANADA

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Abstract

The Lower Triassic Montney Formation is one of western Canada's most lucrative unconventional hydrocarbon plays, but many geological aspects are poorly understood. In many areas, the very fine-grained formation consists of alternating intervals of bioturbated and nonbioturbated facies. Preliminary analyses have shown that bioturbation in the Montney greatly influenced the distribution of permeability and porosity by altering pore-throat distribution and focusing cementation and dissolution processes to specific horizons during early diagenesis. These small-scale features can significantly impact reservoir permeability and porosity properties. To better understand how bioturbation impacts the vertical and horizontal permeability of the Montney Formation, one core, 182 m in length, will be analyzed in fine detail. The core will be logged and permeability will be measured every 10 cm using a pressure decay permeameter. Three-dimensional permeability will be visualized and modeled using a micro computed tomography scanner. Additionally, x-ray fluorescence spectrometry and sedimentary petrography will be completed to describe composition and rock texture. From combining these methods, models will be produced to help predict reservoir quality within bioturbated and nonbioturbated facies. It is hypothesized that the bioturbated zones will have higher permeability due to the facies being more homogeneous, whereas the nonbioturbated facies will have a lower permeability as a result of fine-grained laminae acting as flow barriers. Models produced within this study will then be used throughout the Montney Formation and other fine-grained formations to help explain reservoir permeability and porosity.

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