



## The Influences of Structural Highlands on Channel Stacking and Reservoir Quality, Atlas Member, Saskatchewan

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### Summary

The Atlas Member is the uppermost unit of the Cantuar Formation in Southwest Saskatchewan, deposited during the Lower Cretaceous in an overall transgression. Locally, the sub-Cretaceous Unconformity incises into the Upper Jurassic Success and Roseray formations (J.E. Christopher, 1997). During deposition of the Atlas Member, the topography of the unconformity was variable, including the Swift Current highlands and intervening incised valley systems. Incised valley systems were infilled with complex fluvial sediments of the Cantuar Formation which are up to 85 meters thick (Figure 1) (Leckie et al. 1997). The fluvial sandstone reservoir of the Atlas Member is composed of stacked channels of commonly feldspathic litharenite that overlie the Swift Current highlands or are present at the top of the incised valley system. The purpose of this study is to compare the reservoir quality of the Atlas Member where it overlies the Swift Current highlands versus locations where it is present within the incised valley system.

Analyzing the fluvial reservoir heterogeneity and quality is conducted by evaluating channel stacking patterns (depositionally controlled) and fluid content (post-depositionally controlled) to determine the effects of structural highlands on channel reservoirs. Oil and water saturations are compared between Atlas channel sands: (1) within the incised valley system; and; (2) overlying the Swift Current highlands. Cross-sections constrain channel body architecture and geometry to determine the effects of differential compaction on deposition.

Horizontal wells landed within the Atlas Member appear to be more productive in areas where the sandstones overlie the sediments of the Swift Current highlands. The reservoir heterogeneity analysis will lead to a better predictions of reservoir quality within the Atlas Member in Southwest Saskatchewan.

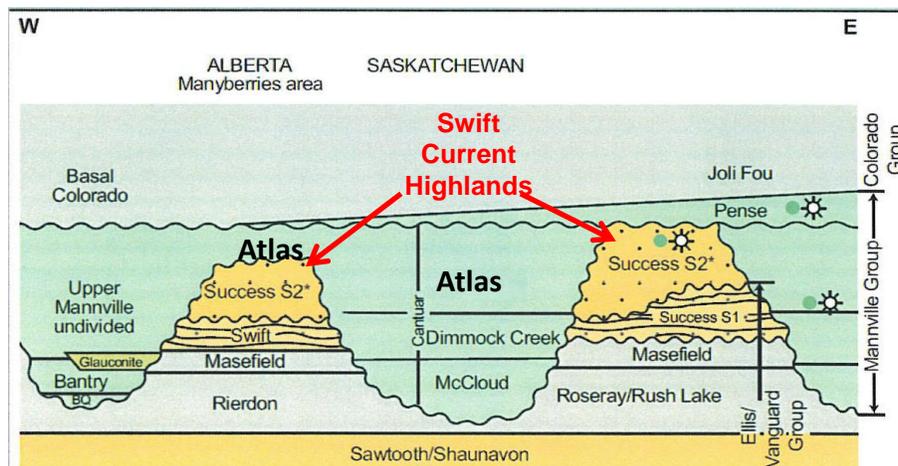


Figure 1: Cantuar formation infilling the Incised-Valley system. Modified figure from Leckie D et al. (1997).

## References

- Christopher, J. E. (1997). Evolution of the Lower Cretaceous Mannville Sedimentary Basin in Saskatchewan. Petroleum Geology of the Cretaceous Mannville Group, Western Canada. *Canadian Society of Petroleum Geologists*, 18, 191–210.
- Leckie, D. A., Vanbeselaere, N. A., James, D. P. (1997). Regional Sedimentology, Sequence Stratigraphy and Petroleum Geology of the Mannville Group: Southwestern Saskatchewan. Petroleum Geology of the Cretaceous Mannville Group, Western Canada. *Canadian Society of Petroleum Geologists*, 18.