

Hydrodynamics of Abnormal Pressures

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Summary

Atlas 2027 will be the first such publication to have a chapter devoted to the hydrodynamic setting of the Western Canada Sedimentary Basin with a particular focus on pressures that deviate from a normal hydrostatic gradient. A chapter addressing this subject is long overdue given the significant resources hosted in plays displaying this sort of pressure regime (i. e.: “Deep Basin” plays).

This talk will provide an update on the current state of the chapter and the work needed to finalize the completion of the chapter by the December 31, 2025 deadline.

Theory / Method / Workflow

The chapter will contain discussions of the:

- Pressure data types,
- Evaluation techniques,
- Implications of abnormal pressures in geomechanical considerations,
- Modes of abnormal pressure and their development,
- Regional Nominal Hydrostatic Gradients and
- Case studies of representative plays.

The case studies will contain regional overviews of plays representing a variety of abnormal pressure settings. These case studies will include reviews of the following formations and their associated play types:

- Milk River: Predominately low-pressure dry gas hosted in a fine-grained sand / siltstone reservoir.
- Cardium: Hybrid pressure liquids-rich gas (LRG) / oil / dry gas hosted in a diverse clastic reservoir.
- Montney: Predominately high pressure (LRG) / dry gas / oil hosted in low permeability siltstone-dominated reservoirs.
- Duvernay-Muskwa-Horn River: High-pressure LRG hosted in mudstone-dominated reservoirs.

Results, Observations, Conclusions

Understanding the genesis of abnormally pressured reservoirs has long been an important part of the geoscience heritage of the Western Canada Sedimentary Basin. In this chapter we aim to provide a useful overview of the mechanisms driving abnormal pressuring and examples of plays under these conditions.