geoconvention
Virtual Event
September 21-23
2020
CSPG · CSEG · CWLS · GAC · MAC · IAH

Mapping basin-wide H_2S distribution in the Montney Formation

Andrew Kingston[1], Omid Ardakani[1,2], Samantha Mackie[2], Per Pederson[2]
[1]Geological Survey of Canada; [2]Department of Geoscience, University of Calgary

Abstract

The Montney is one of the most productive unconventional reservoirs in western Canada and one of Canada's most economic gas plays (CER, 2013). However, production is hampered by the regional occurrence of hydrogen sulfide (H_2S) gas, which occurs in varying concentrations within hydrocarbon reservoirs. H_2S is a toxic and corrosive gas which greatly affects the safety and economics of natural gas production and even minor amounts can necessitate bespoke engineering requirements. The goal of this project is to produce a comprehensive basin-wide map of H_2S distribution in the Montney Formation to allow better prediction and assessment of the potential for H_2S occurrence for economic, environmental, and safety benefit.

H_2S measurements produced by industry are archived provincially by either the Alberta Energy Regulator or British Columbia Oil and Gas Commission. This study combines H_2S concentration data from these two provincial databases to produce an interprovincial, basin-wide map of H_2S distribution in the Montney Formation. In addition, H_2S concentration data will be assigned to Montney Formation stratigraphic members (i.e., Upper, Middle and Lower) in order more accurately assess the distribution both laterally and vertically within the basin. Members of the Montney are stratigraphically identified based on the work of Zonneveld and Moslow (2018), which clarified and formalized the units of Davies et al. (1997) and Davies et al. (2018).

Preliminary results indicate several broad-scale trends in H_2S distribution including: (1) H_2S concentrations are in general higher and more widespread in the southeast part of the basin and more moderate and spatially limited in the northwest; (2) two areas of high H_2S concentrations are readily identifiable, one in Alberta and one in British Columbia that are mainly associated with major structural features in the basin; and (3) generally in Alberta higher H_2S concentrations occur in the Lower Montney in contrast higher H_2S concentrations are observed in the Upper Montney in British Columbia.

References

Davies, G.R., Moslow, T.F. and Sherwin, M.D. 1997. The Lower Triassic Montney Formation, west-central Alberta. Bulletin of Canadian Petroleum Geology, 45(4), pp. 474-505.

Davies, G.R., Watson, N., Moslow, T.F. and MacEachern, J.A., 2018. Regional subdivisions, sequences, correlations and facies relationships of the Lower Triassic Montney Formation, west-central Alberta to northeastern British Columbia, Canada—with emphasis on role of paleostructure. Bulletin of Canadian Petroleum Geology, 66(1), pp.23-92.

Zonneveld, J.-P. and Moslow, T.F. 2018. Palaeogeographic setting, lithostratigraphy, and sedimentary framework of the Lower Triassic Montney Formation of western Alberta and northeastern British Columbia. Bulletin of Canadian Petroleum Geology, 66(1), pp. 93-127.