



Understanding gas generation and their spatial distribution through isotopic composition mapping of the Montney Fm., Canada

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Under current energy policies, regulations, and available drilling technology, natural gas production may provide a cleaner, and less expensive energy resource. Over the last fourteen years, there has been increasing interest in unveiling the wet and dry gases generation and distribution from the Montney Formation, which extends from northeastern British Columbia (BC) to western Alberta (AB), Canada. Not only for economical interest, but also, because carbon isotope fingerprinting of *in situ* gases (methane, ethane and propane) and their spatial distribution would provide a geochemical baseline necessary for eventual environmental remediation. This led to major research efforts to spatially constrain parameters such as formation temperatures, maturity, and gas composition (BC Oil and Gas Commission, 2012). Published data from Desrocher, (1997), and Tilley and Muehlenbachs, (2006) were combined with new isotopic data from production wells and unwanted surface casing vent gases and mapped their spatial isotopic composition and variation. Inspection of the mapped data indicates regional differences. Early produced kerogen type II gases are mostly found in shallower reservoirs mainly in western Alberta's fields (W5), whereas over-mature gases are produced from deeper parts of the basin in northeastern British Columbia. Display isotope reversals and characteristic roll-over sequences. Exceptionally, $\delta^{13}\text{C}$ enriched propane characterizes gases in the northern most part of the Montney in BC. Cross-plots $\delta^{13}\text{CH}_4$ versus $\delta^{13}\text{CO}_2$ suggest these gases were sourced from more terrigenous matter and may also be biodegraded.

References

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