

A CLUE TO IDENTIFY THE OCCURRENCE OF FUGITIVE GAS

1 Background and Surface casing vent samples location

- Biodegradation
- Mixing
- Migration Path
- Source Rock Maturity
- Kerogen Type

Figure1. n-alkanes and carbon dioxide carbon isotopic composition, traditional applications in organic geochemistry (i). Map showing location of surface casing vent (SCV) samples from the Western Canada Sedimentary Basin (WCSB) of this study (ii). The data points represent 2,399 energy well. Hydrocarbon and carbon dioxide isotopic values come from unpublished in-lab analyzed samples collected over the last 15 years at the displayed locations. Gas carbon isotope ratios (methane, ethane) analysis were performed at the University of Alberta by using a Finnigan MAT 252 GC CF-IRMS system.

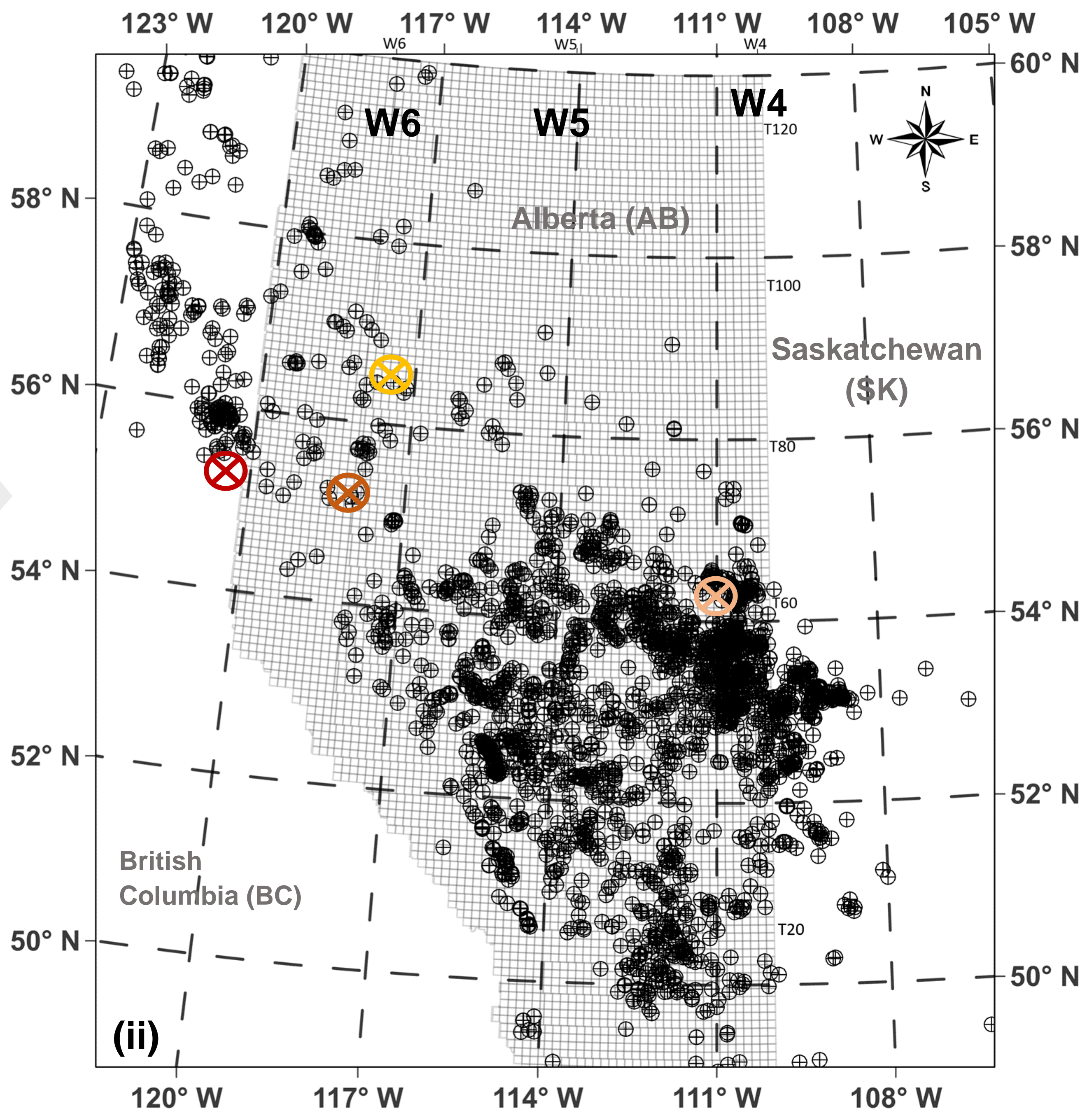
3 Samples source and Histogram distribution

- Production
- Surface Casing Vent
- Ground Migration

Production Gas: Commercial natural gas and/or oil associated gases sampled from well separator or meter run.

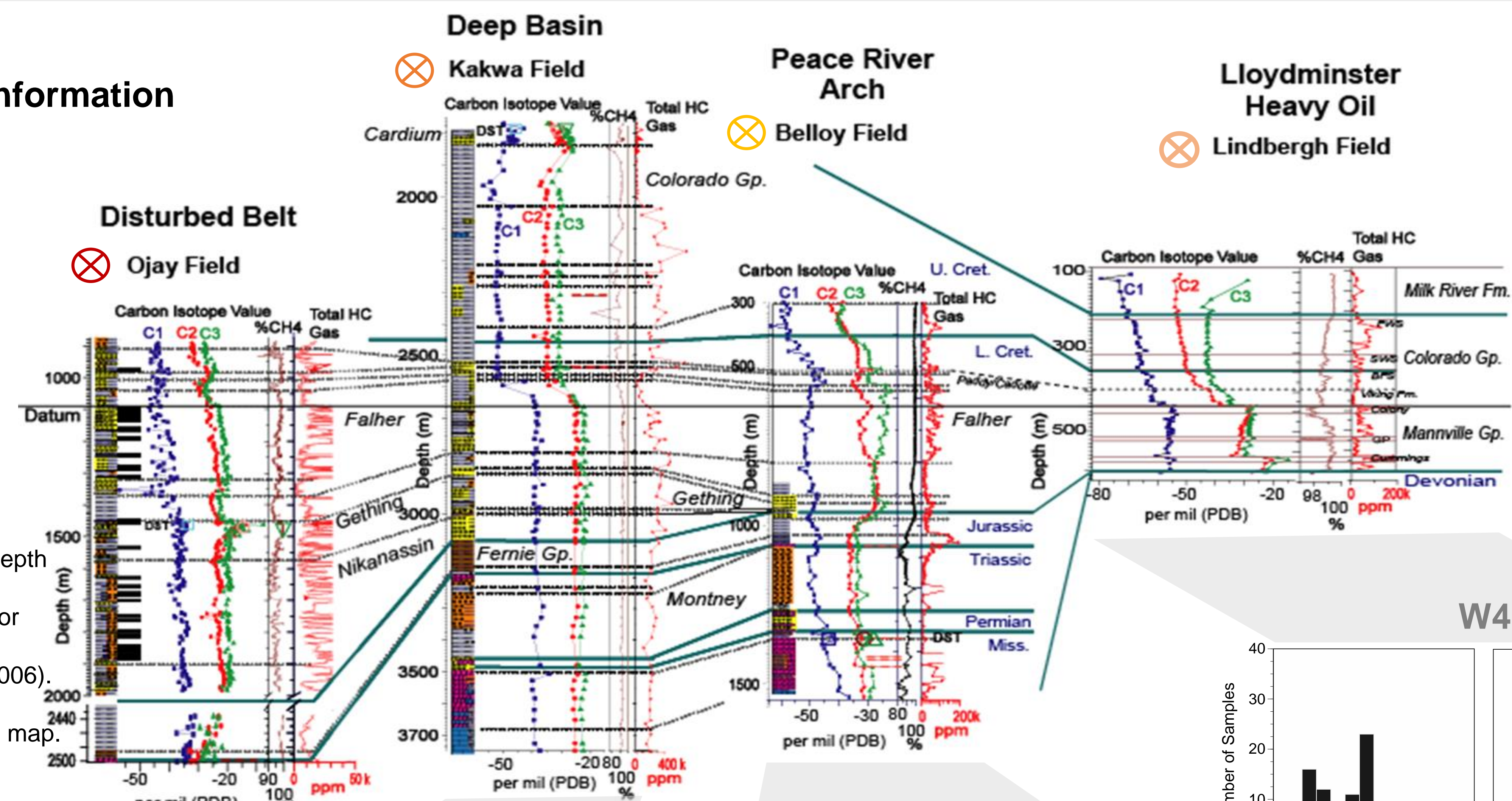
Surface Casing Vent (SCV): It is the flow of gas out of the surface casing/casing annulus (often referred to as internal migration). By regulation in Canada, SCVs are left open and vent to the atmosphere. It is part of surface gas leakage that leads to direct emission of gases to the atmosphere and surroundings and are usually related to the well's infrastructure distribution, or casing failure.

Ground Migration (GM): gas sampled from the soil or ground from the wells pad area. Also called soil gas migration, this gas aliquot represents the isotopic composition and mixture of gases resulting from a complex interaction out of vertical and lateral free-phase fugitive casing gases and geologic media with subtle variabilities.

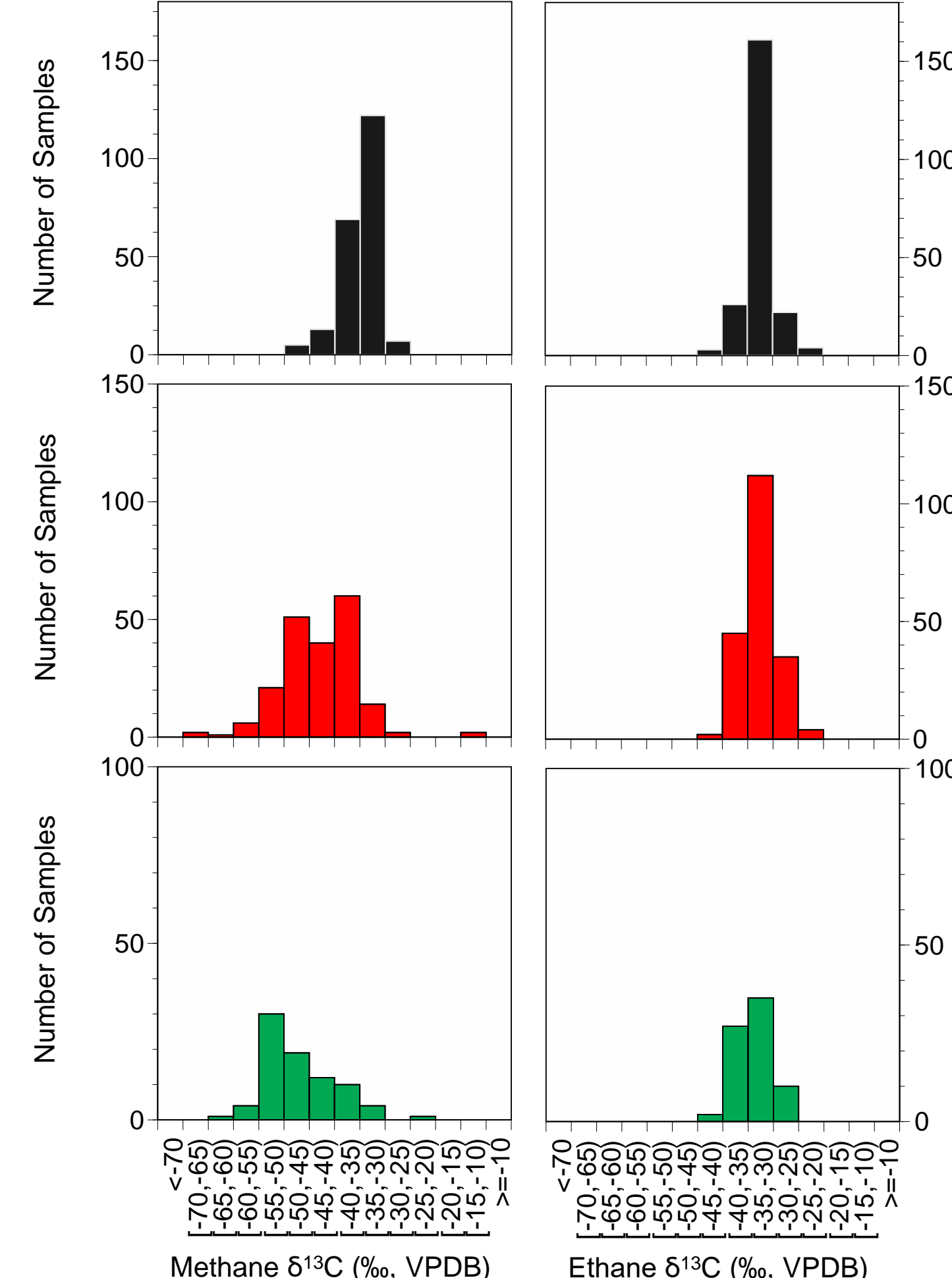


2 Mudlog information

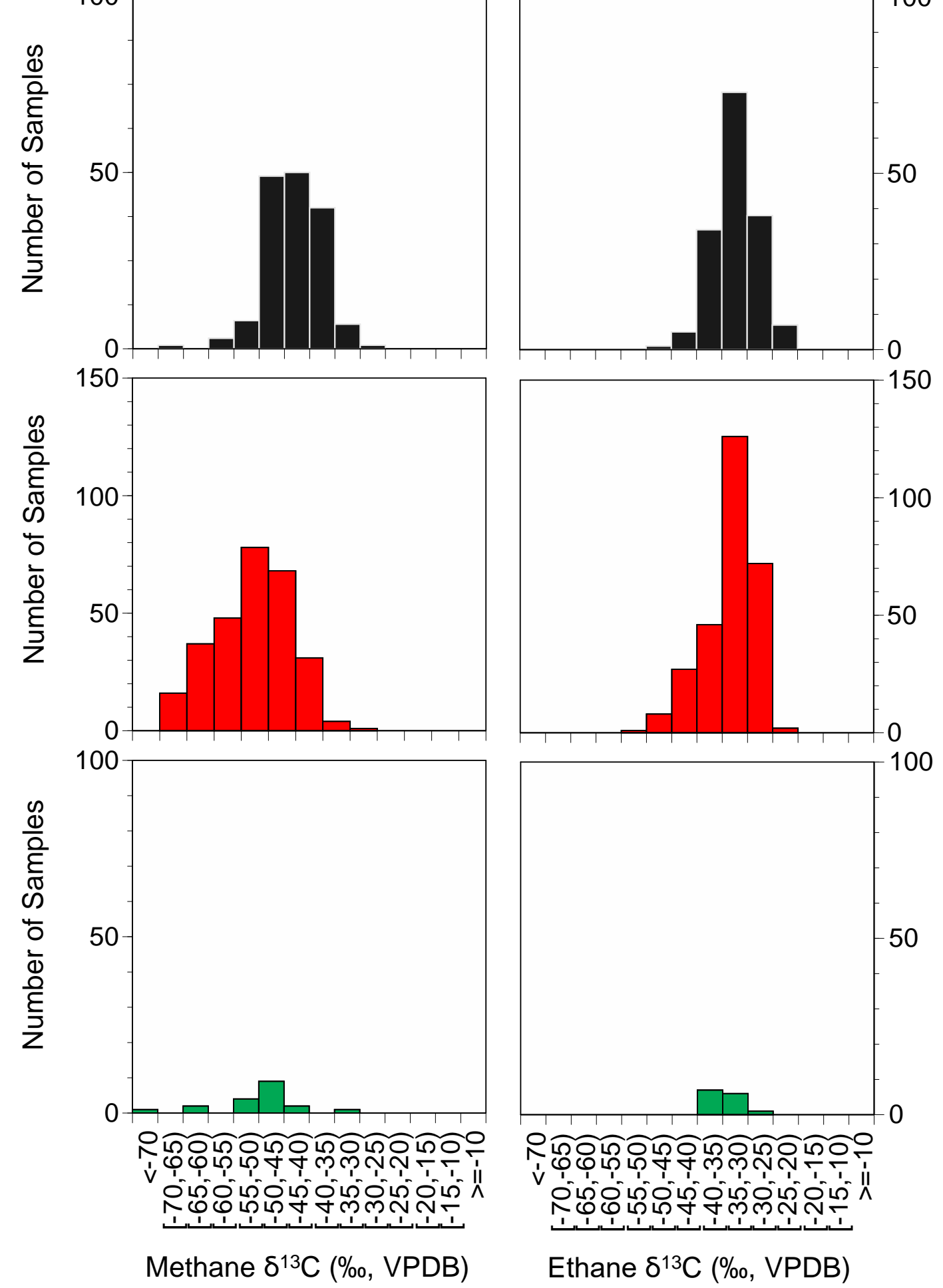
Figure 2. Mud gas isotope depth profile from eastern Alberta, Canada (Modified and see for further details Tiley and Muehlenbachs, (2006). Mudlogs location has been highlighted on the provincial map.



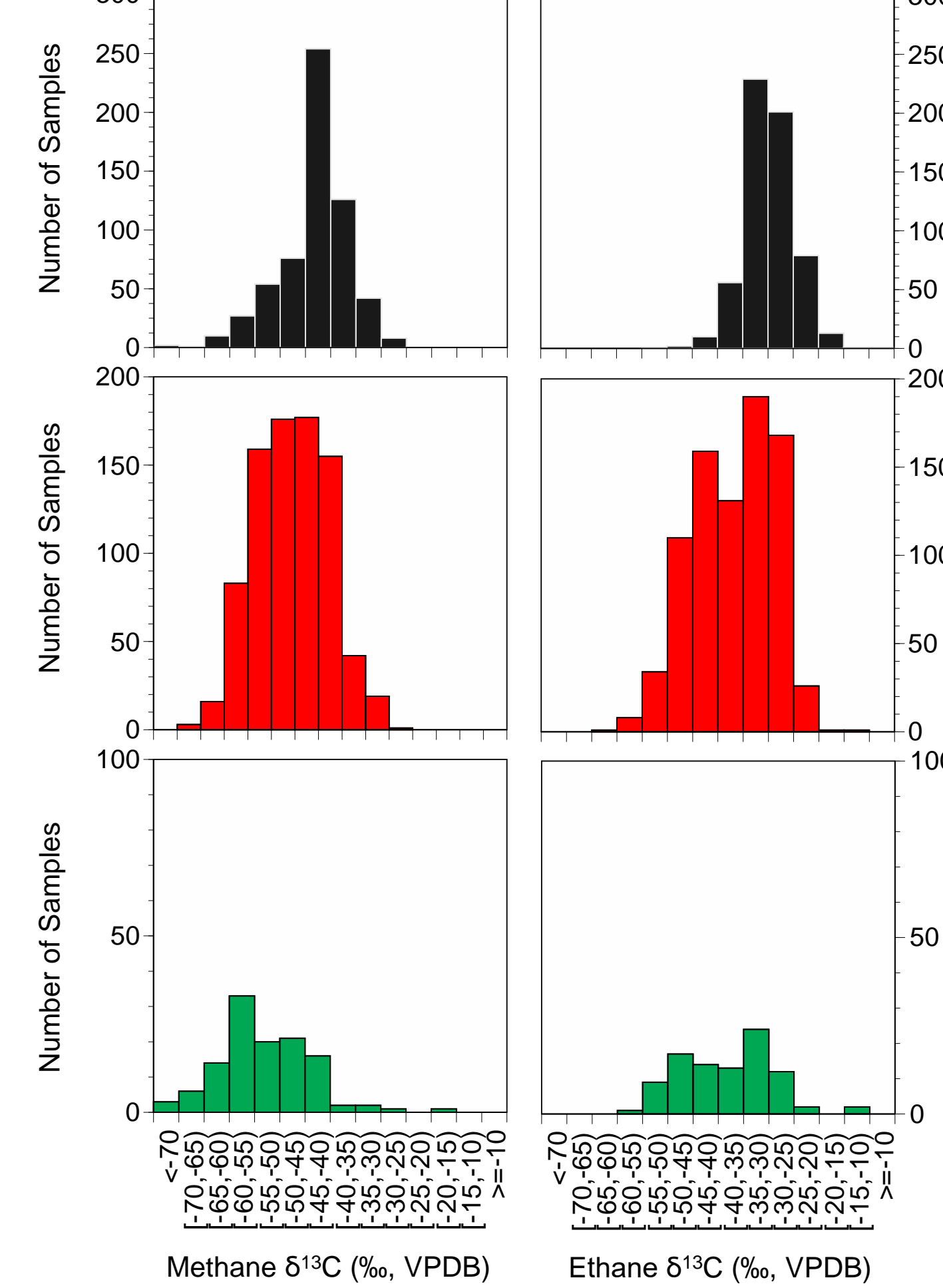
British Columbia (BC)



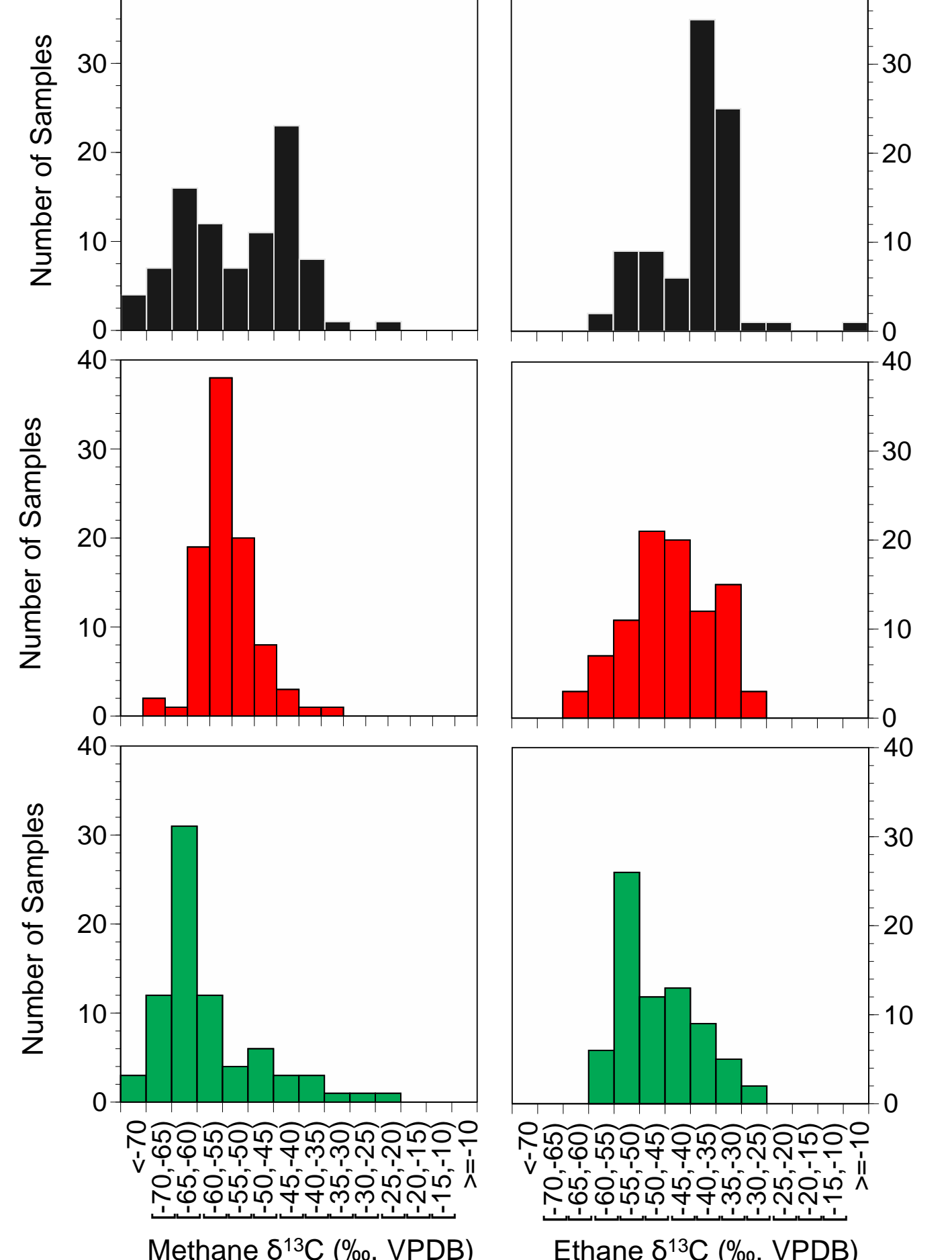
W6



W5



W4



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Reference

Tiley, B. and Muehlenbachs, K. (2006). Gas maturity and alteration systematics across the Western Canada Sedimentary Basin from four mud gas isotope depth profiles. *Organic Geochemistry*, 37(12), 1857–1868.

Related work scan:



The Western Canada Sedimentary Basin energy wells:
δ13C gas isotopic mapping of gas migration

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