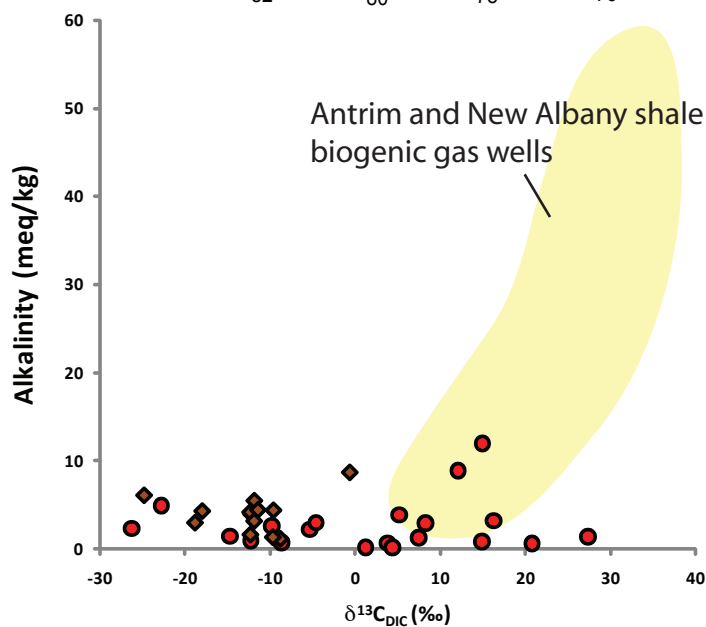
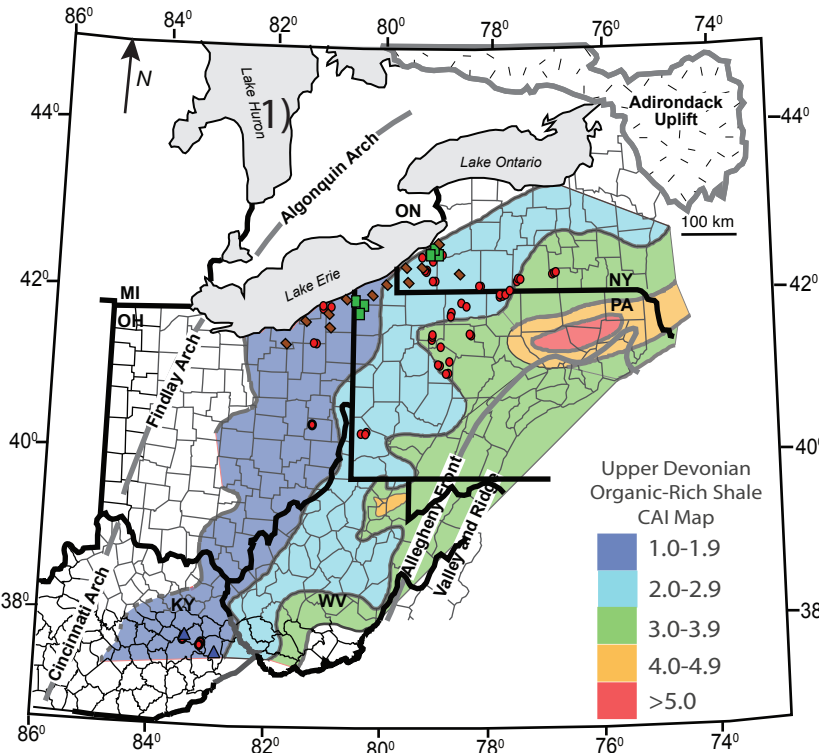


Hydrogeochemistry of shallow gas accumulations in fractured Devonian black shales

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Summary of major results:

Chemical and isotope analyses of coproduced natural gas and formation waters from Devonian-age organic-rich shales across the northern margin of the Appalachian Basin indicate that the majority of methane is thermogenic in origin.

High $\delta^{13}\text{C-DIC}$ values (up to 30 per mil) with relatively low alkalinities (<10 meq/kg) suggest limited microbial methane generation at the basin margin.

Shale brines were diluted by freshwater recharge with an isotopic composition similar to modern precipitation.

