

TEMPORAL VARIABILITY OF METHANE IN SHALLOW GROUNDWATER WELLS IN THE MARCELLUS SHALE REGION

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ABSTRACT

Much has been learned about the impact of hydraulic fracturing in the Marcellus Shale region. However, there is still need for baseline groundwater quality data, especially time-series sampling of methane. Limited opportunities remain for baseline data collection in Northeastern Pennsylvania, where shale gas production has proliferated, but opportunities remain in New York, where hydraulic fracturing is currently banned. The objective of this study is to characterize temporal variability of naturally-occurring methane in shallow groundwater in the Marcellus region. I hypothesize that methane in domestic wells with a primarily thermogenic source will vary less through time than those with a microbial source. Additionally, I expect thermogenically-sourced methane is more closely correlated with groundwater type (e.g. Na-HCO₃) and landscape position (e.g. valley vs. upland) between wells, versus temporal patterns in climatic conditions at individual wells. I am working with homeowners to sample domestic wells in the Marcellus Shale region of NY monthly. Currently, my ability to investigate relationships between methane and groundwater type and landscape position is hindered by limited spatial coverage; this award will provide more contiguous geographical coverage as well as allow me to complete a year of analyses. Dissolved methane concentrations will be compared with meteorological data, water type, and well landscape position to determine which variables are the best predictors of methane concentrations through time. The data will provide information on within year and between year variability of methane, as well as spatial variability between wells, which will fill a data gap and can be used to inform policy regulations.

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