



Methane emissions from abandoned oil and gas wells in Pennsylvania: Data and analysis of seasonal variations

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Abandoned oil and gas (AOG) wells are a potential pathway for the migration of subsurface fluids such as methane to the atmosphere. There is little information on the emissions from these AOG wells, but measurements taken by Kang et al. 2014 show that methane emissions from AOG wells can be significant. Here the variability of direct measurements of methane fluxes from static flux chambers at AOG wells and control locations near the wells are reported. Variability of the methane flow rates (particularly from the high emitting wells) is of great interest to better understand the dynamics and net emissions of the wells. Rounds of measurements were therefore taken in July, August and October of 2013 and January, March, June, and October of 2014 to determine any seasonal variability in the methane flow rates. Additionally at two of the high emitting wells multiple measurements were taken within one day to determine the variability on shorter (hourly) timescales. Overall the high emitting wells (wells with flow rates $>1E4$ mg/hr of CH_4) displayed only a small degree of variability compared to the low emitting wells. The order of magnitude variations for the wells go from 0 to 4 with most between 0 and 2. The order of magnitude variation also seems to have no relation to the number of times the well was sampled. Preliminary results indicate that the seasonal variability for low emitting wells is likely linked to microbial activity while variability for the high emitting wells is likely due to changes in some other pressure source.