3.057 VOC Fluxes from Natural Gas Production in the Upper Green River Basin, Wyoming..

Early Career Scientist

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Abstract:

The Upper Green River Basin of Wyoming (UGRB) contains two of the top ten gas fields in the U.S., producing approximately 807,386 mfc of natural gas in 2013. This gas is somewhat “wet”, meaning that along with methane, heavier hydrocarbons and water are produced in the extraction process.
A common concern of natural gas production and transmission is the emission of methane (a potent greenhouse gas) and consequently, measurements of fugitive methane from these processes are increasing. Natural gas production also emits many non-methane hydrocarbons (NMHCs), including air toxics such as benzene, toluene, and xylenes, for which little data on emission rates exists. Besides deleterious health effects, these NMHCs are implicated in wintertime ozone production which is difficult to model without accurate emission inventories.
NMHC fluxes are typically estimated via canister grab samples during a methane flux measurement. The methane:NMHC ratio of a canister is determined later in the laboratory, and applied to a known methane flux measured in the field. Utilizing the EPA Other Test Method 33a, a Picarro methane analyzer, and an Ionicon Proton Transfer Reaction-Time of Flight-Mass Spectrometer, the University of Wyoming Mobile laboratory directly measures both methane and NMHC emission fluxes from 38 well pads in the UGRB.
Preliminary results suggest varying NMHC compositions between well pads, disparities between large methane emitters and large NMHC emitters, and multiple NHMC sources on well pads. NMHC fluxes ranging from ~ 0 – 150mg/s have been observed. These results and implications for traditional canister sampling of these sites will be discussed.