

SEMINAR

A summary of recent measurements characterizing the emissions of hydrocarbons and other trace gases in several U.S. shale basins and associated environmental impacts of shale oil/gas production

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ABSTRACT

Production of crude oil and natural gas from shale reservoirs has increased substantially over the last decade and now accounts for over half of the natural gas produced in the U.S. The “shale boom” has resulted in a recent and unprecedented increase in the domestic production of methane (CH₄) and non-methane volatile organic compounds (VOCs). Methane is an important greenhouse gas and the emission of VOCs may contribute to the secondary formation of tropospheric ozone and organic particles. The emissions of air toxics such as hydrogen sulfide (H₂S) and benzene may further degrade local air quality. Characterizing the emissions of methane, VOCs, and other trace gases from shale oil and gas operations is critical to assessing environmental impacts of energy production.

This presentation will summarize the efforts of NOAA and colleagues to characterize the emissions of a full suite of VOCs and other trace gases emitted from oil and gas activities in 14 U.S. shale basins between 2011-2015. These measurements cover a range of spatial scales from process-level emissions on individual well pads in Utah and Colorado to basin-wide emissions in production areas from the Bakken (North Dakota) to the Eagle Ford (southern Texas) formations. NOAA has developed and deployed a variety of state-of-the-art instrumentation and measurement platforms to compile the most chemically detailed analysis of the largest number of shale basins constituting over 70% of the shale oil/gas production in the U.S. The goal of this presentation is to demonstrate that emissions of methane and VOCs are distinctive and unique to each shale basin studied and represent a significant anthropogenic emission source. A brief review of a variety of environmental impacts linked to shale oil and natural gas operations will be presented.

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