

## Summary of Results from the NOAA Shale Oil and Natural Gas Nexus (SONGNEX) Study

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## A33C-04: Summary of Results from the NOAA Shale Oil and Natural Gas Nexus (SONGNEX) Study

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**Wednesday, 12 December 2018**

**14:25 - 14:40**

📍 *Walter E Washington Convention Center - 151A*

In March and April of 2015, the NOAA WP-3D research aircraft made airborne measurements over several different oil and natural gas production regions in the central and western U.S. ranging from North Dakota to Texas. The study was conducted at a time when the domestic production of natural gas was at an all-time high and the production of crude oil near an all-time high, but also when drilling activity had abruptly decreased due to a drop in the price of oil. In this presentation, we will give a summary of the measurement results obtained in the different production regions. Emission fluxes of greenhouse gases (CH<sub>4</sub>) and air pollutants (VOCs, NO<sub>x</sub>, air toxics) were determined through mass balance and from enhancement ratios versus methane. While photochemistry was generally weak during the flights, some trace gases showed evidence for secondary formation. Measurements by mass spectrometry showed the presence of some less commonly observed trace gases including nitrogen heterocyclic compounds. Emissions of pollutants are expressed as a fraction of the produced natural gas and crude oil. Such metrics can be compared with emission factors for fossil fuel combustion by other sources (motor vehicles and power plants) and allow a comparison of emissions from different stages in the lifecycle of fossil fuels. We have also studied NO<sub>x</sub> emissions from oil and natural gas production through trend analysis of the NO<sub>2</sub> columns from the Ozone Monitoring Instrument. This analysis shows that the drilling of new wells and the extraction of crude oil and natural gas both lead to NO<sub>x</sub> emissions. These results are compared with a new fuel-based emission inventory for NO<sub>x</sub> emissions from oil and natural gas production.

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