ATS/CIRA Colloquium

Jessica B. Gilman

Visiting ATS from the Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO and Chemical Sciences Division, NOAA Earth System Research Laboratory, Boulder, CO

Characterizing the emissions of volatile organic compounds (VOCs) from oil and natural gas operations in several U.S. shale basins

Hosted by Arsineh Hecobian

Friday, November 1, 2013

ATS room 101; Discussion will begin at 11:15am
Refreshments will be served at 10:45am in the weather lab

The production of oil and natural gas from unconventional reservoirs is currently at an all-time high. Since 2000, production of natural gas from shale and tight sand formations has tripled and currently accounts for over half of all natural gas produced in the U.S. (U.S. Energy Information Administration). This recent natural gas "boom" has raised some concern regarding environmental impacts and degradation of local air quality. Raw natural gas is a mixture of approximately 60-95 mole percent methane. Depending on the particular reservoir, raw natural gas may contain significant amounts of volatile organic compounds (VOCs) in the form of natural gas liquids (e.g., ethane, propane, butanes) and natural gas condensate (e.g., pentanes, cycloalkanes, and aromatics). In the atmosphere, these organic compounds can react in the presence of nitrogen oxides (NO_x = NO + NO_2) and sunlight to produce ozone (O_3) and particulate matter.

Since 2011, we have measured an extensive set of VOCs and other trace gases in five major shale basins in the U.S. including Uintah (Utah), Denver-Julesburg (Colorado), Haynesville (Texas and Louisiana), Fayetteville (Arkansas), and Marcellus Shale (Pennsylvania). These measurements were conducted at various ground sites, in a mobile laboratory, and aboard the NOAA WP-3D aircraft. The unique mixture of emissions from each of these basins will be compared in order to investigate the relative importance of primary VOC emissions on the formation of secondary pollutants such as ozone.

About Dr. Gilman:

Dr. Jessica Gilman is a research scientist at CIRES and is affiliated with NOAA's Chemical Sciences Division where she conducts field and laboratory measurements of volatile organic compounds (VOCs) using custom-built gas chromatographs (GCs). Her research focuses on characterizing the primary sources of VOCs and the chemical evolution of these compounds in the atmosphere. Recent field studies have focused on the impact of emissions of VOCs from oil and natural gas operations across the U.S., urban emissions and photochemistry in Los Angeles, Calif., and the contribution of biogenic emissions to regional haze in the southeastern U.S.

Link to colloquium videos and announcement page: http://www.atmos.colostate.edu/dept/colloquia.php