Geophysical Research Abstracts
Vol. 20, EGU2018-11229, 2018
EGU General Assembly 2018

ACME-V campaign: intensive greenhouse gases observations in the North Slope of Alaska during summer 2015.

Sebastien Biraud (1), Margaret Torn (1), Arthur Sedlacek (2), and Colm Sweeney (3)

(1) Lawrence Berkeley National Laboratory, Earth Sciences Division, Berkeley, USA (scbiraud@lbl.gov), (2) Brookhaven National Laboratory, Environmental & Climate Sciences Department, Upton, USA (sedlacek@bnl.gov), (3) NOAA, Global Monitoring Division, Boulder, USA (colm.sweeney@noaa.gov)

Atmospheric temperatures are warming faster in the Arctic than predicted by climate models. The impact of this warming on permafrost degradation is not well understood, but it is projected to increase carbon decomposition and greenhouse gas production (CO_2 and/or CH4) by arctic ecosystems. Airborne observations of atmospheric trace gases, aerosols and cloud properties in North Slopes of Alaska (NSA) are improving our understanding of global climate, with the goal of reducing the uncertainty in global and regional climate simulations and projections.

From June 1 through September 15, 2015, the Atmospheric radiation measurement (ARM) airborne facility (AAF) deployed a G1 research aircraft (ARM-ACME-V mission) to fly over the North Slope of Alaska, with occasional vertical profiling between Prudhoe Bay, Oliktok point, Barrow, Atqasuk, Ivotuk, and Toolik Lake. The aircraft payload includes a Picarro and a LGR analyzers for continuous measurements of CO_2, CH4, H_2O, and CO and N2O mixing ratios, and a 12-flask sampler for analysis of carbon cycle gases (CO_2, CO, CH4, N2O, $13CO_2$, and trace hydrocarbon species including ethane). The aircraft payload also include measurements of aerosol properties (number size distribution, total number concentration, absorption, and scattering), cloud properties (droplet and ice size information), atmospheric thermodynamic state, and solar/infrared radiation. Preliminary results using CO_2, CH4, CO, ethane, and soot spectroscopy observations are used to tease apart biogenic and thermogenic (biomass burning, and oil and gas production) contributions.