IASOA Methane, Ozone/Trace Gases Working Group

February 15, 2017

Attendees: Sara Crepinsek, Irina Petropavlovskikh, Stephen Platt, Lori Bruhwiler, Shima Shams, Kristof Bognar, Taneil Uttal, Jennie Thomas, Detlev Helmig, David Tarasick, Xiaoyi Zhao, Von Walden, Kim Strong, Steve Montzka

Role Call of group members

Estimating Arctic Methane Emissions Using Top-Down Approaches presentation by Lori Bruhwiler – Arctic budget of greenhouse gases, important to separate the Arctic from other places in the world, using a global scale top-down view, global mean Methane and Methane trend figure, seek to answer the question: what is driving the recent growth? Anthropogenic? Natural? Is the Arctic Contributing?, rapid increase in the 80's followed by a leveling off followed by a recent rapid increase again, global-scale source attribution, global Methane going up with decrease in d13C which suggests agriculture/animals/wetlands/both, getting to spatial global assimilation we care about, prior emission estimates, estimated atmospheric state (concentration and emissions), earth system analyzer-CH4, remotely sensed ecological data, satellites TCCON, current surface network, global atmospheric flux inversion results (Methane Total Emissions) – disagreement in flux inversions as a function of latitude, specifically in the Arctic the agreement is not as bad and is similar, find that total Arctic budget of Methane is 23Tg per year, the "bottom-up" approach, is there double-counting going on in summation of Methane flux information (i.e. Bottom-up info), there could be spatial biases, transport biases in inversions, it's difficult to scale process observations to the entire Arctic, information lost during simulations when not given proper weight, fundamentally want to know if inversions agree on IAV and are there trends in emissions, is the Arctic putting out more Methane as it warms?, overview of monitoring sites (sparse over Siberia), if going to detect small trends then need long time series, important to keep these time series going and not lose any sites, difficult to detect small trends in current techniques and models, maybe can't separate local wetland sectors from clean air sector, local sites near sources interested in measuring, suggestion that annual cycle is changing over time – explaining it is difficult because don't know anthropogenic emissions at lower latitudes, overall: it is hard to detect changes in Arctic emissions given high atmospheric variability, we need sustained observations of fluxes and atmospheric concentrations with adequate spatial coverage, we need to understand the global Methane budget, anthropogenic and natural

Direct observations are quite solid in their conclusions of finding diagnostic versus simulated models, trends are quite distinct in observations, sampling four times a month at Arctic stations is sometimes not enough and needs to be completed more often, Barrow was unique in observations compared to other observations, annual cycle is changing at Barrow but it is unclear what is the cause (could be a sampling artifact), global models have difficulty capturing events since they are not as well understood, need more aircraft campaigns (vertical profiles outside of the boundary layer for NOx)

Discussion of Methane, Ozone and Trace Gases Working Group – broaden specifics of some of the questions to include Methane and other trace gases, justify ozonesonde network at EC – add something about the useful-ness of this data

Action Items:

- Send out science questions via email for discussion (Crepinsek)
- Participants to submit 1-2 questions they would like to see the WG answer (ALL)