To: Interest Group for the Air Quality Research Seminars and Discussion (AQRSD) group

From: John S. Daniel (NOAA), Sherri Hunt (EPA), and Greg Frost (NOAA) – AQRSD Co-Leaders

Subject: Agenda for the Tuesday, 9 June 2020 meeting of the Air Quality Research Seminars and Discussion (AQRSD) group

A meeting of the Air Quality Research Seminars and Discussion (AQRSD) group will be held 2-4PM Eastern, Tuesday 9 June 2020.

We are continuing our webinar format. Please use the following link to register

https://attendee.gotowebinar.com/register/7647471015389958923

Once registered you will receive the webinar link and audio options. If you have technical problems, please email Richard.J.Tisinai@noaa.gov.

Also note, this month's meeting is 100% virtual.

The proposed agenda follows. Please let us know if you have suggested changes or ideas for future discussion topics.

Sherri Hunt, Greg Frost and John Daniel

Air Quality Research Seminars and Discussion (AQRSD)
"Virtual" meeting this month – webinar only; no physical location
2 PM – 4:00 PM eastern, Tuesday, 9 June 2020
Call-in number (only if needed/not using webinar): contact Richard.J.Tisinai@noaa.gov

The Copernicus Atmosphere Monitoring Service (CAMS): forecasting air quality in Europe and at the global scale – Dr. Vincent-Henri Peuch, European Centre for Medium-Range Weather Forecasts (ECMWF), Director of CAMS

Copernicus is the flagship Earth Observation Programme of the European Commission and ECMWF is heavily involved in its implementation, in particular by managing 2 of the 6 thematic services focusing on Climate (C3S) and Atmospheric Composition (CAMS). In particular CAMS is tasked to provide operational atmospheric composition information at the global scale and, with finer resolution and precision over Europe. I will describe the systems that we use for this and some of the current associated R&D activities. The global data assimilation and modelling system that we use is a version of ECMWF Integrated Forecasting System also used for Numerical Weather Prediction. Over Europe, a multi-model ensemble of 9 members is used. We will also illustrate some of the currently ongoing work with these systems to study the links between air pollution and COVID-19.

Development of the CU AirSOF instrument: First Applications to Quantify Emissions from Wildfires by Mass Balance – Rainer Volkamer, University of Colorado

Wildfires are an increasing source of pollution that adversely affects public health, impacts ecosystem, and climate. In the past 20 years the fire niche has been expanding due in large part to anthropogenic factors that increasingly start wildfires. Today, there is hardly a month without wildfires in the continental U.S.. However, pyrogenic emissions remain a poorly characterized source of atmospheric trace gases and aerosols, and predicting these emissions remains a major challenge due to the lack of measurement techniques to evaluate these predictions comprehensively and quantitatively on the scale of wildfires. The need to better "Quantify Emissions and Deposition" by developing new "analytical instrumentation and measurement platforms…" is a priority science area in the National Academies report on "The Future of Atmospheric Chemistry Research" (NAS, 2016).

Since 2013, my group at the University of Colorado (CU) has developed Solar Occultation Flux Spectroscopy (SOF) from ground- and airborne platforms. First ground-based applications aimed to better quantify NH3 and NOx emissions from agriculture (Kille et al., 2017; doi: 10.5194/amt-10-373-2017), and to quantify and separate CH4 emissions from oil & ag (Kille et al., 2019, doi: 10.1029/2019GL082132). In October 2017, the first airborne SOF measurements were demonstrated, and successfully measured CO mass fluxes on the scale of actual wildfires (the Santa Rosa fires in Northern CA). CU AirSOF is a one-of-a-kind prototype instrument that measures the column absorption of numerous trace gases directly in the open atmosphere above the aircraft at mid-infrared wavelengths (along the direct solar beam). The first science deployment of CU AirSOF as part of the "Biomass burning of trace gases and aerosol" (BB-FLUX) project in July-September 2018, and its precursor campaign in California (Pre-BB-FLUX) is described. A total 12 test flights, and 40 research flights were conducted (mostly from Sacramento, CA and Boise, ID) that sampled 125+ plumes, 60+ plume profiles from 19 different wildfires during the 2017 and 2018 wildfire seasons. BB-FLUX further exploits remote-sensing (CU AirSOF, DOAS, Lidar) and in-situ synergies to quantify mass fluxes of CO2, CO, aerosols and other trace gases (e.g., NH3, NO2, HCHO, CHOCHO, HONO, etc) with the objective to better understand emissions fluxes, plume injection height, and evaluate satellites.

This presentation describes the CU AirSOF instrument operating principle, and applications to inform two questions: how much fuel goes up in smoke, and in which form? And what are the major uncertainties with predicting air quality impacts of pyrogenic carbon emissions for ozone and particle pollution? The first satellite detection of HONO by the Sentinel5 Precursor satellite is briefly discussed, and BB-FLUX data are used to evaluate this new global capability.