Geophysical Research Abstracts
Vol. 21, EGU2019-18954, 2019
EGU General Assembly 2019

Integrated analysis of tropospheric O_3 formation: Assessment of Pandora trace gas observations in continental and maritime transition areas of the Chesapeake Bay

Fernando Santos (), Joseph Robinson (2), Alexander Kotsakis (2), Glenn Wolfe (2), Sally Pusede (3), James Flynn (4), Donald Blake (5), Thomas Hanisco (2), and Robert Swap (2)

(2) National Aeronautics and Space Administration, Greenbelt, Maryland, USA, (3) Dept of Environmental Sciences, The University of Virginia, Charlottesville, Maryland, USA, (4) University of Houston, Houston, USA, (5) University of California, Irvine, USA

Tropospheric ozone (O_3) impacts human health and vegetation and plays a central role in the oxidation of chemically and climatically relevant trace gases. Due to the importance of O_3 and its precursors to air quality and climate change, it has received continuous attention in the past decades from both the scientific and regulatory communities. With the aim to characterize pollutant formation, transport, and enhancement in land/water transition regions, the OWLETS (Ozone Water-Land Environmental Transition Study) campaign was carried out during summer 2017 (July - August) and 2018 (June - July), investigating the southern and northern Chesapeake Bay regions, respectively. In this study, we utilize measurements from the NASA C-23 Sherpa and University of Maryland Cessna 402B aircraft that overflew and spiraled above intensive observation sites within the study region, determining the mixing ratios of the various trace gases. These measurements included more than 35 species of non-methane volatile organic compounds (NMVOCs), which provide additional information regarding the source of emissions (e.g., biogenic vs. anthropogenic) as well as insight into photochemical processing. These observations will be compared to Pandora trace gas spectrometers that were deployed at several key sites overflown by the NASA C-23 and Cessna 402B during the OWLETS campaigns. The Pandora spectrometers provide total columns of O_3 and nitrogen dioxide (NO_2) information. Also, we aim to use Pandora's formaldehyde (HCHO) product as a proxy for volatile organic compounds (VOCs) and evaluate tropospheric ozone formation. The measurements obtained from NASA C-23 and Cessna 402B aircraft and Pandora trace gas spectrometers can help to understand the relative contribution of NO_2 and NMVOCs towards O_3 formation. Due to the Chesapeake Bay's geography, it is affected by unique meteorological conditions and relatively fast photochemical processes associated with NMVOCs and NO_x emissions from different sources.