

(73-240416-C) Filling Gaps - National Observations of Greenhouse Gases Aircraft Profiles (NOGAP)

J. Peischl^{1,2}

¹Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado, Boulder, CO 80309; 303-219-0566, E-mail: jeff.peischel@noaa.gov

²NOAA Chemical Sciences Laboratory (CSL), Boulder, CO 80305

In November of 2023 the Global Monitoring Laboratory's National Observations of Greenhouse gases Aircraft Profiles (NOGAP) survey completed the first of six loops around the United States to document and understand the vertical and horizontal distribution of greenhouse gasses (GHGs) in the lower atmosphere. The NOGAP survey supplements an ongoing aircraft-based network, run by NOAA's Global Monitoring Laboratory (GML), that covers the United States and parts of Canada.

NOGAP was designed to survey background air throughout the contiguous United States, covering more than 9600 nautical miles over land and profiling just under 300,000 vertical meters with 48 climbs from 150 meters above ground level to 6000 meters above sea level over 12 flights. The small aircraft used for NOGAP will take 288 flask samples with NOAA's 12-flask sampling systems to sample more than 60 species enroute for analysis at GML. In addition, insitu measurements of carbon dioxide (CO₂), methane (CH₄), carbon monoxide (CO), water vapor, ozone, temperature and winds will be made at a 2.4 second resolution. The route has been designed to focus on filling gaps in the Global Greenhouse Gas Reference Network (GGGRN) across the continental US. The additional insitu measurements of winds and GHGs enables direct assessment of transport errors leading to biases in boundary layer height and horizontal winds. It also allows us to use column-integrated quantities calculated from the profiles to assess enhancement and depletion of GHGs due to local fluxes in forward and inverse models.



Figure 1. Map of one circuit of the NOGAP campaign. Flight tracks are colored by day, and red aircraft symbols indicate the locations of vertical profiles.