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Poster
Insitu vertical profile measurements of greenhouse gases (GHGs) are critical to the calibration and validation of remote sensing measurements of GHGs. While space-based GHG measurements offer unprecedented spatial coverage, insitu vertical profile measurements provide information on vertical structure such as gradients within and between the boundary layer and free troposphere, allowing for more detailed assessment of fluxes and model transport. Because of their critical role and the unique information that insitu vertical profile measurements provide, NOAA is increasing its investment to expand density and coverage of vertical profile measurements using multiple different aircraft operational models.

The NOAA Global Greenhouse Gas Reference Network (GGGRN) aircraft program consists of 14 sites where vertical profiles have been routinely collected 1-2 times per month using flask air sampling for multiple decades. This year, sampling frequency at the GGGRN aircraft network sites was increased to three times per month and plans are underway to add three new sites in the tropics and Southern Hemisphere. Also this year, to investigate gaps in the GGGRN aircraft network, NOAA began the National Observations of GHGs using Aircraft Profiles (NOGAP) survey, which is collecting ~100 vertical profiles of GHGs in a circuit around the continental U.S. every other month. NOAA has also been supporting routine insitu vertical profile measurements in the tropics over the Amazon in South America and in tropical Africa since 2017 and 2020, respectively. These tropical profile data from both locations verify that assimilation of satellite measurements lead models to better reproduce insitu observations, but several aspects of the observed tropical profiles are still not well-represented given current satellite and model capabilities. Lastly, an effort is underway at NOAA to instrument short-haul jet aircraft to make GHG profile measurements on commercial flights, which is projected to greatly increase the number profiles collected beginning in 2025.
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