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**Global Monitoring Division Hot Items**

## **Most Comprehensive Pole-to-Pole Airborne Survey of Greenhouse Gases Underway**

**Global Monitoring Division - ESRL-GMD**

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ESRL Scientists are participating in the airborne "Collaborative Research: HIAPER Pole-to-Pole Observations (HIPPO Global) of Carbon Cycle and Greenhouse Gas Study" onboard the NCAR G-5 high performance research aircraft. The program will conduct 120 vertical profiles from the North Pole to the South Pole, from surface to the tropopause and above, over four times in different seasons over a two year period. The first flight series began in Colorado, January 8 and will run through January 30. The flight circuit is proceeding through Alaska up to 82°N; a mid-Pacific course south through Hawaii and Pago Pago, American Samoa; then to Christchurch, New Zealand; and over Antarctica, returning northward to Tahiti and along the eastern Pacific Ocean; and back to Colorado. This 44,700 km (27,760 miles, 24,200 nautical miles) route and will take 20-23 days to complete. This study will provide the first comprehensive, global survey of major and minor greenhouse gases, covering the full troposphere in all seasons and multiple years.

Background: ESRL scientists have been monitoring the distribution and trends of the major greenhouse gases for the past 30 years at ground-based stations. Since many of these greenhouse gases are transported and destroyed in the upper atmosphere, vertical profiles can reveal important atmospheric parameters, for example, lifetimes, transport times, emission and destruction fluxes. There are five ESRL instruments operated on HIPPO global: (1) a six channel airborne gas chromatograph and mass spectrometer, (2) a ozone, water vapor, and two channel gas chromatograph combined instrument, (3) a Whole Air Sampler for over 40 trace gases, (4) a classical ozone photometer, and (5) a black carbon laser spectrometer. This is a collaborative study, not only between two ESRL divisions (Global Monitoring and Chemical Sciences Divisions), but includes scientists from Harvard University, Princeton University, University of Miami-Florida, Scripps Institution of Oceanography, National Center for Atmospheric Research, Jet Propulsion Laboratory, and the National Science Foundation (NSF). NSF also sponsors the study.

Significance: Defining the vertical distribution and trends of the greenhouse gases is an important element in NOAA's Climate Goal. The study of greenhouse gases is an important theme of NOAA's Earth System Research Laboratory. Global climate models require the trends and vertical distribution of the greenhouse gases to initialize and validate their models that predict future climate change.

**More information:** [http://www.eol.ucar.edu/deployment/field-deployments/field-projects/hippo\\_global/hippo](http://www.eol.ucar.edu/deployment/field-deployments/field-projects/hippo_global/hippo)

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