

First Results from UCATS During the GloPac 2010 Mission

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Global Hawk Pacific (GloPac) 2010 was the first scientific mission of the Global Hawk Unmanned Aerial System (UAS), and included a payload designed for *in situ* measurement of trace gases and aerosols, remote sensing of gases and particles, and measurement of various meteorological parameters. The Global Hawk is capable of long-duration flights (30 hours; range = 20,000 km) at altitudes up to ~19 km, as demonstrated during GloPac by a flight from 34°N into the Arctic, with about 10 hours on location followed by a return to its base. The UAS Chromatograph for Atmospheric Trace Species (UCATS) instrument was used to measure N₂O, SF₆, H₂, CH₄, CO, and ozone during GloPac. Mission objectives addressed by these measurements include sampling of polar vortex fragments as they move into midlatitudes and break up, and observations of air from the tropics to high latitudes. Results are presented showing data from March/April 2010 and from previous aircraft missions, using tracer-tracer correlations to examine mixing and transport of high latitude air with lower latitude air in the stratosphere, and changes in the lower stratosphere since the mid-1990's.

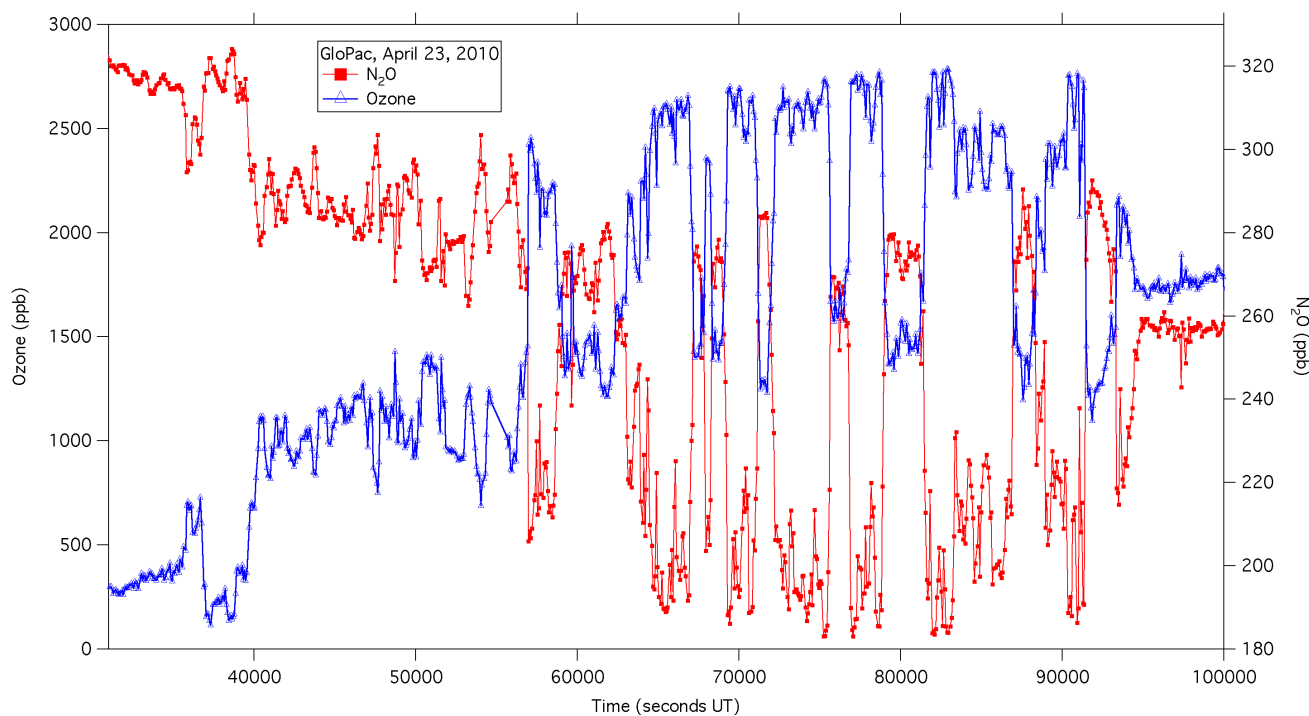


Figure 1. Time series of N₂O and ozone on part of the 28-hour flight toward the North Pole. Note the strong anticorrelation of N₂O and ozone as the Global Hawk flew near the boundary between two distinct stratospheric air masses, one from midlatitudes and one from the vortex region.