

Greenhouse Gas and Ozone Measurements from Aircraft in Alaska 2009 - 2011

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The NOAA ESRL GMD Carbon Cycle and Greenhouse Gases Group's aircraft network consists of 18 sites, mostly in North America, that conduct bi-weekly flask sampling over given locations to altitudes of 8000 m above sea level (masl). Most sites sample 12 flasks during an altitude profile, and through collaboration with GMD's Ozone group, many conduct continuous ozone measurements as well. In March 2009, a new site in Alaska (site code ACG) was added to our network, through a collaborative effort with the U.S. Coast Guard (USCG). The USCG Air Station in Kodiak, AK, operates several C-130 aircraft and conducts routine bi-weekly flights for Arctic Domain Awareness (ADA flights) from March to November. These flights generally begin in Kodiak, continue on to Barrow, and then return back to Kodiak (see map) after passing at low altitudes over Kivalina and Galena. We have installed an inlet window-replacement plate on the USCG C-130 aircraft along with a pallet with NOAA instrumentation that is deployed on each ADA flight. Instrumentation on board consists of: two flask packages per flight, a compressor package for filling flasks, a continuous CO₂/CH₄/H₂O analyzer (Picarro Cavity Ring-Down), a continuous ozone analyzer (2B systems), and an ambient temperature and humidity sensor. GPS time and location from the aircraft's navigation system are also collected. Flasks sampled in flight are analyzed at NOAA ESRL for the major greenhouse gases and a variety of halocarbons and hydrocarbons that influence climate, stratospheric ozone, and air quality. For the 2011 season, a new four-species Picarro analyzer was installed, adding continuous CO measurements to the site. We will present details on the deployed instrumentation as well as data collected from the 2009 and 2010 seasons along with some recent results from 2011.

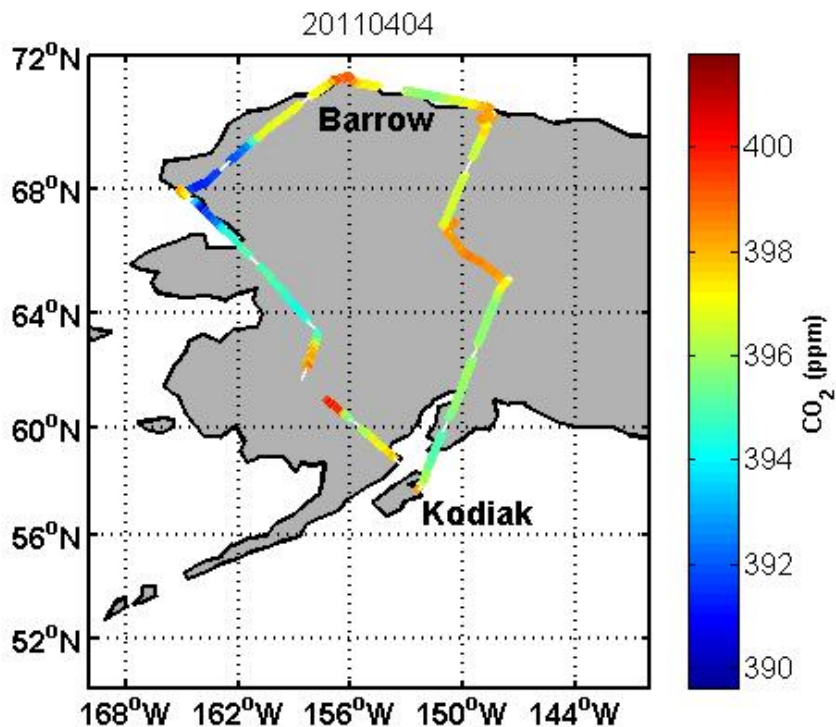


Figure 1. April 4, 2011 flight path of the U.S. Coast Guard C-130 in Alaska. Continuous CO₂ (shown), CH₄, CO, and O₃ are measured during flight.