

Tropospheric Ozone Aircraft Measurement Program Developments

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CMDL is expanding its tropospheric ozone aircraft measurement program. This was done in conjunction with the Carbon Cycle and Greenhouse Gas (CCGG) group's existing aircraft flask sampling network. CMDL made extensive modifications to the 2B Technologies, Inc. ozone monitor. The entire instrument was built into a protective case for rugged use and ease in handling for pilots at field sites. The solenoid, pump, software, and battery were upgraded. The ozone suitcase package has removable compact flash memory to send flight data back to Boulder and supports the global positioning system (GPS) interface. A Vaisala temperature and humidity probe (Humitter50) was also incorporated into the data set. A new supplemental interface board that will control the ozone instrument's automatic self-zero calibration along with all communications to and from the flask package is nearing completion and is expected to be online this summer. CMDL currently has 2B ozone instruments on aircraft in Boulder, Colorado; Trinidad Head, California (aircraft shown in Figure 1); Ulaanbaatar, Mongolia; and Ames, Iowa (flying to four different site locations: Beaver Crossing, Nebraska; Bradgate, Iowa; Fairchild, Wisconsin; and Rowley, Iowa). These flights are scheduled to begin April or May 2005. A highly modified 2B ozone instrument was developed specifically for the Altair Unmanned Aerial Vehicle (UAV) NOAA Demonstration mission (named NOAA UAV Demo) planned for this spring off the California coast. Numerous intercomparisons between 2B instruments and ozonesondes were flown at the Colorado site and show good agreement between the two instruments (Figure 2). Some sampling errors were discovered over the past year at the Carr, Colorado, site concurrent with an aircraft change resulting in a slight offset between the ascent and descent profiles. This issue appears to have been addressed; however, we are awaiting additional flights to confirm this. In the coming year, more field sites are expected to be integrated with the ozone instrument as the CCGG flask package upgrades continue.



Figure 1. Trinidad Head aircraft in the Brookings, Oregon, hanger with 2B Technologies, Inc. ozone instrument shown in front luggage compartment.

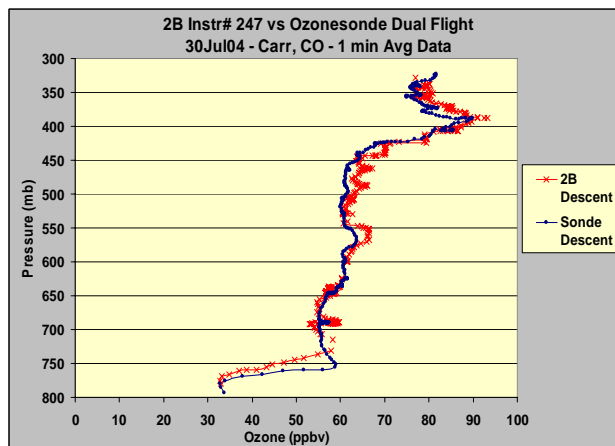


Figure 2. One-minute averaged ozone concentration profile from a dual flight comparison showing 2B Technologies, Inc. ozone instrument 247 versus an onboard ozonesonde sampled during the aircraft's descent over the Carr, Colorado, site.