BNL-75604-2006-AB

# *AIRBORNE MEASUREMENTS OF OZONE AND REACTIVE NITROGEN COMPOUNDS IN TAMPA, FLORIDA DURING THE BAY REGIONAL ATMOSPHERIC CHEMISTRY EXPERIMENT (BRACE)*

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*Presented at the*
86th Annual Meeting of the American Meteorological Society,
Atlanta, GA
Jan. 28-Feb. 3, 2006

February 2006

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**ABSTRACT**

Staff from NOAA's Air Resources Laboratory, The University of Miami, and Texas Tech University conducted airborne measurements of trace gases and aerosols in the Bay Regional Atmospheric Chemistry Experiment (BRACE) using the NOAA Twin Otter. The Twin Otter flew more than 90 hours in 21 flights in and around the Tampa metropolitan region in May, 2002, at altitudes of 60-3000 m MSL. Flights were conducted over rural and suburban areas, over the centers of Tampa and St. Petersburg, and over Tampa Bay and the Gulf of Mexico. The overall objective of the aircraft measurements in BRACE was to study the emission, transport, and photochemical transformations of nitrogen and other ozone precursors in the Tampa area. Continuous instrumentation was used to measure NO, $NO_X$, $NO_Y$, $HNO_3$, CO, $SO_2$, $O_3$, $CH_2O$, and $H_2O_2$. A semi-continuous GC technique with luminol detection was used to measure PAN. Filter packs were used to make integrated measurements of nitric acid and inorganic aerosols in both fine ($d < 2.5$ μm) and bulk aerosol size fractions. Stainless steel grab cans were filled during flight for post-flight analysis of NMHCs by GC/FID/MS. The urban plume was sampled under a variety of meteorological regimes, as it was advected by the prevailing winds over the Florida peninsula (with continuing input of natural and anthropogenic precursors along the advection path) and, in other cases, over the Gulf of Mexico, where additional chemical inputs were negligible and the plume was relatively unaffected by turbulent deposition processes. Case studies will be used to compare and contrast the photochemical processes in the plume under these different regimes. The observed relationships and variations of trace gas concentrations will be used to determine the efficiency of ozone production, as well as instances of $NO_X$ or VOC limitation. Sampling the plume at varying downwind distances, over both land and water, allows the determination of overall rates of photochemical ozone production, $NO_X$ and $SO_X$ oxidation, and estimates of depositional losses of trace species