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ABSTRACT

Near UV Atmospheric Absorption Measurements From the DC-8 Aircraft During the 1987 Airborne Antarctic Ozone Experiment

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During the Airborne Antarctic Ozone Experiment from 28 August 1987 to 30 September 1987 near UV zenith scattered sky measurements were made over Antarctic from the NASA DC-8 aircraft using a 1/3 m spectrograph equipped with a diode-array detector. Scattered sky light data in the wavelength range 348 nm - 388 nm was spectrally analyzed for O₃, NO₂, OClO, and BrO column abundances. Slant column abundances of O₃, NO₂, OClO and BrO were determined, using a computer algorithm of non-linear and linear least square correlation of Antarctic scattered sky spectra to laboratory absorption cross section data. Using measured vertical electrochemical sonde ozone profiles from Palmer, Halley Bay, and the South Pole Stations the slant columns of O₃ were converted into vertical column abundances. The vertical column amounts of NO₂, OClO, and BrO were derived using vertical profiles calculated by a chemical model appropriate for Antarctica. NO₂ vertical column abundances show steep latitudinal decrease with increasing latitude for all 13 flights carried out during the mission. In the regions where NO₂ abundances are low, OClO and BrO were observed. The spatial and temporal vertical column abundances of these species will be discussed in the context of the chemistry and dynamics in the antarctic polar vortex during the austral spring.