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OBSERVATIONAL EXPERIMENT OF THE ANTARCTIC OZONE HOLE OF 1991 UNDER THE POLAR PATROL BALLOON (PPB) PROJECT: (2) A PRELIMINARY RESULT OF OZONE AND AEROSOL OBSERVATION (ABSTRACT)

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Among Polar Patrol Balloon (PPB) experiments, a balloon for observation of ozone and aerosol was launched from Syowa Station (69°S, 40°E) at 0755 UT on 23 September 1991, directed eastward around the 80 hPa level (~16 km) in the lower stratosphere inside the polar vortex, *i.e.*, inside the ozone hole, for about 5 days. It reached near 80°S, 250°E (110°W) around 02 UT on 28 September after flying three-fourths of the way around Antarctica in the stratosphere, and dropped to the Ross Ice Shelf at the earth's surface near 85°S, 200°E (160°W) around 20 UT on 28 September. *In situ* measurements were made of ozone, size distribution of aerosol, and temperature along the balloon track.

During the Lagrangian type observation for the periods at the 78–80 hPa level, *i.e.*, during the observation in the same air mass in approximate sense, drastic change of ozone concentration was observed. The large change suggests fine spatial variability. Another interesting feature is the positive correlation between ozone concentration and sulfate aerosol amount. There are two possible causes for the positive correlation: One is reflection of vertical profile of ozone and aerosol, *i.e.*, due to the observed air mass being not exactly the same; another is reflection of the history of the air mass, *i.e.*, PSC activity in the past, releasing ClO_x species to destroy ozone and removing preexistent sulfate aerosols from the air mass downward by sedimentation. During the descending motion around 80°S, the aerosol size distribution data indicate high concentration of PSCs (type-I and -II) from 200 hPa to 80 hPa. These data are preliminary. Updating of the data, more sophisticated analysis using the PPB data as well as other data such as ozone data at Syowa Station, Nimbus 7/TOMS data, and meteorological data of JMA objective analysis, and more sophisticated interpretation of the data are now being carried out.

For details, the reader may refer to M. HAYASHI *et al.* (Proc. 1992 Quadrennial Ozone Symp., in press, 1993).

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