gated during the period from June to November 1981. Eliassen-Palm (E-P) flux diagnostics is used as a powerful and useful tool to deal with the wave-mean flow interaction process.

Characteristics of the seasonal march from winter to summer of the wave activity (measured by the E-P flux) and the zonal mean wind in the southern hemisphere are summarized as follows: From June to July the wave activity is quiet corresponding to small time variations of the maximum westerly speed. In mid-August the core of the stratospheric westerly jet shifts poleward and downward due to a wave number 2 minor warming. After the shifting of the westerly jet the wave activity of wave number 1 is enhanced, with a succession of waves continuing until October. In early November the summer easterlies are established at the 5 mb level.

One of the most interesting characteristics of the seasonal march in the southern hemisphere is shifting of the westerly jet in mid-winter. Regarding the wave-mean flow interaction, the different wave properties of waves 1 and 2 are also interesting: wave 1 activity, to which the quasi-stationary component mainly contributes, begins in association with shifting of the westerly jet while wave 2 activity lies mainly around the shifting. These facts suggest the importance of the wind profile in determining the variability of wave activity.

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A BALLOON OBSERVATION OF STRATOSPHERIC NITROGEN DIOXIDE OVER SYOWA STATION, ANTARCTICA (Abstract)

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Stratospheric nitrogen dioxide was observed by spectroscopic technique on board a 5000 m³ balloon flown from Syowa Station. The method was based upon atmospheric absorption of solar radiation in the visible region. The solar spectra in the wavelength region 430–450 nm were measured with a resolution of about 2Å, and analyzed to deduce the absorption due to nitrogen dioxide. The spectrometer used was a Jobin-Yvon H20 monochromator, and one spectral scan took about one minute. The balloon's gondola was oriented toward the sun, and the solar radiation was guided to the spectrometer by an automatic sun seeker and follower. An electrochemical ozonesonde was on board the gondola to measure the ozone density *in situ*. The balloon was flown at 1402 UT on November 24, 1982, and the observation terminated at 0615 UT the next day. 832 spectra were obtained for various solar zenith angles from 60° to 90° at a balloon float altitude of about 25 km. These spectra enabled us to deduce the stratospheric distribution of nitrogen dioxide. The altitude profile was slightly different between those measured at sunset and sunrise. The peak density was found to be about 5×10^{9} cm^{-3} at the altitude of 26–28 km, and the column density above the 20 km altitude was $(5-6)\times10^{15}$ cm^{-2}.

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