



Long-term changes of the zonal asymmetry in Antarctic total ozone during spring by TOMS 1979-2005 data

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The new features of total ozone quasi-stationary asymmetry over Antarctic region during Austral spring are presented. The amplitude and longitudinal position of zonal anomalies are calculated for distribution of total ozone along seven individual latitudes at 5-degree intervals between 50°S and 80°S. The mid-latitude collar of ozone-rich stratospheric air has a sub-Antarctic maximum with a mean location in the 90°E-180°E quadrant and with 354-387 DU total ozone level between 50°S and 65°S. The steady displacement and elongation of the ozone hole under the influence of planetary waves causes a zonal anomaly of low ozone in the sector 0°-60°W with total ozone levels of 190-240 DU between 65°S and 80°S. A significant eastward shift of approximately 40° in longitude is observed in the total ozone minimum over the Weddell Sea–South Atlantic sector during 1979-2005, whereas the zonal maximum is relatively stable in position. A long-term shift in tropopause temperature distribution in the region is discussed, although this trend is not followed by geopotential heights. These features suggest that changes in the thermal and dynamical structure of the lower stratosphere are the dominant cause of this zonal displacement in total ozone. The geographical distribution of the zonal extremes in total ozone for the seven latitude bands shows that the extremes exhibit sensitivity to the shape of the Antarctic continent. It is suggested that the radiative influence of Antarctica contributes to the formation of this pattern. Anomalies in the horizontal structure of the tropopause and lower stratosphere, which appear related to orography, are discussed.

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