



Antarctic spring total ozone and tropopause zonal asymmetry

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Analysis of zonal anomalies in total ozone and tropopause height shows that spring ozone depletion has a strong influence on changes in the height of the tropopause over the West Antarctica. Seasonal change of the tropopause peak heights occurs between 9 km (summer and autumn) and 14 km (winter and spring) over the Atlantic longitude sector and in the range of about 9-10 km only at the opposite longitudes. East-west tropopause height asymmetry is accompanied by the tropopause sharpness asymmetry that can possibly contribute to the east-west asymmetry in Antarctic climate change. Long-term shift in the position of the total ozone minimum is confirmed by similar tendency in tropopause pressure zonal structure. However, this trend is not followed by geopotential heights at the tropopause level. Besides, quasi-stationary zonal anomalies in tropospheric temperature do not have a significant influence on the tropopause structure during spring months, when ozone loss in the lower stratosphere is dominant factor of the thermal regime formation just above tropopause. Because no indications of troposphere contribution to eastward zonal shift are found, it is assumed that changes in the thermal and dynamical structure of the lower stratosphere could be responsible for this tendency. In 2005 and 2006 the tropopause height variations in the monthly means between 9 km and 12-14 km were determined over Atlantic sector where zonal ozone minimum exists. Unlike this tendency, in winter months, the tropopause structure is more sensitive to troposphere temperature distribution. The radiative influence of Antarctica can contribute to the formation of this pattern. Anomalies in the horizontal structure of the tropopause and lower stratosphere, which appear related to

orography, support this view. Higher tropopause of western Antarctica coupled with its increasing decadal trend could be involved in climate change in this region.

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