昭和基地における上部成層圏オゾンの長期トレンド

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Long term changes in the upper stratospheric ozone at Syowa, Antarctica

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Analyses of stratospheric ozone data recorded by Dobson Umkehr measurements since 1977 at the Syowa (69.0S, 39.6E), Antarctica station show a significant decrease in ozone above 4 hPa during the 1980s and 1990s. Ozone values over Syowa remain low since 2001. The time series of upper stratospheric ozone from the homogenized NOAA (/2) SBUV V8 overpass data (+/-4 degrees, 24 hours) are in qualitative agreement with Syowa station data. Ozone recovery during the austral spring over Syowa station appears to be slower than predicted by use the Equivalent Effective Stratospheric Chlorine curve. The long-term changes in station's equivalent latitude are derived from MERRA analysis at ~ 3 hPa and ~50hPa. These data are used to attribute some of the upper and middle stratospheric ozone changes to the changes in vortex position relative to station location. In addition, high correlation in HS (high solar activity) years of the Southern Hemisphere Annular Mode (SAM) with polar upper stratospheric ozone points toward strong relation between the strength of the Brewer-Dobson circulation and the Polar stratospheric ozone recovery. Detection of stratospheric ozone recovery in the Antarctic region requires careful consideration of counteracting contributions from chemical and dynamical processes.

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