Geophysical Research Abstracts
Vol. 14, EGU2012-6148-3, 2012
EGU General Assembly 2012

Antarctic spring total ozone response to the sea surface temperature variations in the Tropical Pacific

G. Milinevsky, O. Evtushevsky, and V. Kravchenko

Kyiv National Taras Shevchenko University, Space Physics Laboratory, Physics Department, Kyiv, Ukraine (genmilinevsky@gmail.com)

Response of the total ozone column (TOC) in the Antarctic region in spring to the sea surface temperature (SST) variations in the Tropical Pacific is analyzed using the monthly mean data from the Version 8 Merged Ozone Data Sets and NCEP-NCAR Reanalysis, respectively. Detrended time series over the period 1980-2010 were used for the correlation analysis. Variations of the TOC anomalies in October were considered (i.e. in the month, when the highest ozone depletion is observed) and their response to the SST variations during the 18 preceding months was analyzed. It has been revealed that the highest response is observed in the TOC variations over the Western Antarctica to the SST anomalies in the central part of the Tropical Pacific (30°N–30°S, 160°E–200°E). The maximum positive correlation r = 0.69 is between the TOC anomalies in October and the SST anomalies in June, four months earlier. Statistically significant response (r = 0.4–0.5) is seen also to the SST variations during about one year before the TOC anomalies in October. Over the Eastern Antarctica, the weaker negative TOC response dominates and the correlations are generally lower for the standard climate indices which describe the SST variability in the Tropics, particularly for ENSO. The TOC response exhibits the stationary wave number 1 pattern with the east-west asymmetry caused the climatological ozone hole displacement from the South Pole to Western Hemisphere. The results agree with the previous studies showing that the teleconnections between the Tropical Pacific and Antarctic stratosphere could influence the spring ozone depletion. The results indicate also that (i) the zonal mean TOC values would be less informative in their response analysis due to the averaging of the opposite correlative relationships over the Eastern and Western Antarctica and (ii) the delayed response to the tropical SST could give contribution to the interannual TOC variations in the ozone depleted area.