

Influence of solar wind and ozone on the temperatures of the troposphere and stratosphere

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The correlation between global atmosphere and solar magnetic activity is evident though the cause is not clear. In this presentation, we analyze the influence that solar wind and ozone give to the global atmosphere to examine the cause on the basis of the previous observations [1].

The AE index data were used to detect the influence of the solar wind on the total ozone and the air temperature change of the troposphere and stratosphere.

In the analysis, the following factors were taken into account: 1)EPP-NO_x effects on ozone at low latitudes may be comparable to the effects of solar UV radiation [Callis et al., 2000, 2001; Langematz et al., 2005; Rozanov et al., 2005]. 2) Since the ozone generated at low latitude is conveyed to the pole area of the winter hemisphere, EPP-NO_x has affected the ozone reduction of the pole area.

As the analysis result, showalter stability index which is calculated from the temperature of 500hPa and 850hPa in polar regions correlates with the AE index, Especially when the Arctic Oscillation is changed from the positive phase to the negative phase, the tendency is strong. This increase in high-energy particles with the solar wind, to reduce the stratospheric ozone polar, it is possible to increase the amount of solar radiation reaching the troposphere, there is a possibility that influence the stability of the atmosphere.

Thus, changes in the stratospheric ozone due to the influence of the solar wind appears to affect the climate of the troposphere.

Reference

[1]K.Itoh, JpGU. 2008-2015

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