

Relationship between total ozone and wave activities in Antarctic region

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It is well known that the formation, development and inter-annual variation of the ozone hole are related to the dynamics in winter polar stratosphere. Stratospheric sudden warming was detected in the Southern Hemisphere in 2002 for the first time and then the ozone hole area (defined by the area inside 220DU) was reduced to less than 5 million square kilometers. A similar reduction of ozone hole was also simulated by CCSR/NIES CCM with CCMVal-REF2 scenario, in which the wave number 2 was unusually developed.

These suggest a possibility that ozone hole may suddenly be reduced in a specific year by the dynamics in the future, apart from the effect of the decrease in chlorine and bromine concentration in the atmosphere due to the halogen regulation. Thus, in order to speculate ozone hole trend and the variability in the course of the long-term climate change of the future, it is needed to clarify the relationship between wave activity and ozone hole in the past. Relationships among the ozone hole indices (maximum ozone hole area and minimum total ozone), wave activity and temperature in the Southern Hemisphere were investigated using observation data and chemical transport model output.

Keywords: stratospheric ozone, dynamics, chemical transport model