

LOW TEMPERATURE IN WINTER AND OZONE-HOLE IN THE SPRING ANTARCTIC STRATOSPHERE (ABSTRACT)

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The Antarctic cold stratosphere in winter plays an importance role in ozone-hole formation since appearance of Polar Stratospheric Clouds (PSCs) which convert inert chlorine compounds to active ones is common under the cold atmospheric condition. Many investigators have discussed the relation between coldness in winter and scale of spring ozone depletion; however, few have discussed the relation between duration of cold time and ozone hole activity. It is essential for the formation of PSCs that the atmospheric temperature is lower than the frost point of H₂O and/or HNO₃. Here, we analyzed the duration of the period when the stratospheric temperature is lower than the estimated frost point of PSCs on assumption of content of HNO₃ and H₂O, and use the number of days with temperature lower than the frost point temperature as an index indicating the length of the cold period.

The following points are suggested from the analysis:

- (1) At about 15 km height, the number of days with temperature lower than -76°C in one year is about 70 in 1980; it increased at the rate of 0.8 days/year from 1967 to 1990.
- (2) Increasing length of the cold period is due to cold days in winter season at 20 km height, in late winter at 15 km height.
- (3) Year to year changes in monthly mean total ozone show good correlation with the variation in number of days with temperature lower than the estimated frost point of PSCs.

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