

# Explaining Antarctic ozone hole anomalies

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The strongly reduced Antarctic stratospheric ozone hole destruction in 2010 and several other recent years results from the occurrence of dramatic meteorological events in the polar winter, known as sudden stratospheric warmings (SSWs). These findings are reported in a paper published online in Scientific Reports.

The annual occurrence of the Antarctic [ozone hole](#) is related to the gradual increase in atmospheric concentrations of [chlorine](#), resulting from the anthropogenic production of chlorofluorocarbons (CFCs). International efforts to reduce these [emissions](#) have led to a gradual decline of these substances but despite these changes, in several years since 1979 — 1986, 1988, 2002, 2004 and 2010 — there have been unexpectedly small amounts of ozone depletion, mainly at around 20–25 km altitude (in the middle stratosphere). The reasons for this have remained unclear.

Based on satellite observations and measurements from the Microwave Limb Sounder instrument, Jos de Laat and Michiel van Weele report that the reduced ozone destruction at 20–25 km altitude in 2010 is related to the occurrence of a mid-winter minor Antarctic SSW. Although the SSW raises stratospheric temperatures by only a few kelvins, it causes humidity-rich air in the middle stratosphere to descend (although not below 18 km), which in turn modifies the air's chemical composition.

The other years since 1979 with similarly low amounts of ozone depletion are also characterized by either minor or major SSWs, further highlighting the importance of these meteorological events in

[stratospheric ozone](#) hole destruction.

**More information:** [DOI: 10.1038/srep00038](https://doi.org/10.1038/srep00038)

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