

## Impacts of the Arctic ozone depletion on Japan observed with FTIR between 2009 and 2011

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The ozone depletion is one of the environmental problems. In 2011, ozone depletion which was comparable to the Antarctic ozone hole occurred in the Arctic.

The ozone depletion has occurred inside the polar vortex. The air mass from inside the polar vortex is spread to mid-latitude in spring after its breakup. The purpose of this study is to quantify the impact of polar ozone depletion on mid-latitude by comparing the amounts of ozone in mid-latitude air masses before and after the breakup of the polar vortex.

Vertical profiles of ozone and hydrogen fluoride (HF) have been retrieved from infrared spectra observed with a Fourier transform infrared spectrometer (FTIR) at Tsukuba using the SFIT2 spectral fitting program developed by Rinsland et al. [1998].

HF can be used as a tracer of the transport, because HF is a remarkably stable species in the stratosphere. Ozone and HF usually show a very high correlation in the lower stratosphere because both species are stable. But the correlation will be changed when ozone is chemically perturbed. Therefore, we examined the correlations of mixing ratios between ozone and HF in the mid-latitude air masses before and after the breakup.

Goto et al. [2010] compared the ozone-HF mixing ratio correlations in the mid-latitude air masses before and after the breakups of the polar vortex between 2005 and 2008 and indicated that ozone was decreased by 0.2 to 0.4 ppmv at around 19km altitude in 2007 and 2008. Preliminary analysis in 2009 shows no impact of the ozone depletion at Tsukuba. We report the impacts of the Arctic ozone depletion on Japan between 2009 and 2011.