

The effect of the Arctic ozone depletion observed over Tsukuba in February 2001

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The vertical column amounts of O₃, HCl, HF, and HNO₃ are derived from infrared spectra observed with a Fourier transformed spectrometer at Tsukuba using the SFIT nonlinear least-squares spectral fitting program. We showed that the upward or downward shift of assumed initial profiles can improve accuracy in the derivation of O₃, HCl, HF, and HNO₃ column amounts. Correlations of O₃-HF and HCl-HF showed that the amounts of O₃ and HCl declined due to chemical processes in mid-February 2001 when a polar vortex came over Tsukuba. Potential Vorticity analysis and Back trajectory calculations were performed using European Center for Medium-Range Weather Forecasts (ECMWF) data during this period. It was confirmed that the stratospheric air above Tsukuba was originated from the inner part of the polar vortex.