Millimeter-wave observation of stratospheric ClO and a plan of simultaneous observations of water vapor isotopomers in Chile

Akira Mizuno[1], Yasuo Fukui[2], Norikazu Mizuno[3], Tomoo Nagahama[4], Hideaki Nakane[5], Hideo Ogawa[6], Yoshinori Yonekura[7], Sinichiro Asayama[8], Atsushi Morihira[9]

[1] Astrophysics, Nagoya Univ., [2] Department of Physics, Nagoya Univ, [3] Department of Physics Sci., Nagoya Univ, [4] Dept. of Astrophys., Nagoya Univ., [5] Atmospheric Environment Div., NIES, [6] Department of Earth and Life Sci., Osaka Precture Univ, [7] Earth and Life Sci., Osaka Prefecture Univ, [8] Drpartment of Erth and Life Sci., Osaka Prefecture Univ, [9] Fujitsu VLSI Corporation

A new sensitive millimeter-wave radiometer for atmospheric minor constituents has been developed by Nagoya University and the National Institute for Environmental Studies (NIES). The instrument equipped low-noise superconducting (SIS) mixer and 1GHz-bandwidth acousto-optical spectrometer was installed at Las Campanas Observatory, Chile. We have detected significant ClO emission at 204.3 GHz in October 2000 with an actual observation time of only 4 hours. This is the first detection of ClO millimeter-wave spectra at 40km altitude in the mid-latitude region of the southern hemisphere.

In near future, we will install the radiometer in Atacama region at an altitude of ~5,000m in Chile, where the absorption of millimeter-wave signal due to tropospheric water vapor is quite small. We will start simultaneous observations of isotopomers of stratospheric and mesospheric water vapor such as H2O, H2-18-O, and HDO, and investigate the origin of the increase of water vapor in the middle atmosphere.