

## Observation of atmospheric trace gases at Poker Flat, Alaska

# Yasuhiro Murayama[1], Satoshi Ochiai[1], Kohei Mizutani[1], Yasuko Kasai[1], Frank Murcray[2], Richard L. Collins[3], William R. Simpson[3], Steven Lloyd[4]

[1] CRL, [2] Univ. of Denver, [3] UAF, [4] JHU/APL

<http://www.crl.go.jp/t/team5>

We have started trace gas observations with millimeter (mm)-wave radiometer and FTIR at Poker Flat, Alaska, fall 1998. The mm-wave radiometer is a radiometer-spectrometer which is equipped with very low noise receivers cooled down to 4 Kelvin. Observing 200GHz-band emission spectra of atmospheric molecules such as ozone and ClO, vertical profile of trace gas density is retrieved. FTIR is a Fourier transform infrared spectrometer, primarily receiving sun light and detecting absorption spectra to find the trace-gas concentration. They are scheduled to participate TOMS3-F (Total Ozone Measurements by Satellites, Sondes, and Spectrometers At Fairbanks) campaign (chaired by S. Lloyd of Johns Hopkins Univ.) starting late March, for validation of high-latitude total ozone measurements.

We have started trace gas observations with millimeter (mm)-wave radiometer and FTIR at Poker Flat, Alaska, fall 1998. The mm-wave radiometer is a radiometer-spectrometer which is equipped with very low noise receivers cooled down to 4 Kelvin. Observing 200GHz-band emission spectra of atmospheric molecules such as ozone and ClO in the daytime and nighttime, vertical profile of trace gas density is retrieved. Height coverage is usually ~20-60 km, so for ozone, lower portion of the profiles shows the ozone layer in the stratosphere with variation controlled by dynamics mainly, while upper part can be used for mesospheric chemistry studies. Using other wind measuring radar/lidar, dynamical-chemical coupling process study is a potential target of this experiment. Ozone density observed at 60km during the March-April 1999 campaign shows clear diurnal cycles for several days due to mesospheric photochemical process, but for another adjacent several-day period the cycle was not clear, implying different conditions between these two periods which may be attributed to not only chemistry but also dynamics such as background temperature variation and/or atmospheric wave disturbances.

FTIR is a Fourier transform infrared spectrometer, primarily receiving sun light and detecting absorption spectra to find various trace-gas concentrations. Vertical profiles retrieved from FTIR data cover mainly the troposphere to mid-stratosphere <~30 km. FTIR tends to operate fairly regularly and stably. If it is clear sky, observation is performed 3 or 4 times or more a day. We are now starting to use SFIT retrieval software packages developed by C. Rinsland (NASA Langley), and are successfully obtaining HCl profiles so far.

The mm-wave radiometer and FTIR at Poker Flat are scheduled to participate the TOMS3-F (Total Ozone Measurements by Satellites, Sondes, and Spectrometers At Fairbanks) campaign (chaired by S. Lloyd of Johns Hopkins Univ.) starting late March. Data comparison studies along this campaign will include total ozone data of Earth Probe TOMS, ozonesondes, ground-based Dobson and Brewer spectrometers, etc., (from USA, Canada, and Japan). Campaign goals include studying the offset between TOMS data and ground-based Dobson/Brewer data especially found at high latitude and large ozone amount conditions.