

Seasonal variation of carbon monoxide at Poker Flat, Alaska with FTIR

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<http://www2.crl.go.jp/dk/c216/index.html>

We have been observing atmospheric trace gases using a Fourier transform infrared spectrometer (FTIR), which was installed at Poker Flat, Alaska (65 N, 147 W) since July 1999. In this work, we have derived height profiles of trace gases from absorption spectra using a retrieval method.

The FTIR measures absorption spectra automatically by remote control. Observations have been made daily from April to October 2000 and from February to October 2001. Spectra have been obtained 5 - 10 times per a day for the days of good conditions such as clear sky.

Retrieval method reveals height profiles of trace gases by making use of difference of pressure broadening in each altitude. The Rodgers optimal estimation method was used in this work. The retrieved profile can be derived by defining a prior height profile (a priori) and covariance matrices of a priori and a measured spectrum in this method. The SFIT2 program developed by NIWA and NASA Langley was used for data analyses in this work.

Preliminary analyses of carbon monoxide have been done. We have selected 1 or 2 spectra with a high noise to signal ratio per a month for the year of 2001 and derived height profiles and total column amounts of carbon monoxide. Retrieved profiles show the enhancement of carbon monoxide from March to April. Airflow of the carbon monoxide-rich air from Asia to Alaska can be considered to be one possibility of the cause of this enhancement. Further analyses will be done to make clear about this effect.

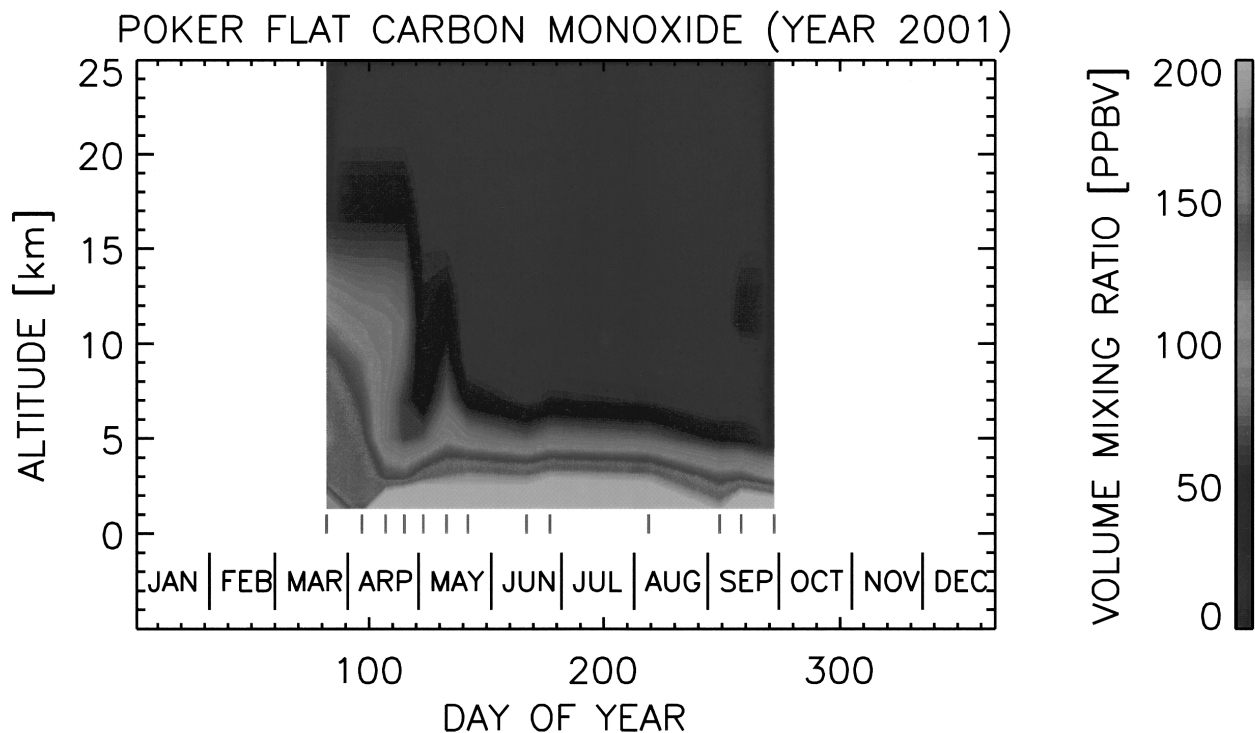


図1 アラスカ州ポーカーフラットにおける2001年の一酸化炭素の季節変動。横軸は2001年における日数、縦軸は高度、色付きの等高線は一酸化炭素の体積混合比を表す。図中の赤線は今回解析に用いたスペクトルが観測された日を示している。