12/12/2015

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Observational data for HFC-134a (CH2FCF3) that were interpreted in the paper Hu et al. (2015) are available in the files described below. We hope to encourage collaborative efforts so would welcome notification of the corresponding authors if you will be using this data in a presentation, publication, or report.

The appropriate citation associated with these data is:

Hu, L., S. A. Montzka, J. B. Miller, A. E. Andrews, S. J. Lehman, B. R. Miller, K. Thoning, C. Sweeney, H. Chen, D. S. Godwin, K. Masarie, L. Bruhwiler, M. L. Fischer, S. C. Biraud, M. S. Torn, M. Mountain, T. Nehrkorn, J. Eluszkiewicz, S. Miller, R. R. Draxler, A. F. Stein, B. D. Hall, J. W. Elkins, and P. P. Tans (2015), U.S. emissions of HFC-134a derived for 2008–2012 from an extensive flask-air sampling network, *J. Geophys. Res. Atmos.*, 2014JD022617, doi:10.1002/2014JD022617.

If you have any question, please refer to our paper or contact the corresponding authors:

Lei Hu (leihutx@gmail.com)

Stephen A. Montzka (stephen.a.montzka@noaa.gov)

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File (1): HFC\_134a\_data\_US\_sites.csv

This file includes sampling and analysis details, HFC-134a measured atmospheric mole fractions, and different estimates of background mole fractions associated with each observations of HFC-134a at US continental sites.

Data column headers: Site Code, Sample Year, Sample Month, Sample Day, Sample Hour, Sample Minute, Sample Second, Sample Latitude, Sample Longitude, Terrain Height, Sample ID, Event Number, Analysis Year, Analysis Month, Analysis Day, Analysis Hour, Analysis Minute, Analysis Second, Analysis Instrument, Measured Mole fraction (ppt), Background Mole Fraction Derived From Approach 1 (ppt), Background Mole Fraction Derived From Approach 2 (ppt), Background Mole Fraction From Approach 3 (ppt), Note.

For details about three different approaches that are used to derive background mole fractions, please refer to our paper.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File (2): surface.mbl.F134A

This file includes estimates of global background mole fractions of HFC-134a (in ppt) within the planetary boundary layer as a function of time and latitude. These mole fractions are derived using atmospheric observations and the methodologies described in Masarie and Tans (1995). The background mole fraction surface was derived from data obtained at the following sites: alt, mhd, brw, etl, esp, thd, kum, smo, cgo, tdf, psa, and spo. In Hu et al. (2015) this surface was used to derive background mole fractions for method 2 and it was incorporated into the derivation of background mole fraction curtains (method 3).

Data column headers: time, mole fractions from latitudes: -90.00,-71.81,-64.16,-58.21,-53.13,-48.59,-44.43,-40.54,-36.87,-33.37,-30.00,-26.74,-23.58,-20.49,-17.46,-14.48,-11.54,-8.63,-5.74,-2.87, 0.00, 2.87, 5.74, 8.63, 11.54,14.48,17.46,20.49,23.58,26.74,30.00,33.37,36.87,40.54,44.43,48.59,53.13,58.21,64.16,71.81, 90.00

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Subfolder (1): Empirical\_Curtain

In this folder, we include the empirical curtain of HFC-134a mole fractions as estimated as a function of latitude, altitude, and time. Also included are the observational data used as input in creating this empirical curtain.

Input data are observed mole fractions of HFC-134a in the free troposphere at our aircraft sites. They were binned by latitudes and altitudes. Then they were filtered and smoothed before being used to create the empirical curtain. If you are interested in details of the method that was used to create the empirical curtain, please contact Arlyn Andrews (Arlyn.Andrews@noaa.gov). Files in the "input\_data" directory include two columns: time, and mole fractions measured in the free troposphere. Latitudes and altitudes associated with the measured mole fractions are indicated by the filename. For example, measured mole fractions within the latitudinal bin centered on 20N (15 – 25 N) and the altitude bin centered on 3500 meters (3000 – 4000 meters) are included in the file labeled as "lat20-alt3500\_99D2\_dat.F134A".

The empirical curtain represents an estimate of the background mole fraction of HFC-134a as a function of time, latitude, and altitude, based on observations. It can be found under the “curtain" directory. We used a same empirical curtain for setting mole fraction boundary conditions over the Pacific and over the Atlantic Ocean basins. In another words, data in file "F134A\_atlantic\_bg\_3500.txt" are the same as those in file "F134A\_pacific\_bg\_3500.txt". In each file, estimated background mole fractions are provided as a function of time and latitude. The altitude ranges are indicated by the filename. Data columns in these files represent time and mole fractions as a function of latitude (from 0N to 90N with 1 degree resolution).

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Footprints used in this study are available upon request.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

References:

Masarie, K. A., and P. P. Tans (1995), Extension and integration of atmospheric carbon dioxide data into a globally consistent measurement record, *J. Geophys. Res. Atmos.*, *100*(D6), 11593-11610, doi:10.1029/95jd00859.