This Meta data file was prepared by T.J. Griffis and Z. Chen on August 14th, 2017.

Data fair use policy

<http://ameriflux.lbl.gov/data/data-policy/>

These data are provided through collaborative research between the USDA-ARS and the University of Minnesota. The following data sets are listed:

1. Tall Tower Nitrous Oxide Data (Rosemount, Minnesota KCMP Tall Tower);

2. Meteorological data from the KCMP tall tower;

3. The inferred background mixing ratios for the Scale Factor Bayesian Inversion;

4. The concentration source footprint for the KCMP tall tower receptor(100 m altitude).

Below we give the description of the basic attributes of the files and data.

**File: *Tall Tower Nitrous Oxide Data/***

Tall tower N2O mixing ratios were measured using a tunable diode laser technique (TGA100, Campbell Scientific Inc., Logan, Utah, USA). The TDL measured N2O at wavenumber 2243.760 cm−1. The TDL was maintained at the base of the tall tower in a temperature-controlled radio communications building. Calibrations were performed hourly with standards traceable to the NOAA-ESRL (National Oceanic and Atmospheric Administration - Earth System Research Laboratory) 2006A N2O mole fraction scale. The NOAA-ESRL gold standard (Standard Cylinder #CA07980) has a mixing ratio (mean ± 1 standard deviation) of 324.30 ± 0.09 ppb as determined by NOAA-ESRL). The hourly precision of the tall tower calibration measurements was calculated from Allan variance analysis of working standards and was 0.50 ppb.

A basic low pass/high pass filter for N2O and CO2 have been used to quality control these data. These thresholds could be tightened further, but provide a very good first level of filtering.

Additional filtering using wavelet analyses is also provided. Here, we used the Haar wavelet to decompose the original N2O signal into low-pass filtered coefficients and high-pass filtered details using level 1 through level 6 decomposition. All analyses were performed using the *wavedec* function available in the MATLAB Wavelet Toolbox (MATLAB, R2013b The Mathworks Inc., MA, USA). The wavelet filtered data A1 through A6 are also provided here.

The data represent hourly averages (LOCAL STANDARD TIME)

Column 1 = decimal day of year

column 2 = N2O mixing ratio ppb (hourly average value measured at 100 m basic filtering)

column 3 = N2O mixing ratio ppb (hourly average value measured at 100 m wavelet filtering A1)

column 4 = N2O mixing ratio ppb (hourly average value measured at 100 m wavelet filtering A2)

column 5 = N2O mixing ratio ppb (hourly average value measured at 100 m wavelet filtering A3)

column 6 = N2O mixing ratio ppb (hourly average value measured at 100 m wavelet filtering A4)

column 7 = N2O mixing ratio ppb (hourly average value measured at 100 m wavelet filtering A5)

column 8 = N2O mixing ratio ppb (hourly average value measured at 100 m wavelet filtering A6)

All mixing ratio data are calibrated against CMDL traceable standards each hour,Data are provided in text (tab delimited) format:

N20\_2010.txt/

N20\_2011.txt/

N20\_2012.txt/

N20\_2013.txt/

N20\_2014.txt/

N20\_2015.txt/

**File: *Meteorological data from the KCMP tall tower*/**

This file describes data posted in the following text files:

**MetN2O\_2010.mat.txt/**

**MetN2O\_2011.mat.txt/**

**MetN2O\_2012.mat.txt/**

**MetN2O\_2013.mat.txt/**

**MetN2O\_2014.mat.txt/**

**MetN2O\_2015.mat.txt/**

These files contain the following data:

Column 1: Decimal day of Year

Column 2: Carbon dioxide mixing ratio (ppm) measured at 185 m

Column 3: Sonic air temperature (oC) measured at 185 m

Column 4: Wind direction (degrees) measured with a CSAT3 sonic anemometer at 185 m

Column 5: Wind speed (m/s) measured with a CSAT3 sonic anemoment at 185 m.

These data have not been filtered for outliers. All values represent hourly values.

**File: The inferred background mixing ratios for the Scale Factor Bayesian Inversion/**

This file describes data posted in the following text file:

inferred background N2O.txt/

The first to the 12th column correspond to January to December, respectively;

The first to the 6th row corresponds to Year 2010 to 2015, respectively, in unit of ppb.

**File: the concentration source footprint for the KCMP tall tower**

This file describes data posted in the following text files:

lon.mat.txt/

lat.mat.txt/

yymm.mat.txt/

./

./

./

The files yymm.mat.txt list all the hourly source footprint data from year 2010 to 2015. For example, 1005.mat indicates the hourly source footprint of May, year 2010.

The lon.mat.txt and lat.mat.txt indicates the longitude and latitude information of the footprint, respectively.

For each yymm.mat.txt file, it includes a 3-dimensional dataset, indicates the footprint at the [longitude × latitude× time] scale.

The unit of the source footprint is ppm μmol-1 m2 s.

Please note that you need to change the file extension to Matlab version,i.e., with .mat extension, in order to open the data files using Matlab.

**The Meteorological Drivers for the CLM Model**

We used Coupled Model Inter-comparison Project Phase 5 (CMIP5) data set to drive the CLM future run for year 2010-2050, the data is available at https://esgf-node.llnl.gov/search/cmip5/