

Title: ReadMe for CAVE 2019 Picarro data

Authors:

Amy P. Sullivan

Research Scientist III, Colorado State University, Department of Atmospheric Science
amy.sullivan@colostate.edu

Jeffrey L. Collett, Jr.

Project PI

Professor, Colorado State University, Department of Atmospheric Science
jeffrey.collett@colostate.edu

1.0. Data Set Description

Final data for the Picarro measurements collected in Carlsbad Caverns National Park. PILS data status is final data. Data are collected every minute with a 15 second integration time. The data are reported at ambient conditions (i.e., not corrected for temperature and pressure). Measured species include:

- Carbon Dioxide
- Methane

Measurements were made at the Biology Office and Building 58 (32.18° N, 104.44° W) located within Carlsbad Caverns National Park. The field study took place from Jul. 25-Sept. 5, 2019.

Those interested in using these data are encouraged to contact the authors listed above for more information. In case of planned publication, we request that data users contact Jeff Collett (collett@colostate.edu) to discuss appropriate recognition of those that collected the data and the agencies that sponsored data collection.

2.0. Instrument Description

A Picarro gas analyzer (G2508) was used to quantify gas concentration of CH₄, CO₂, and NH₃ every 15 seconds. All species are detected using cavity ring-down spectroscopy (CRDS). The Picarro sampled from a 1/4" heated Teflon line, to limit loss of gaseous ammonia, and through a fiber filter at its inlet, to remove particles.

3.0. Data Collection and Processing

Before deployment the calibration was verified by injection of known concentrations from certified cylinders. Zero measurements were made weekly by overflowing the inlet with ultra-high purity zero air for 30 min. CO₂, CH₄, and NH₃ concentrations were measured at parts per billion (ppb) sensitivity, with <300, <7 ppb, and <3 sensitivity respectively at 1-minute time resolution.

4.0. Data Format

Data can be found in the csv file named CAVE2019_Picarro_final.csv. The file contains the start time, end time, and concentrations for each of the species measured. All measurements are

provided as ambient concentrations (i.e., are not corrected for temperature and pressure). The start and end times are provided in Mountain Daylight Time. All data units are ppmv.

A -8888 indicates data below the detection limit. A -9999 indicates missing data.

5.0. Data Remarks

Those interested in using these data are encouraged to contact the authors listed above for more information. In case of planned publication, we request that data users contact Jeff Collett (collett@colostate.edu) to discuss appropriate recognition of those that collected the data and the agencies that sponsored data collection.

6.0 Description of Variables

Variable Name	Units	Description	Time Resolution	Limit of Detection
Start_time (MDT)	MM/DD/YYYY HH:MM:SS	mountain time zone date		
End_time (MDT)	MM/DD/YYYY HH:MM:SS	mountain time zone date		
CO2_dry	ppmv	Carbon dioxide gas mixing ratio	15 second	300 ppbv
CH4_dry		Methane gas mixing ratio		7 ppbv