

Title: README for Picarro G2401-m data**Author(s):**

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1.0 Data Set Description

This dataset contains carbon dioxide (CO₂), methane (CH₄), carbon monoxide (CO) and water vapor (H₂O) in situ mixing ratio observations collected by the PICARRO G2401-m aboard the University of Wyoming King Air aircraft during phase 1 of the TRANS2AM field campaign. Data status is final data - revision R0. Data are collected at ~0.25 Hz and reported at 1 Hz.

The base of operations for the UWKA aircraft during the TRANS2AM field campaign was Laramie Airport in Laramie, WY (KLAR). Phase 1 of the field intensive took place in August and September 2022.

Use of data require prior okay from data authors (please see list above).

2.0 Instrument Description

Gas-phase CO₂, CH₄, CO and H₂O dry air measurements were collected in-situ using a commercial Picarro G2401-m Cavity Ring Down Spectrometer. The instrument was connected to a bypass manifold upstream of an ethane Aerodyne QC-TILDAS. The instrument is calibrated using ultra high purity zero air and a high precision standard near ambient air concentrations purchased from NOAA's GMD facility. Calibrations were performed before and after the campaign. For more details about the aircraft set up, please see these reference listed below. Manufacturer reported precision is less than 200 ppbv for CO₂, less than 2 ppb for CH₄ and less than 30 ppbv for CO.

3.0 Data Collection and Processing

Greenhouse data are collected at ~0.25 Hz and reported at 1-Hz to match the data frequency of the other onboard instruments. Dry air mixing ratios of CO₂, CH₄ and CO data are reported in units of ppmv (parts per million by volume). Water mixing ratios are reported in percentage (parts per hundred by volume).

4.0 Data Format

1-Hz Data files are reported in ICARTT format. Data are reported on the UWKA time base. Missing data are flagged as -9999.

5.0 Data Remarks

Use of data require prior okay from data authors (please see list above).

6.0 References

Pollack, I. B., McCabe, M. E., Caulton, D. R., Fischer, E. V. (2022) Enhancements in Ammonia and Methane from Agricultural Sources in the Northeastern Colorado Front Range Using Observations from a Small Research Aircraft, Environmental Science & Technology, <https://pubs.acs.org/doi/10.1021/acs.est.1c07382>.