

Title: README for gas-phase C₂H₆ data

Author(s):

Dana R. Caulton (<https://orcid.org/0000-0002-5521-1871>)

TRANS²AM project Co-PI, C₂H₆ instrument team lead, corresponding author for the C₂H₆ dataset

Assistant Professor, University of Wyoming, Department of Atmospheric Science,
dcaulton@uwyo.edu

Megan M. McCabe (<https://orcid.org/0000-0002-5702-8763>)

TRANS²AM project, C₂H₆ team member, contributing author to the C₂H₆ dataset

Graduate Research Assistant, University of Wyoming, Department of Atmospheric Science,
mmccabe2@uwyo.edu

1.0 Data Set Description

Final data for gas-phase ethane (C₂H₆) measurements collected aboard the University of Wyoming King Air aircraft during phase 1 of the TRANS²AM field campaign. C₂H₆ data status is final data - revision R0. Data are collected 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 July and August 2021.

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

2.0 Instrument Description

Gas-phase C₂H₆ measurements were collected in-situ using a commercial Aerodyne QC-TILDAS. The C₂H₆ instrument was connected to a bypass manifold downstream of a Picarro G2401-m. The instrument also shared a pumping system with the NH₃ and HNO₃ QC-TILDAS instruments. The instrument is calibrated using a commercially available ethane standard diluted with 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. The instrument is routinely zeroed on the ground and in flight by overblowing the inlet with a supply of ultra high purity zero air. The excess zero air is vented through the bypass manifold. For more details of the aircraft instrument set up, please see these reference listed below. The in-flight 1-s precision for the instrument is 80 pptv.

3.0 Data Collection and Processing

C₂H₆ data are collected and reported at 1-Hz. C₂H₆ data are reported in units of ppbv (parts per billion by volume)

4.0 Data Format

1-Hz C₂H₆ data files are reported in ICARTT format. C₂H₆ data are reported on the UWKA time base. Missing data due to in-flight zeros and laser position calibrations 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>.