

Title: README for gas-phase HNO₃ data

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1.0 Data Set Description

Final data for gas-phase nitric acid (HNO₃) measurements collected aboard the University of Wyoming King Air aircraft during phase 1 of the TRANS²AM field campaign. HNO₃ data status is final data - revision R0. Data are collected at 10 Hz and averaged to 1-Hz for reporting.

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 HNO₃ measurements were collected *in-situ* using a commercial Aerodyne QC-TILDAS outfitted with a custom-built heated aircraft inlet that allows for injection of calibration gases at the

inlet tip and an inertial inlet that provides separation of particles from the air sampling stream. The HNO₃ instrument was operated in tandem with another QC-TILDAS for measuring ammonia (NH₃). The NH₃ and HNO₃ QC-TILDAS spectrometers shared a common aircraft inlet, inertial inlet, flow path, and pumping system. The NH₃ instrument was placed upstream of the HNO₃ instrument in the flow path. The instrument is calibrated with a known mixing ratio of HNO₃ generated from a temperature-controlled permeation device. Calibrations are performed on the ground between flights. The instrument is routinely zeroed on the ground and in flight by overblowing the inlet with a supply of ultrapure air. Active passivation of the flow path was not applied to the QC-TILDAS instruments for these flights. For more details, please see these references listed below.

3.0 Data Collection and Processing

HNO₃ data are collected at 10 Hz and averaged to 1-Hz for reporting. HNO₃ data are reported in units of ppbv (parts per billion by volume)

4.0 Data Format

1-Hz HNO₃ data files are reported in ICARTT format. HNO₃ 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).

No data reported for RF08 conducted on August 13, 2021 due to issues with HNO₃ instrument zeros during this flight.

Please see individual ICARTT file headers for uncertainty and limit of detection.

6.0 References

J. R. Roscioli, M. S. Zahniser, D. D. Nelson, S. C. Herndon, and C. E. Kolb (2016) New Approaches to Measuring Sticky Molecules: Improvement of Instrumental Response Times Using Active Passivation, *The Journal of Physical Chemistry A*, 120 (9), 1347-1357, <https://pubs.acs.org/doi/10.1021/acs.jpca.5b04395>.