

CHEESEHEAD UW Chemistry Ozone Data

Dataset Authors:

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General Dataset Description:

This dataset contains continuous mixing ratios of ozone at the WLEF very tall tower at both the 30- and 122-m height. Measurements were made with a chemical ionization time of flight mass spectrometer and a Thermo Fisher 49i O₃ analyzer. All mixing ratios are in ppbv. Time is in fractional day of year CDT.

Instrument Description:

A full description of the CI-ToFMS instrument can be found in

Bertram, T.H., et al., A field-deployable, chemical ionization time-of-flight mass spectrometer, *Atmos. Meas. Tech.*, 4, 1471–1479, 2011, www.atmos-meas-tech.net/4/1471/2011/doi:10.5194/amt-4-1471-2011

A full description of the CI-ToFMS detection method (Ox-CIMS) can be found in

Novak, G. A., Vermeuel, M. P., and Bertram, T. H.: Simultaneous Detection of Ozone and Nitrogen Dioxide by Oxygen Anion Chemical Ionization Mass Spectrometry: A Fast Time Response Sensor Suitable for Eddy Covariance Measurements, *Atmos. Meas. Tech. Discuss.*, <https://doi.org/10.5194/amt-2019-445>, in review, 2019.

The Thermo Fisher 49i O₃ monitor is a UV photometric analyzer.

Data Collection:

The duty cycle for CI-ToFMS collection went as follows:

- 1.) four hours of ambient sampling,
- 2.) 3 minutes of zeroing by overflowing the instrument subsampling tee with Ultra Zero Grade Air (Airgas),
- 3.) 4 minutes of a standard addition of 1 ppbv SO₂ (detected as O₂-SO₂⁻; -m/Q 96) diluted from a 1 ppmv SO₂ standard in N₂ (Praxair) for mass transfer calibrations.

At six periods throughout the two-week study, an O₃ standard addition of 55 ppbv from a 2B Model 306 Ozone Calibration Source was added to the CI-ToFMS as a second calibration measure.

At any point during this observation period, the Thermo Fisher photometric O₃ analyzer (Model 49i)

was deployed on the inlet not sampled by the CI-ToFMS (i.e. 49i measured at 30 m when CI-ToFMS measured at 122 m). The 49i collected at 1 Hz and was zeroed and received a standard addition of 55 ppbv of O₃ from the ozone calibration source every 2 days.

Quality Control:

Data were despiked by removing periods of short-term local influences.

Time Period: 2019/07/03 12:00:00 - 2019/07/15 21:13:58.08

Location: The tower is located at 45.946 N and 90.272 W.

Data Frequency: 30 second

Data Spatial Type: Time series data from a single tower at two vertical heights.

Dataset Restrictions: No restrictions. See the [CHEESEHEAD Data Policy](#).

File format: All data are in .xlsx format in a single Excel file.

Data format:

The .xlsx file should have 3 columns:

DOY_CDT - Fractional day of year (CDT)

mixingratio_30m_ppbv = O₃ mixing ratio at the 30-m inlet height (ppbv)

mixingratio_122m_ppbv = O₃ mixing ratio at the 122-m inlet height (ppbv)

GCMD Keywords: EARTH SCIENCE, ATMOSPHERE, ATMOSPHERIC CHEMISTRY, OXYGEN COMPOUNDS, OZONE