

# NO<sub>x</sub> at Cape Verde

ACTRIS NO<sub>x</sub> QA workshop 2023

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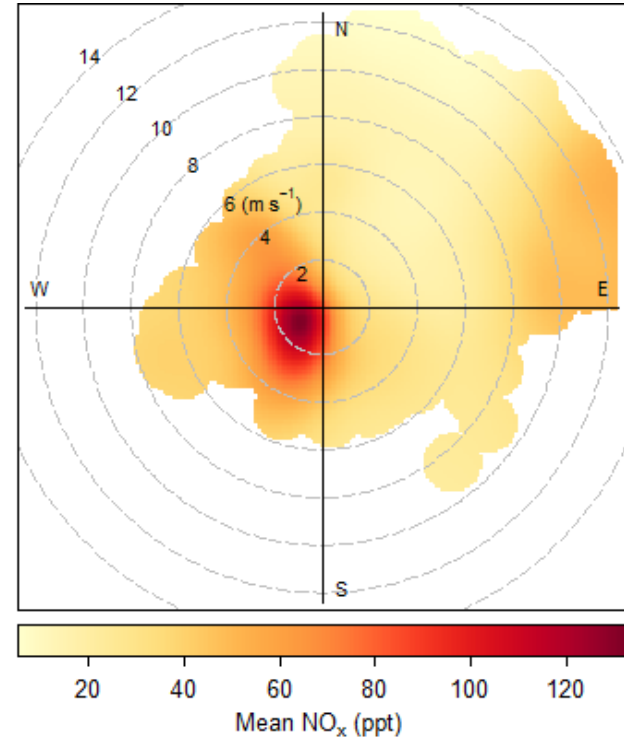
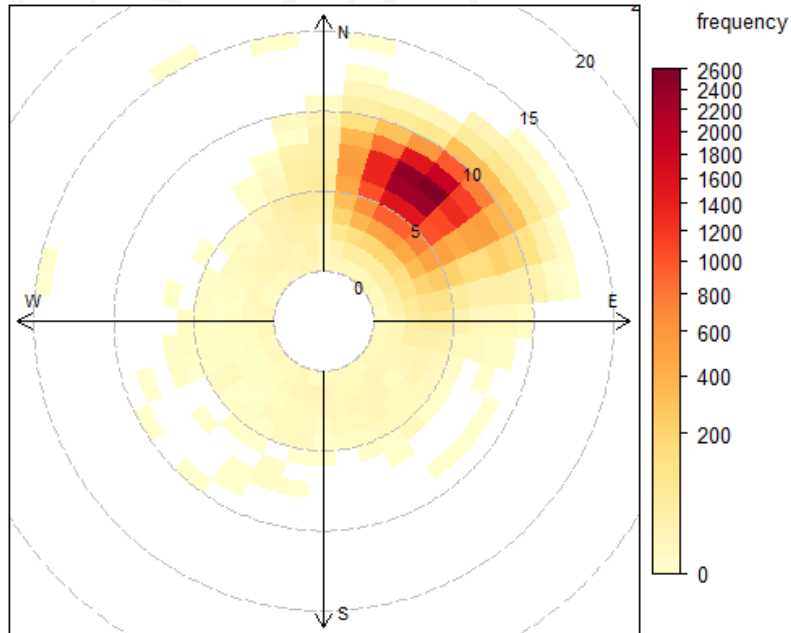
Wolfson Atmospheric  
Chemistry Laboratories  
University of York



# Cape Verde location

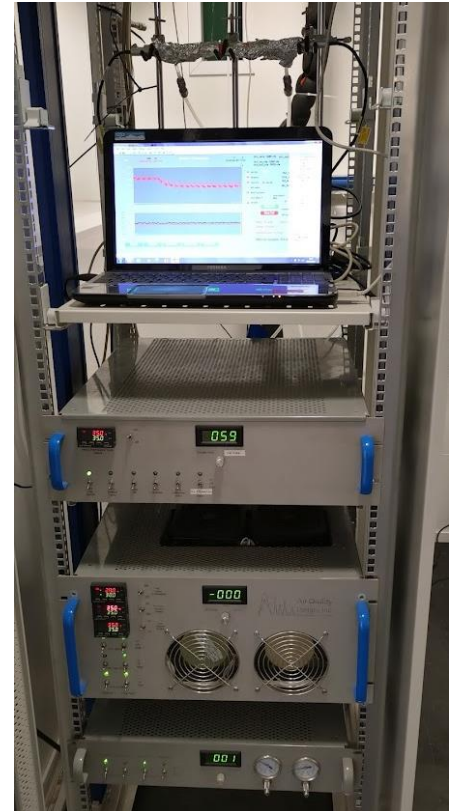


# Wind direction and wind speed



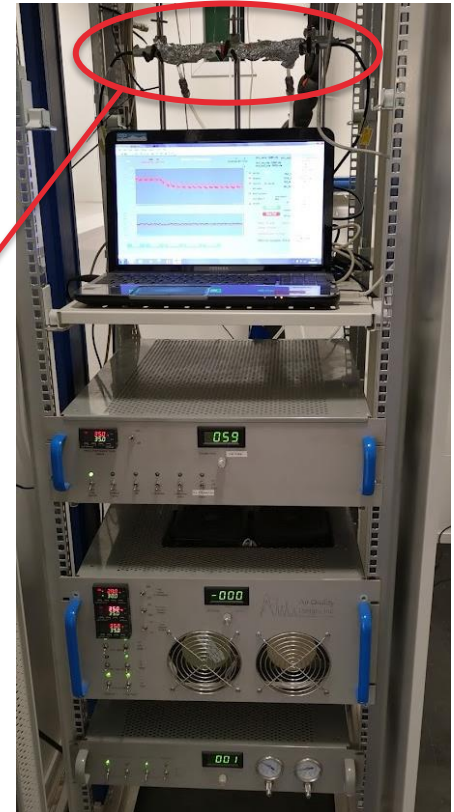
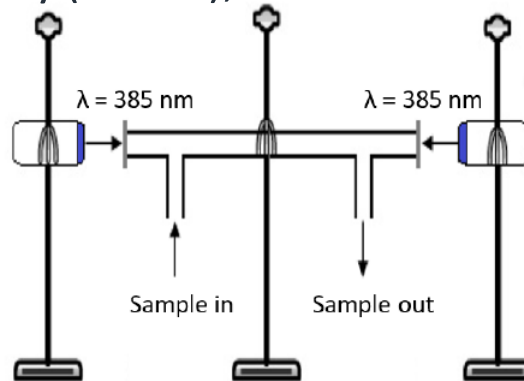
# NO<sub>x</sub> Instrument

- NO<sub>x</sub> measured via a custom, dual channel NO chemiluminescence instrument
  - Channel 1: NO, NO<sub>x</sub> and background
  - NO<sub>2</sub> photolytically dissociated at 385 and 395 nm
    - Nafion dryer on sample
  - Channel 2: NO<sub>y</sub> (currently not operational)



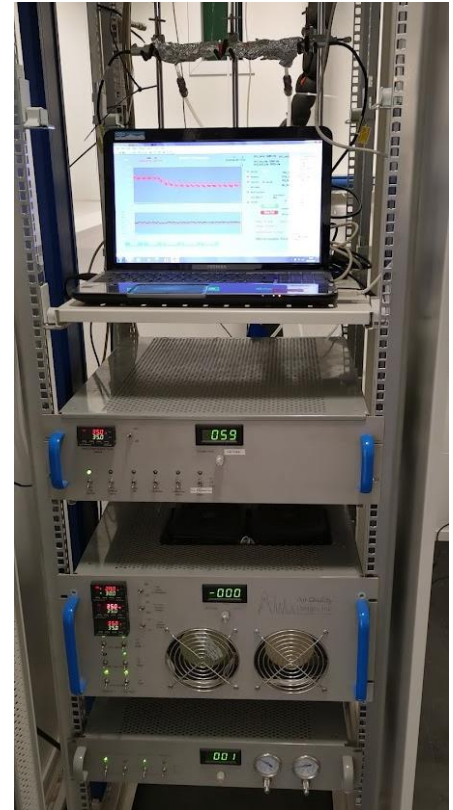
# NO<sub>x</sub> Instrument

- Two NO<sub>2</sub> converters used
  - Blue light converter (BLC 2), high conversion efficiency (~ 92%) but thermal interferences due to BLC heating up
  - Diodes and quartz tube system (photolysis cell – PLC), lower conversion efficiency (~ 54%), but minimal interferences



# NO<sub>x</sub> Measurement cycle

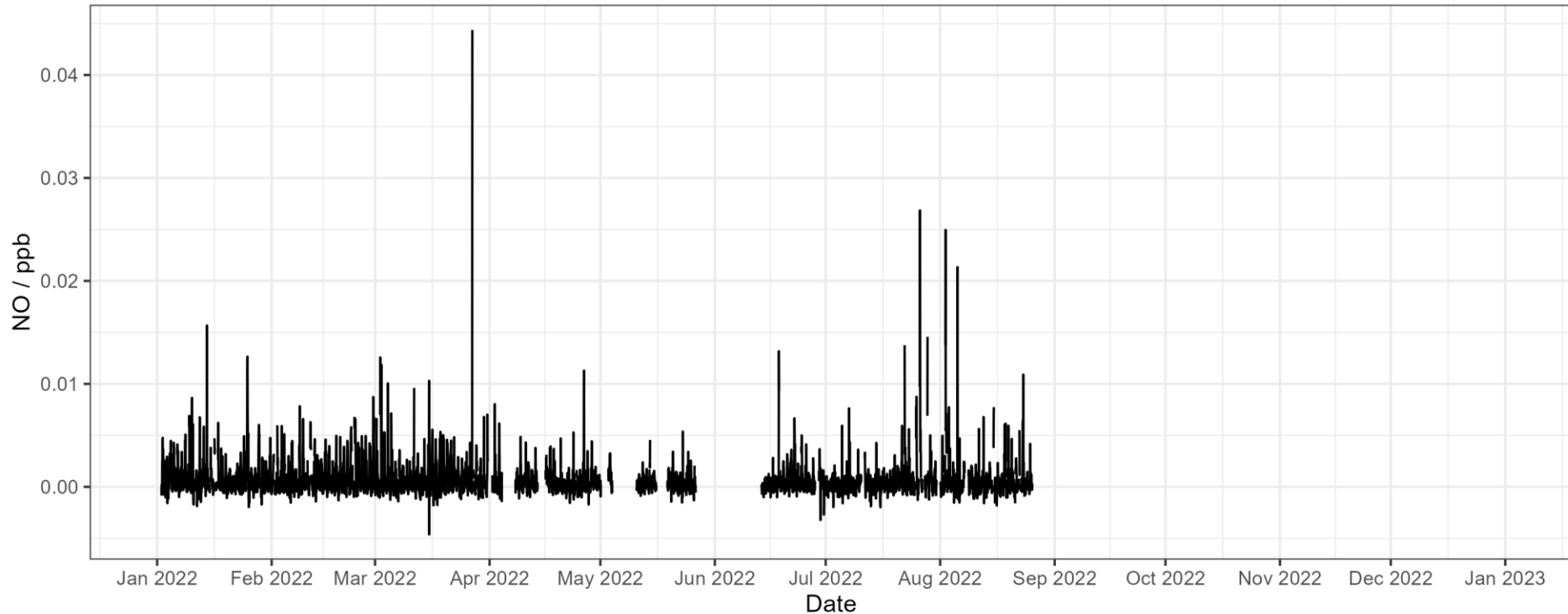
- 5-minute measurement cycle
  - 2 minutes of NO measurement
  - 2 minutes of NO<sub>x</sub>, 1 minute using BLC, 1 minute using PLC
  - 1 minute of background
- NO<sub>x</sub> measured continuously at CVAO since 2006
  - Most recent BLC installed in 2015
  - PLC installed in 2017, diodes replaced in April 2022
- Limits of detection
  - NO ~ 0.8 ppt / hour
  - NO<sub>2</sub> ~ 2 ppt / hour



# NO<sub>x</sub> Calibration

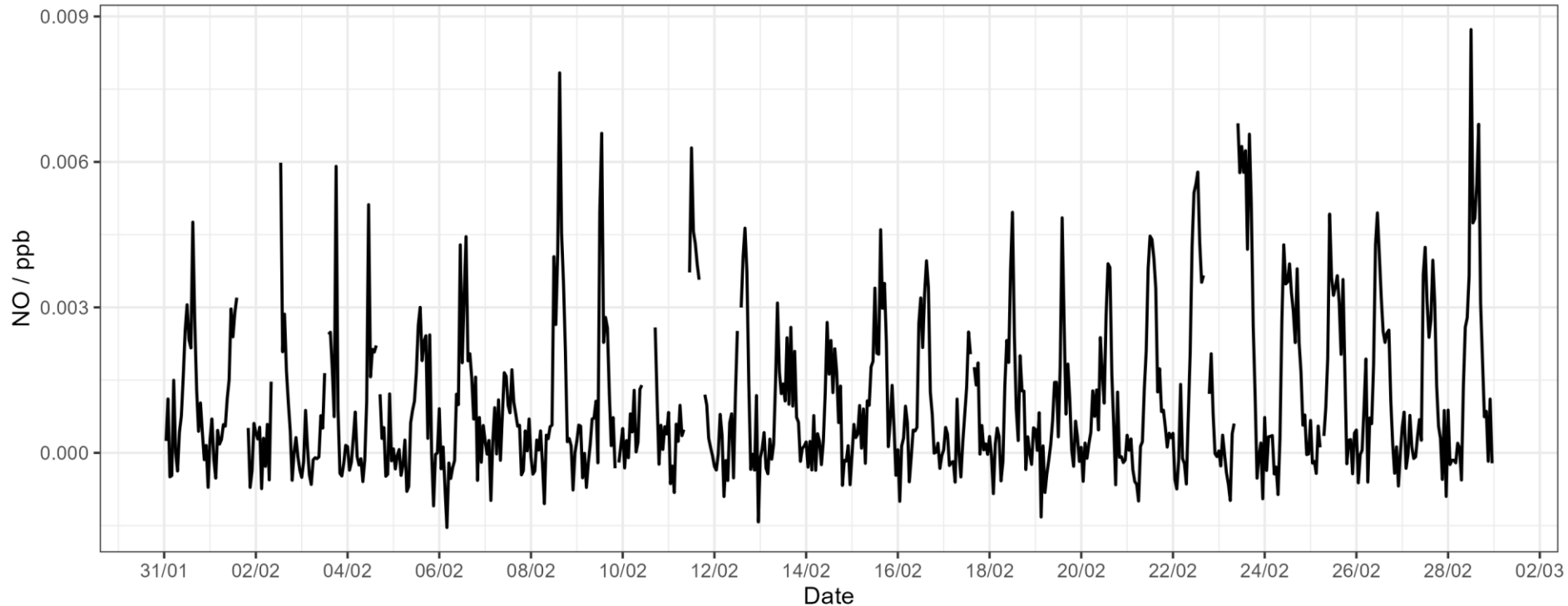
- Calibration every 61 hours
  - 3 NO sensitivity cycles
  - 2 NO<sub>2</sub> conversion efficiency cycles
- After calibration 30 minutes artifact measurement
  - PAG air used
  - For NO nighttime measurement used as artifact

# NO Timeseries





# NO Diurnal cycle - February 202



# NO<sub>2</sub> Timeseries

