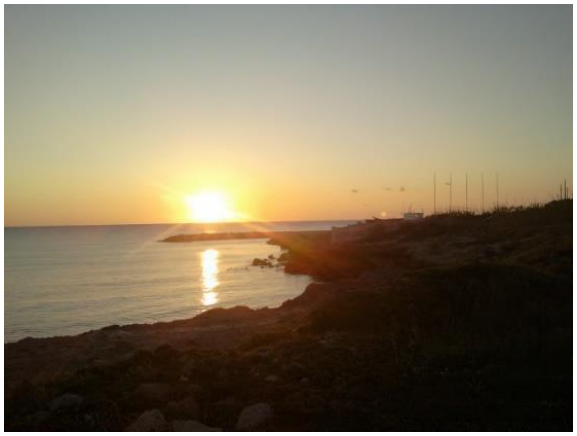
NOx observations at Mt. Cimone and Capo Granitola

CNR–ISAC, Bologna and Turin

ACTRIS NOx/VOC QA/QC Workshop, 7–9 April 2025

Monte Cimone (CMN)
44.0 N, 10.7 E, 2165 m a.s.l.

- Highest peak of the Northern Apennines
- Completely free horizon 360°
- Usually above PBL, except summer
- WMO/GAW Global Station
- CNR Observatory hosted by Italian Air Force



Capo Granitola (CGR)
37.66 N, 12.65 E

- South-western coast of Sicily
- Affected by sea-land breeze
- Remotely-controlled
- WMO/GAW Regional Station
- Hosted by CNR-IAS institute

Experimental set-up

CMN

- Teledyne T200UP with blue light converter
- Thermo 146i for dilution and GPT
- Thermo 1160 zero air supply (activated charcoal and Purafill)
- NO standard (5 ppm):
  1. 2024-01-01 2024-02-13 NPL, Batch: 2243R
  2. 2024-02-14 2024-07-17 MESSER, Batch: 53591848
  3. 2024-07-18 2024-12-31 NPL, Batch: D109110
- Head: inlet composed by Teflon and Pyrex and residence time of about 2s from the tube entrance to instrument inlet, from 2025 active flow control and T, RH, P measurements

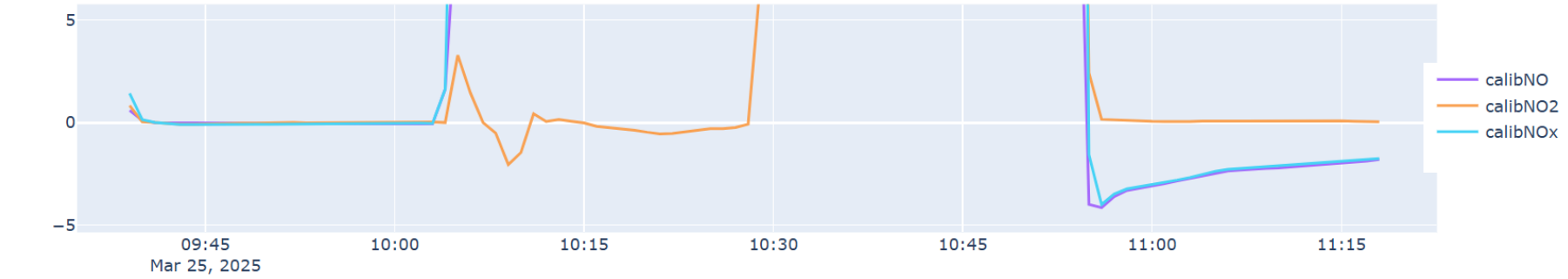
CGR (from 2025)

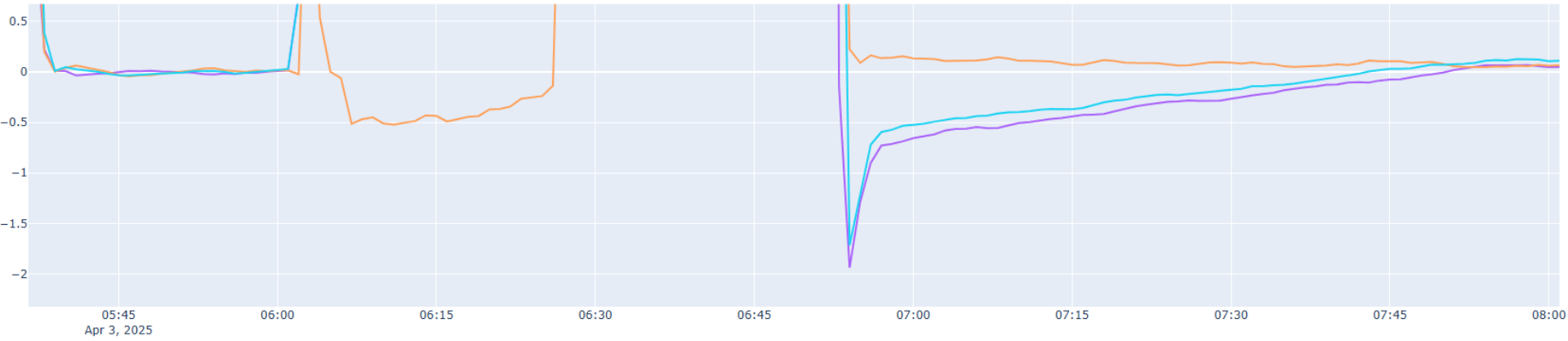
- Thermo 42i-TL with photolytic converter (at CMN until 2023)
- Thermo 146i for dilution and GPT
- Thermo 1160 zero air supply (activated charcoal and Purafill)
- NO standard (5 ppm):
  1. MESSER, Batch: 78036
- Head: Teflon tube with active flow control and residence time of about 2s from the tube entrance to instrument inlet

- NRT data delivery capacity
- Automatic procedures (previously in R, now also in Python) run every 2 hours for calibrations and flags attribution, following the GAW guidelines, and for direct EBAS file creation (lev0, lev1, and lev2 for internal use)

Issues/Problems/Questions in 2024

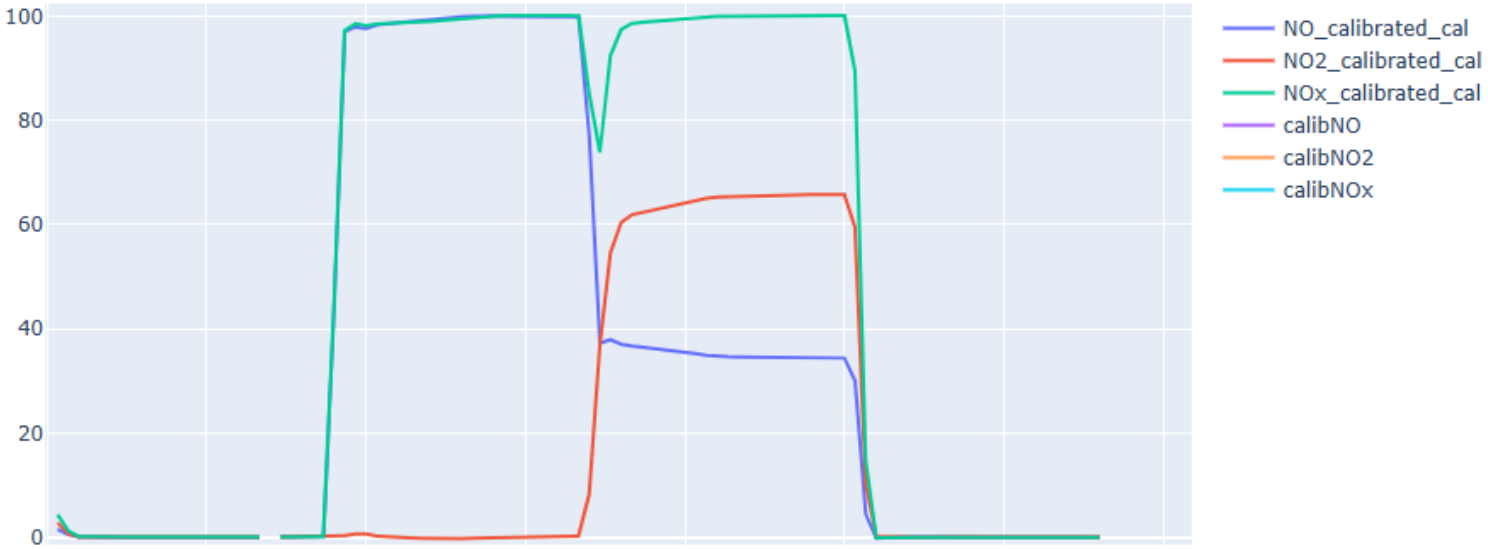
- The instruments coefficients at CMN were changed (by mistake) on August 2024; however, calibrations were correctly performed throughout the year
  -> no correction was applied to our submitted data
- Some awkward/minor features during our calibrations at CMN:
  - slightly negative (-0.3/-0.4) NO_2 values during the NO span phase, even after we performed instrumental zero and span (to set again the instrument coefficients) following the manual
  - negative NO and NOx values during the second zero phase, after GPT. Totally different from first zero phase, the negative values persist long after the calibration (40-50 min) before NO values go back to normal



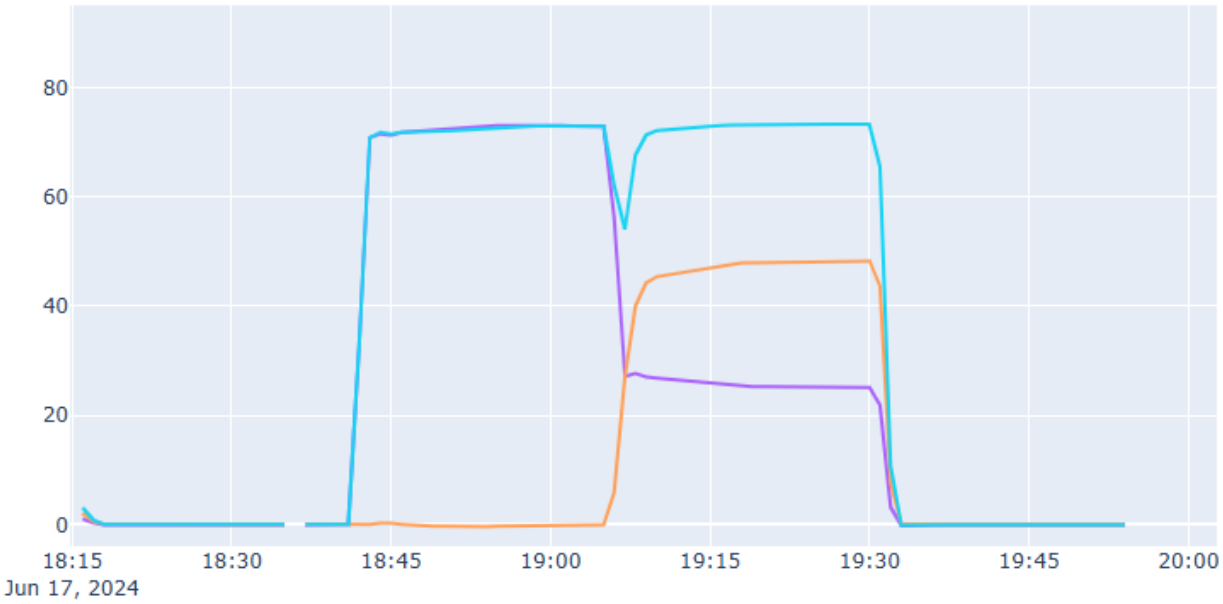


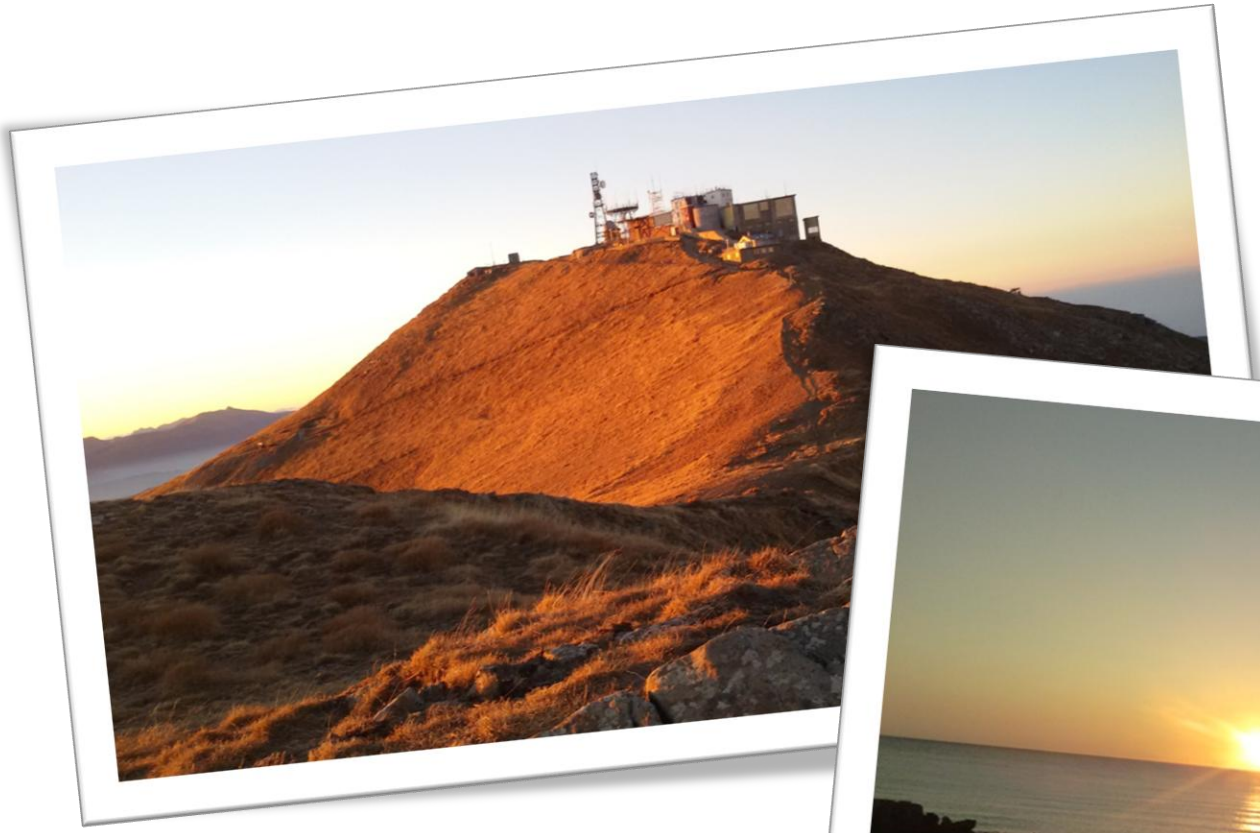
calibrationsNOxT200UP CMN 2024

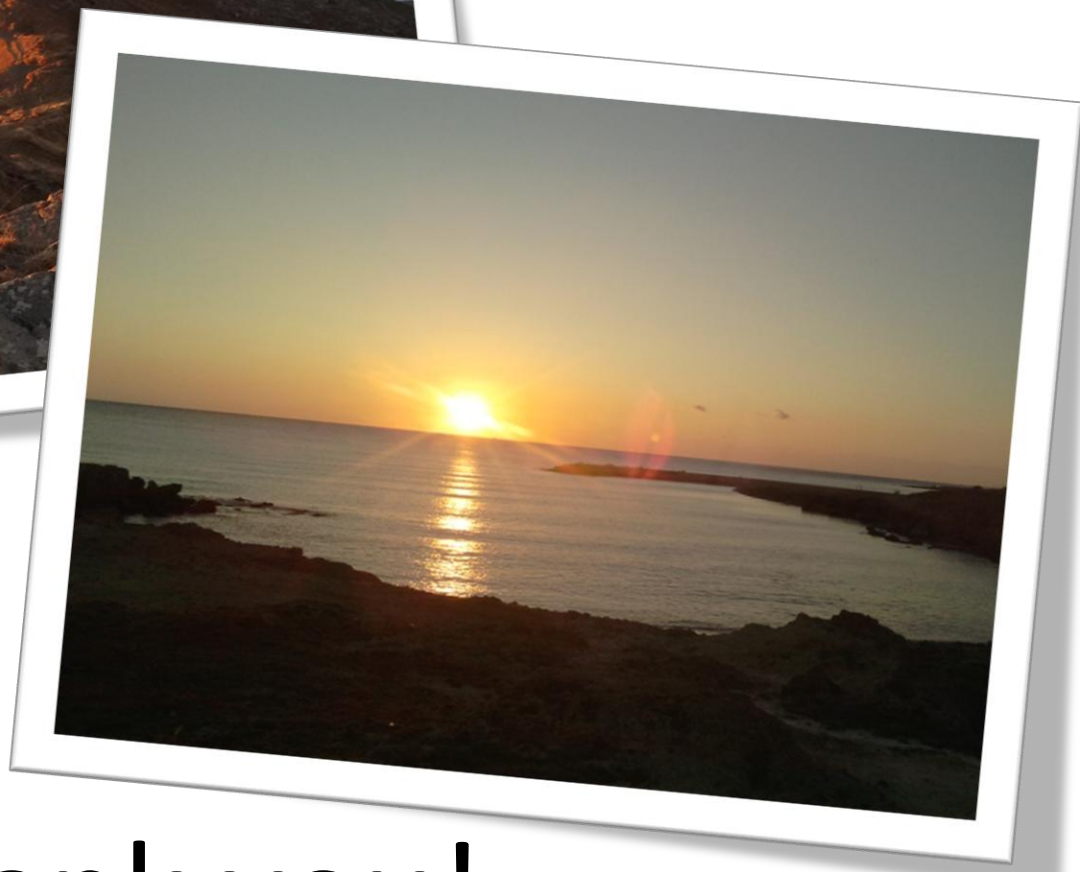
Data with calibration factors applied (lev1)



Raw data, i.e., lev0







Thank you!