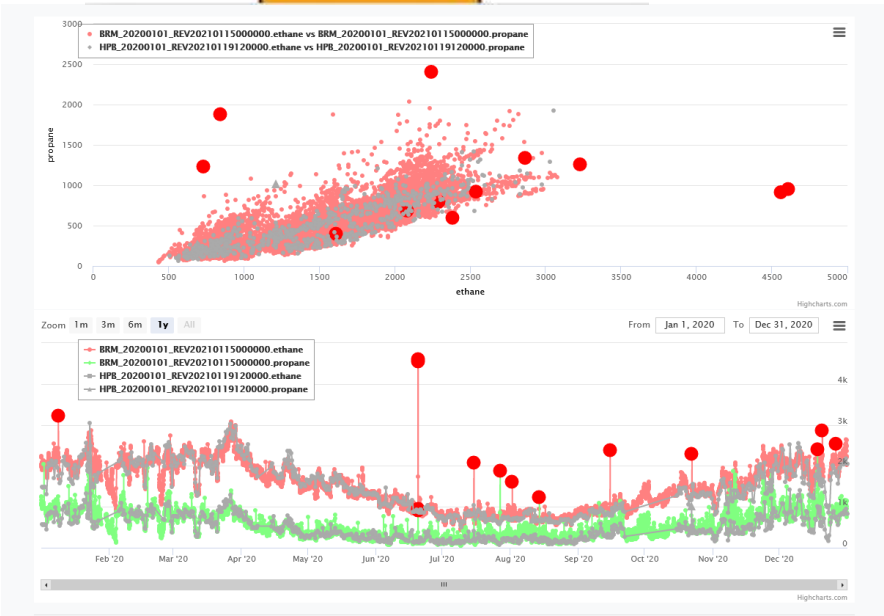
Importance of data quality for modellers and end users

Hardware Components

Soft Skills

- adequate measuring instrument
- air inlet/distribution device/pump
- data acquisition system
- traceability of calibration gases (to international references)
- calibration device/dilution unit
- calibration gases/zero air
- periodic maintenance
- manual data control/documentation
- meteorological data



traceability

stable gases

Empa-Lab

primary standards

NO, SO_2, O_3, CO

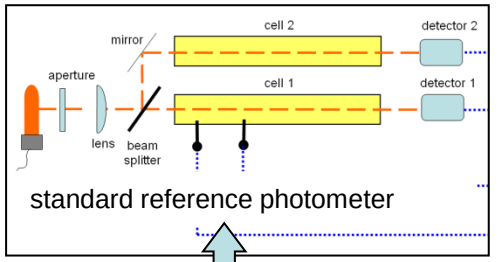
calibration

calibration instrument
Empa

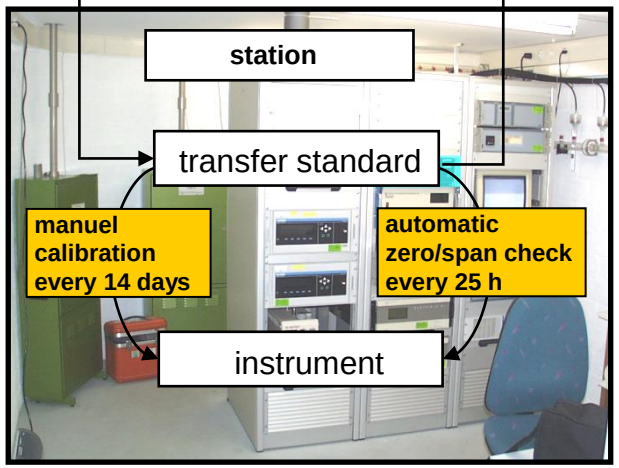
comparison

transfer standard

ozone



standard reference photometer



Quality Assurance – periodic maintenance

- daily: check data availability/instrument status
  calibration zero / span checks

- 2-weekly: general preventive maintenance
  manual calibration
  check impact on data series

- annualy: final data check, submission to BAFU
  instrument check/replacement
  update standard operation procedures

Quality Assurance – Documentation

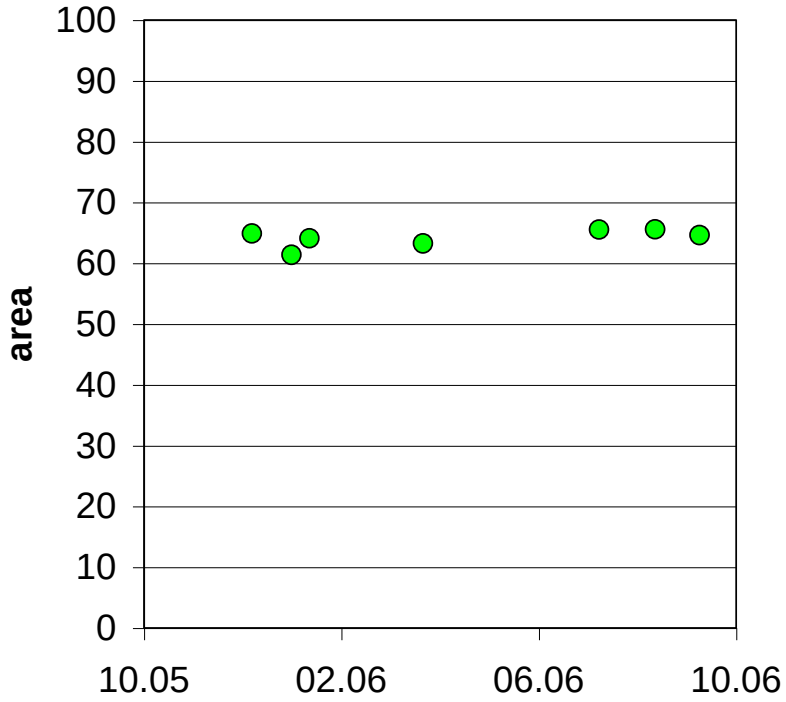
- instrument conditions (log book)
- maintenance procedures (SOP)
- calibration procedures (SOP)
- calibration data (zero/span)
- data control procedures
- data correction functions

Quality Assurance – Data control

drift in detector stability

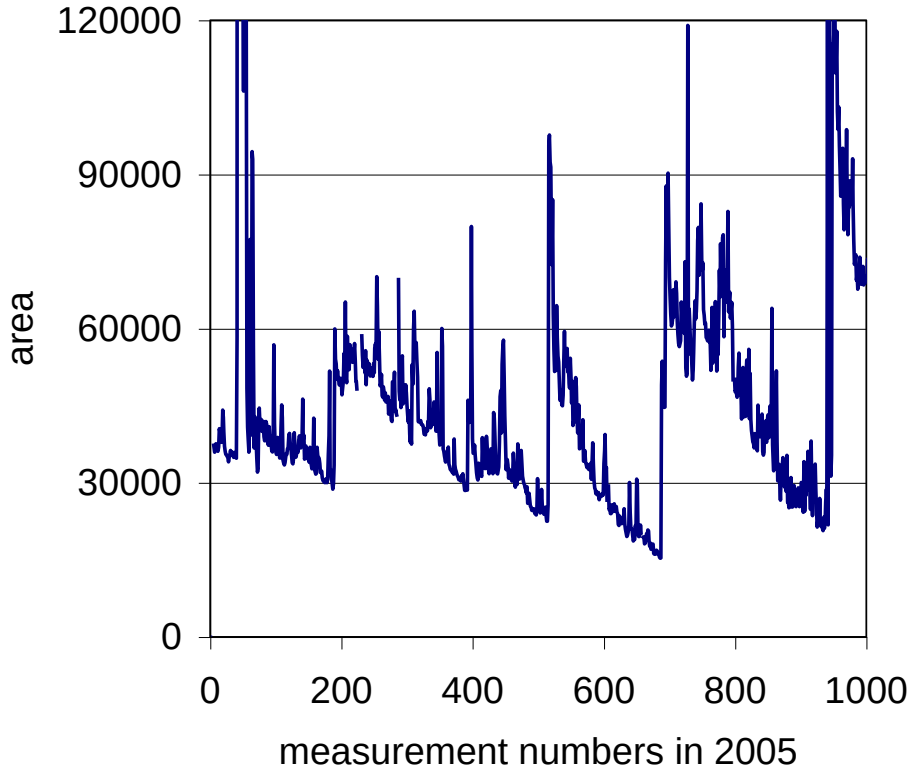
FID (stable)

peak areas of calibration:
- stable over 1 year
- ± 5% std. dev.



MS (unstable)

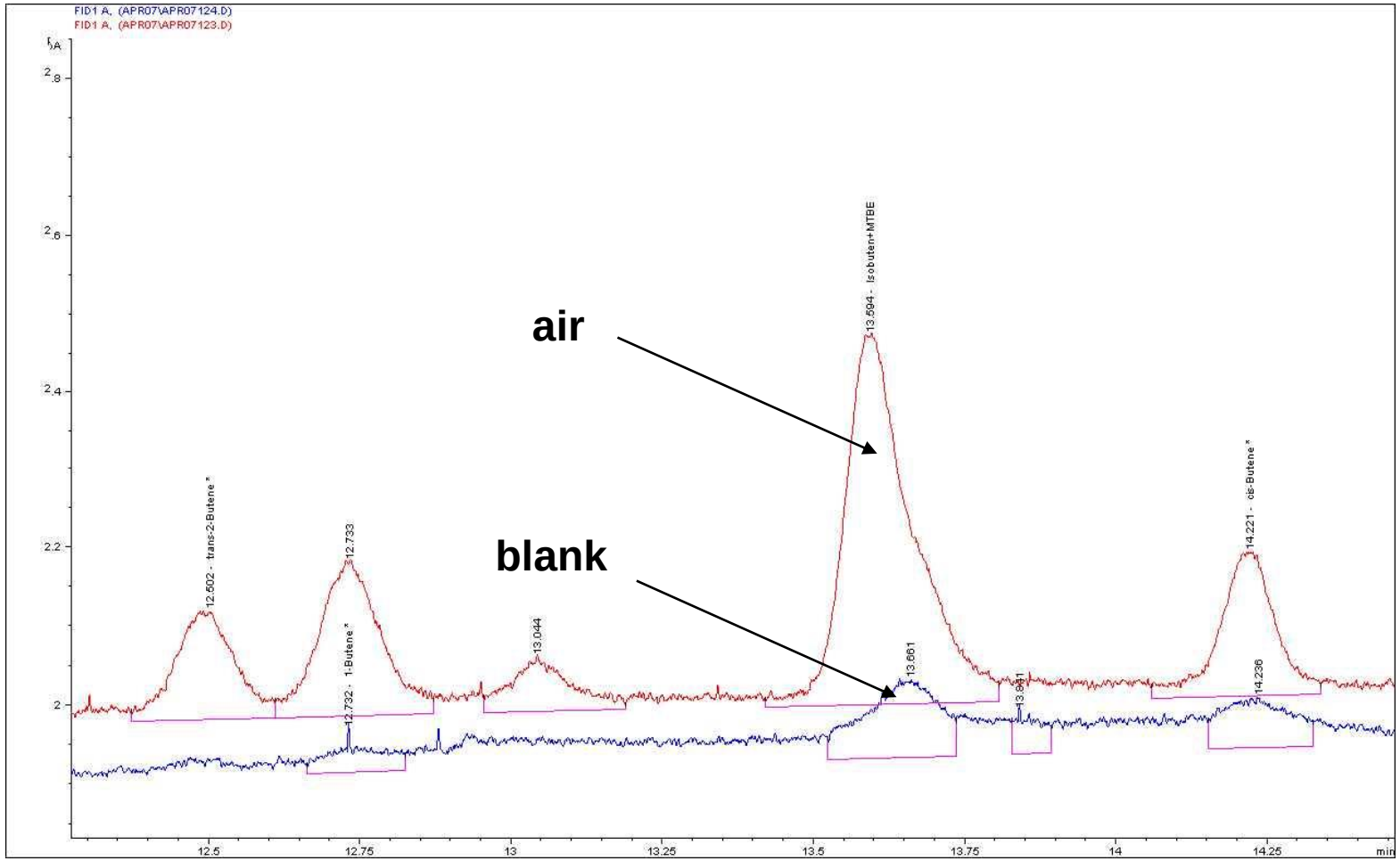
raw peak areas show:
- fast declining sensitivity
- jumps after tuning of source



Quality Assurance – Data control

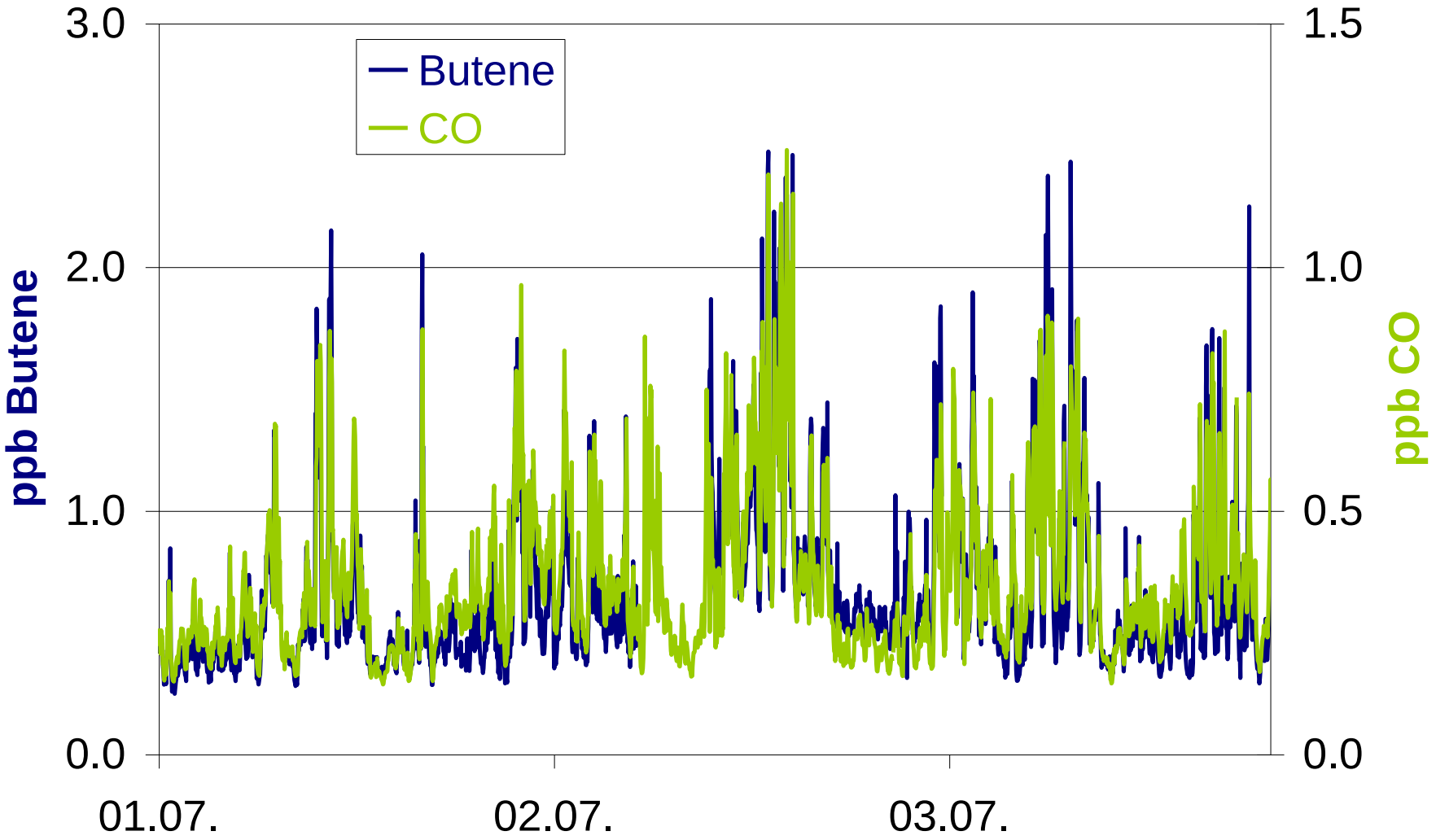
Blanks

Blank of butene (C_4) from the Nafion Dryer: 0.2 ppb



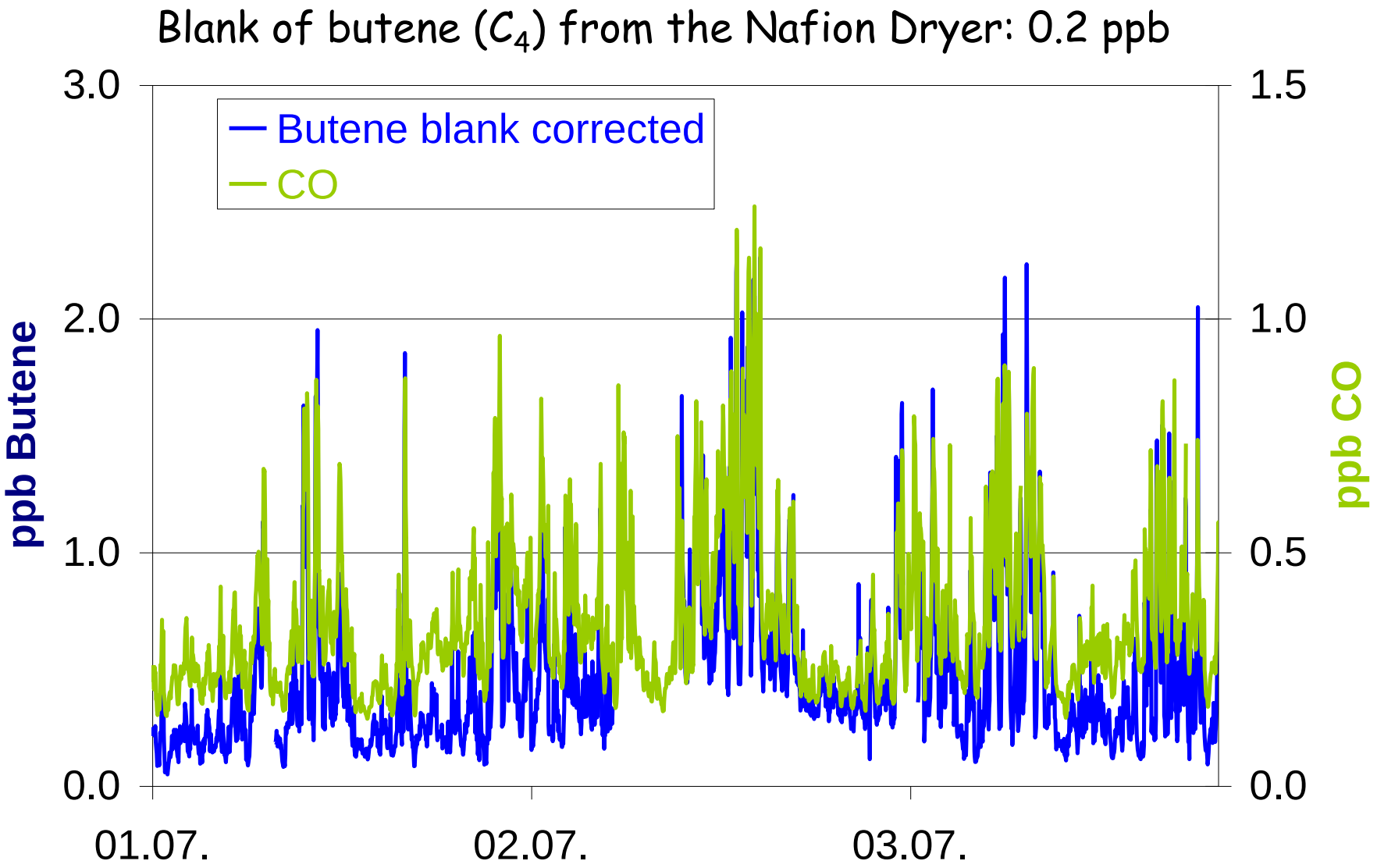
Quality Assurance – Data control

Blanks

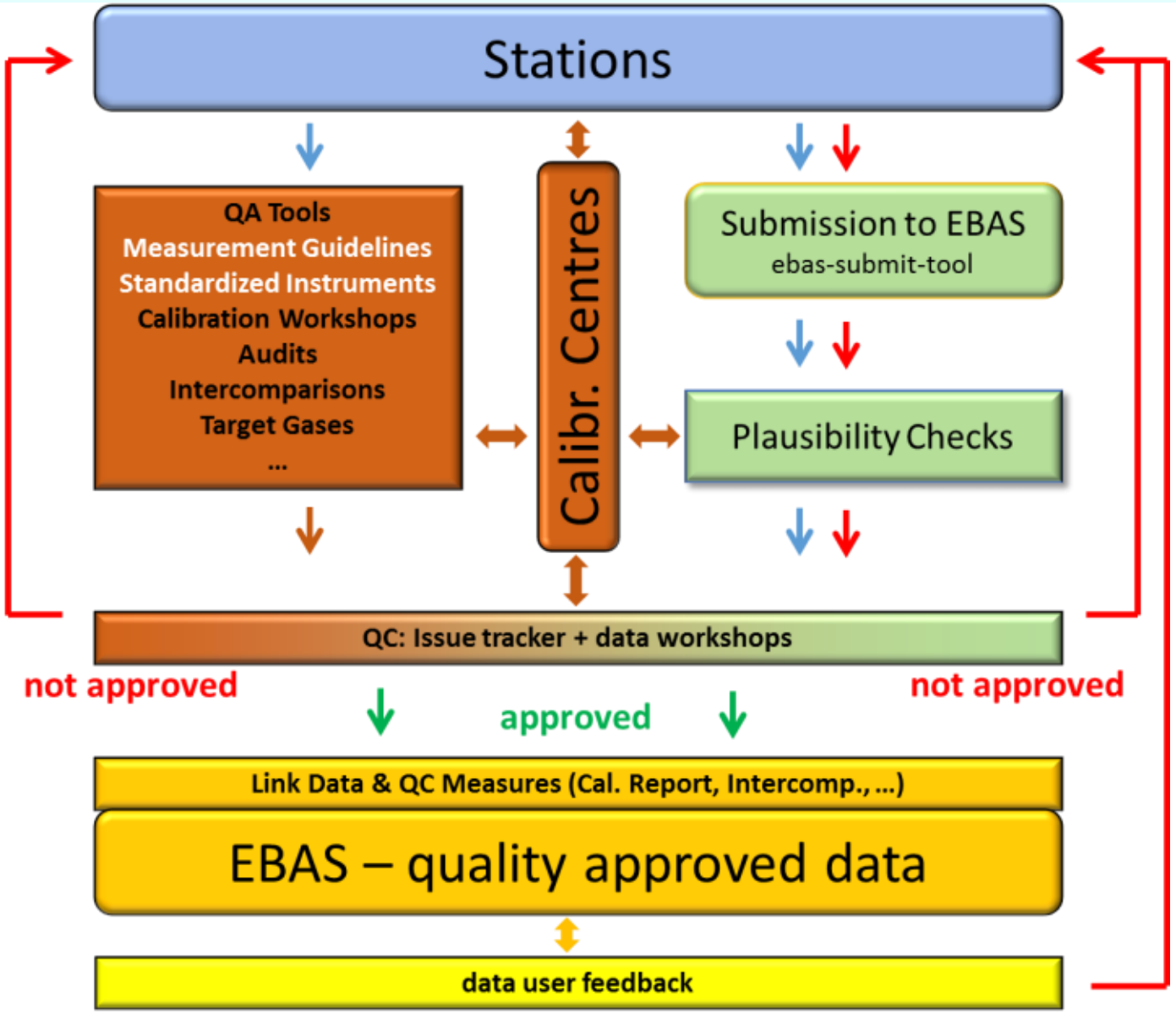


Quality Assurance – Data control

Blanks

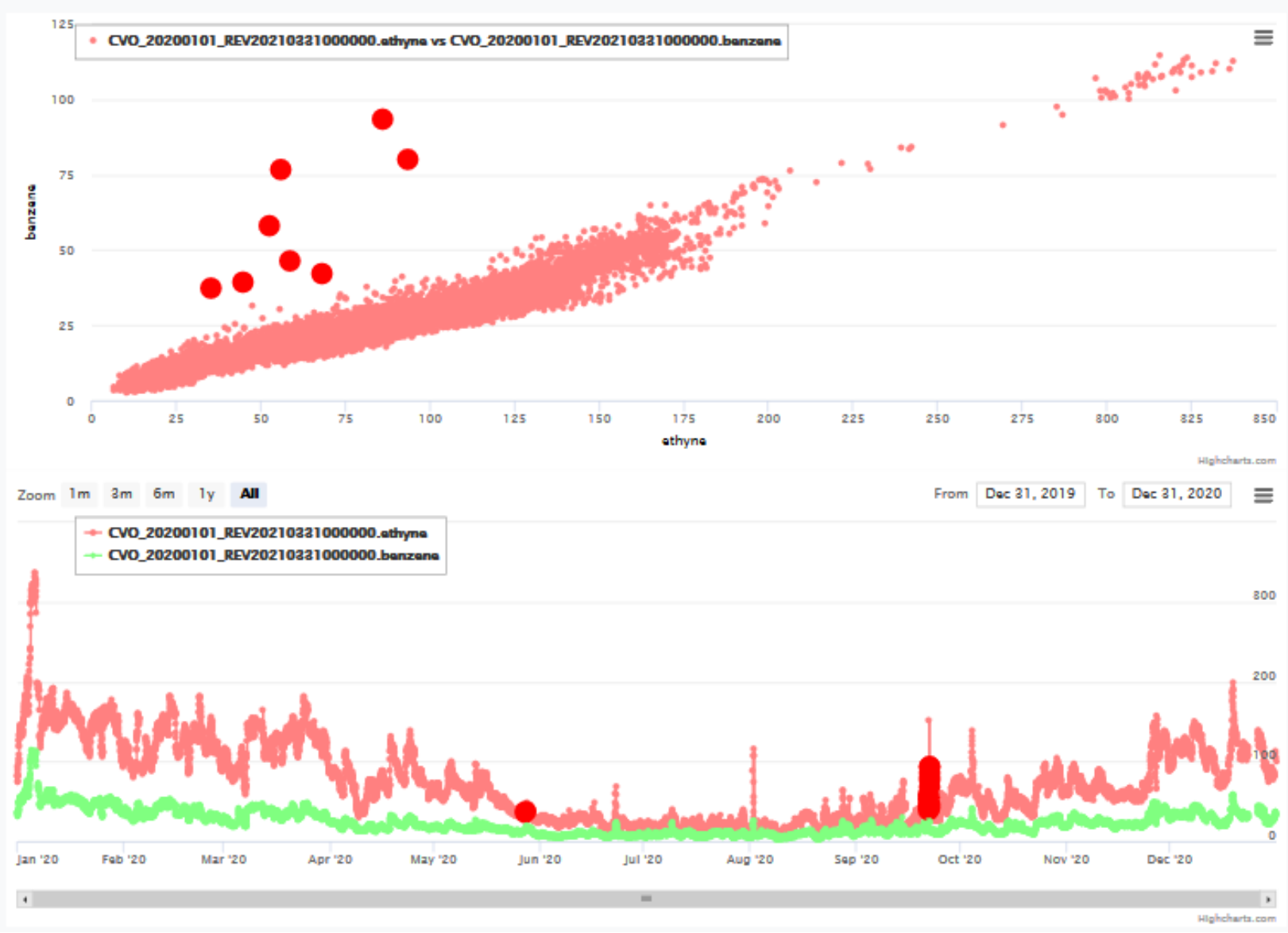


The example of VOC data checks in ACTRIS



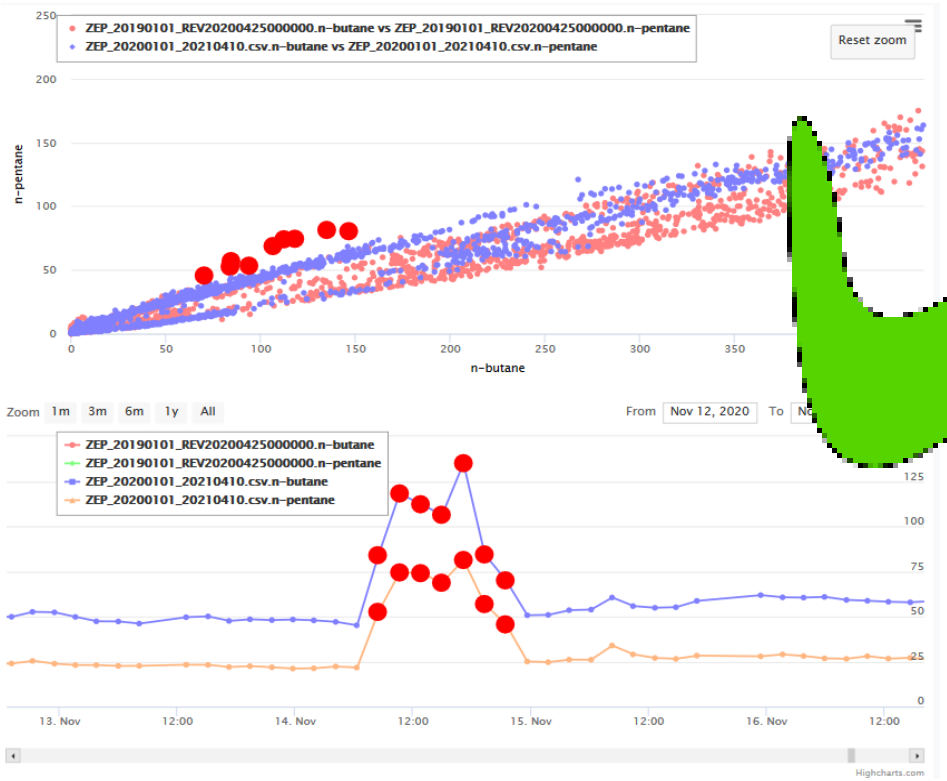
@VOC@: ATmospheric VOC Assessment Tool

Example: Benzene vs Ethine at Cape Verde

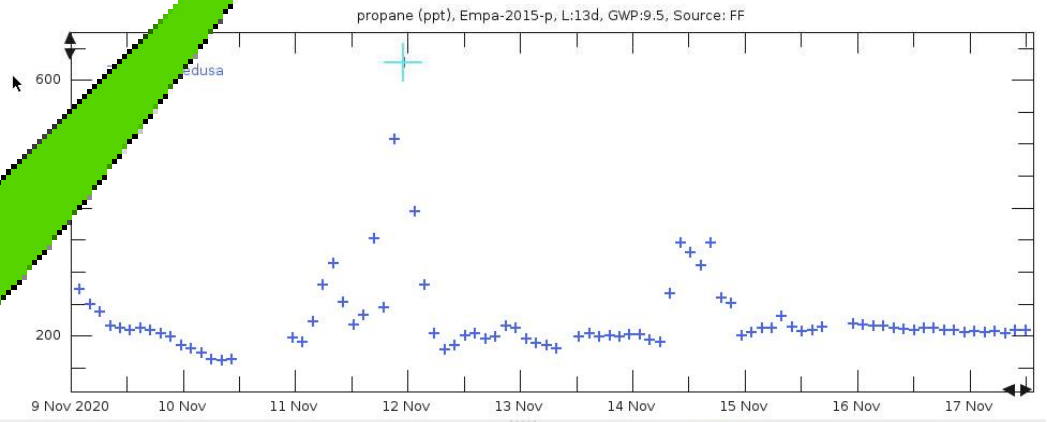


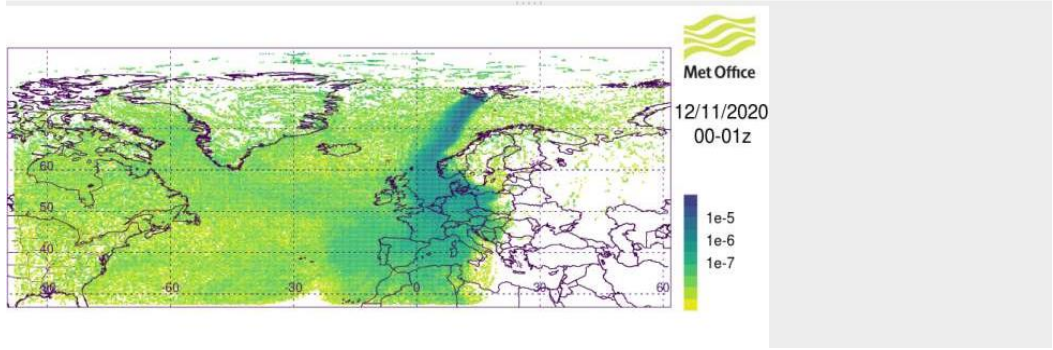
@VOC@: ATmospheric VOC Assessment Tool

Example: Propane vs Butane at Ny-Alesund



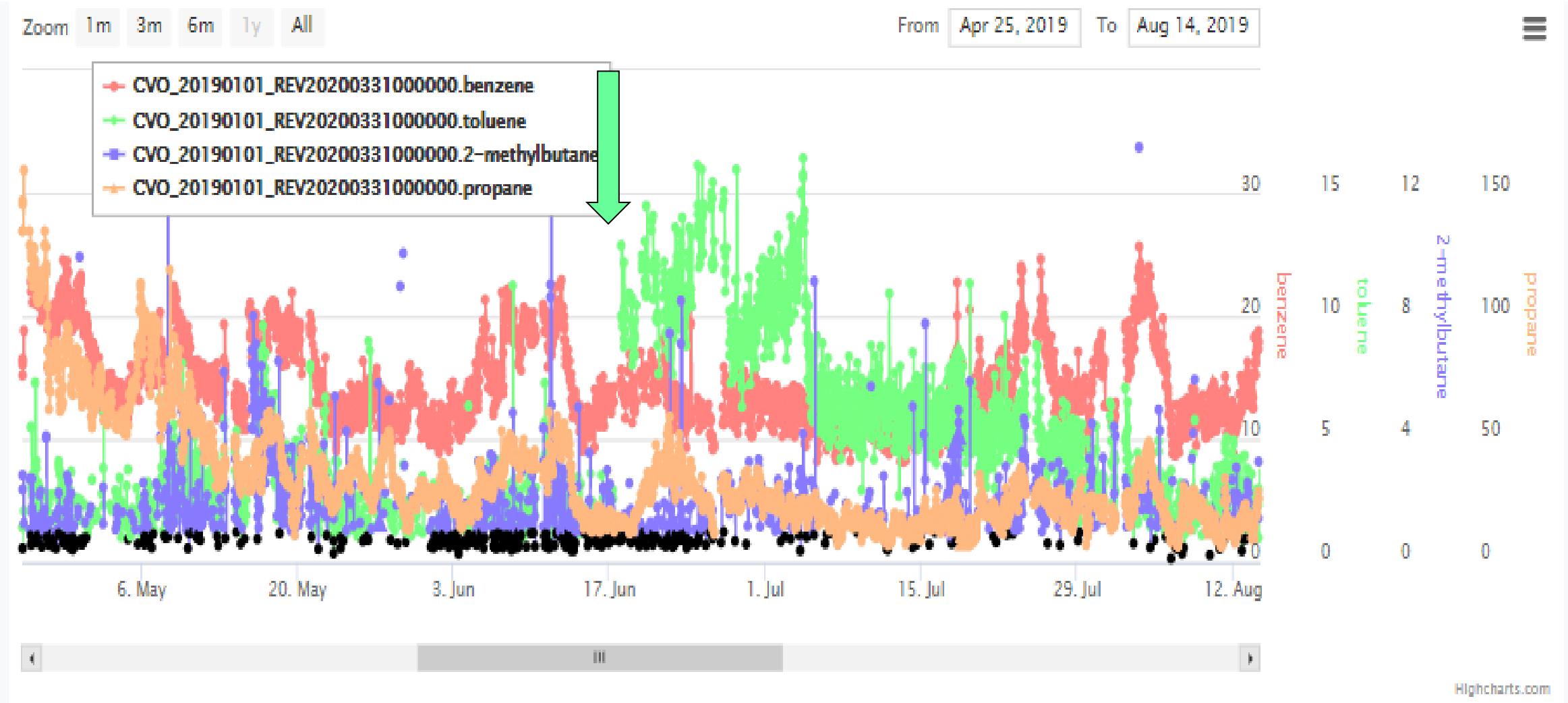
Trajectories used for verification



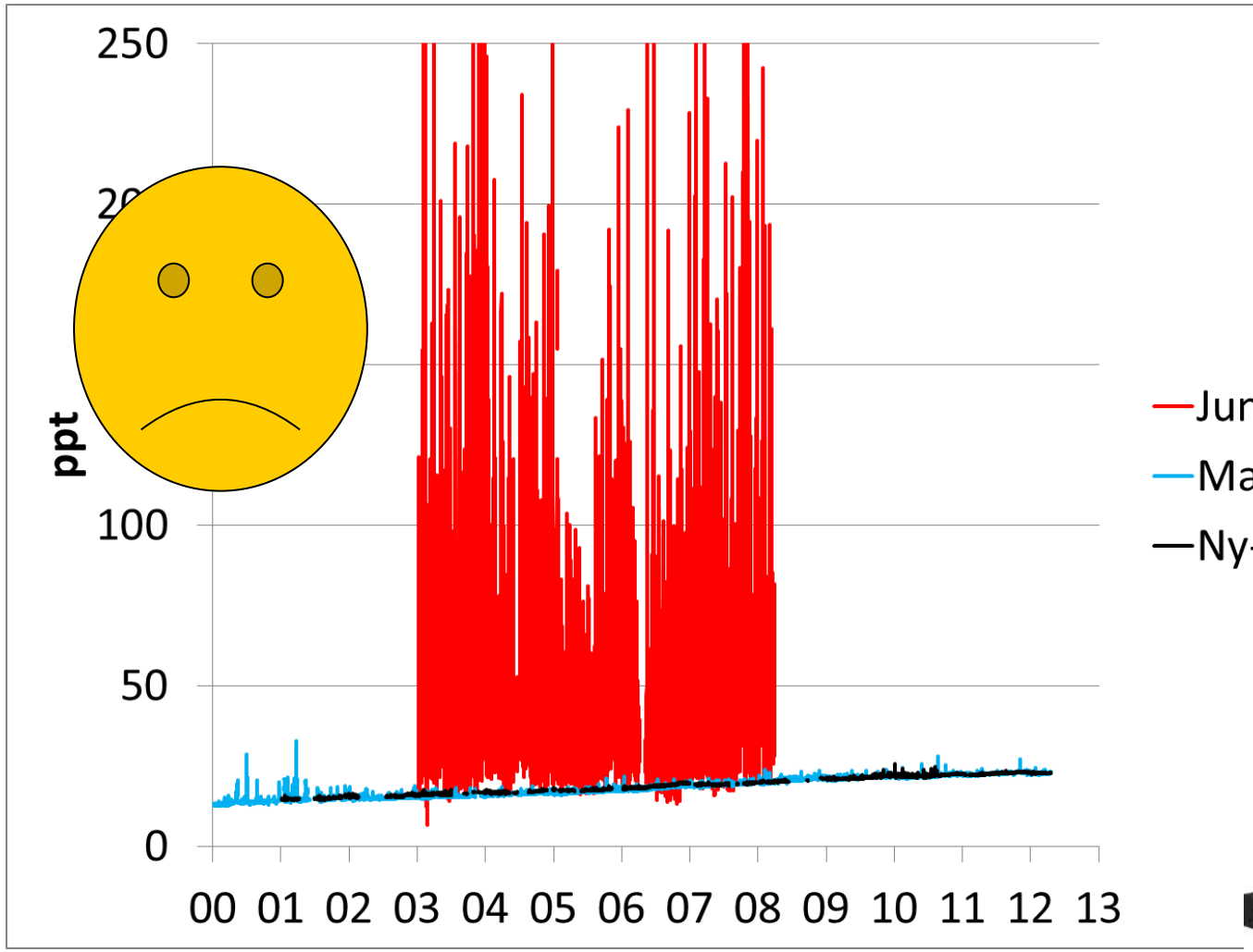


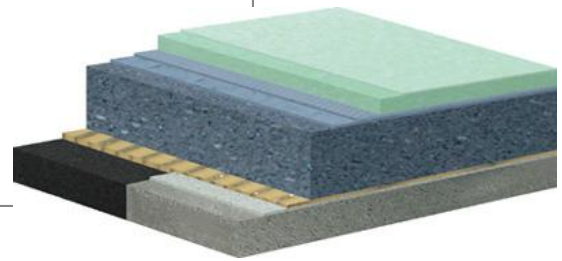
@VOC@: ATmospheric VOC Assessment Tool

Example: Toluene jump after break



Quality Assurance – Data control
Example: HCFC-142b at Jungfraujoch, Switzerland





Quality Assurance – Data control
Example: HCFC-142b at Jungfraujoch, Switzerland

relocation of the inlet: August 2012

Quality Assurance – Data control
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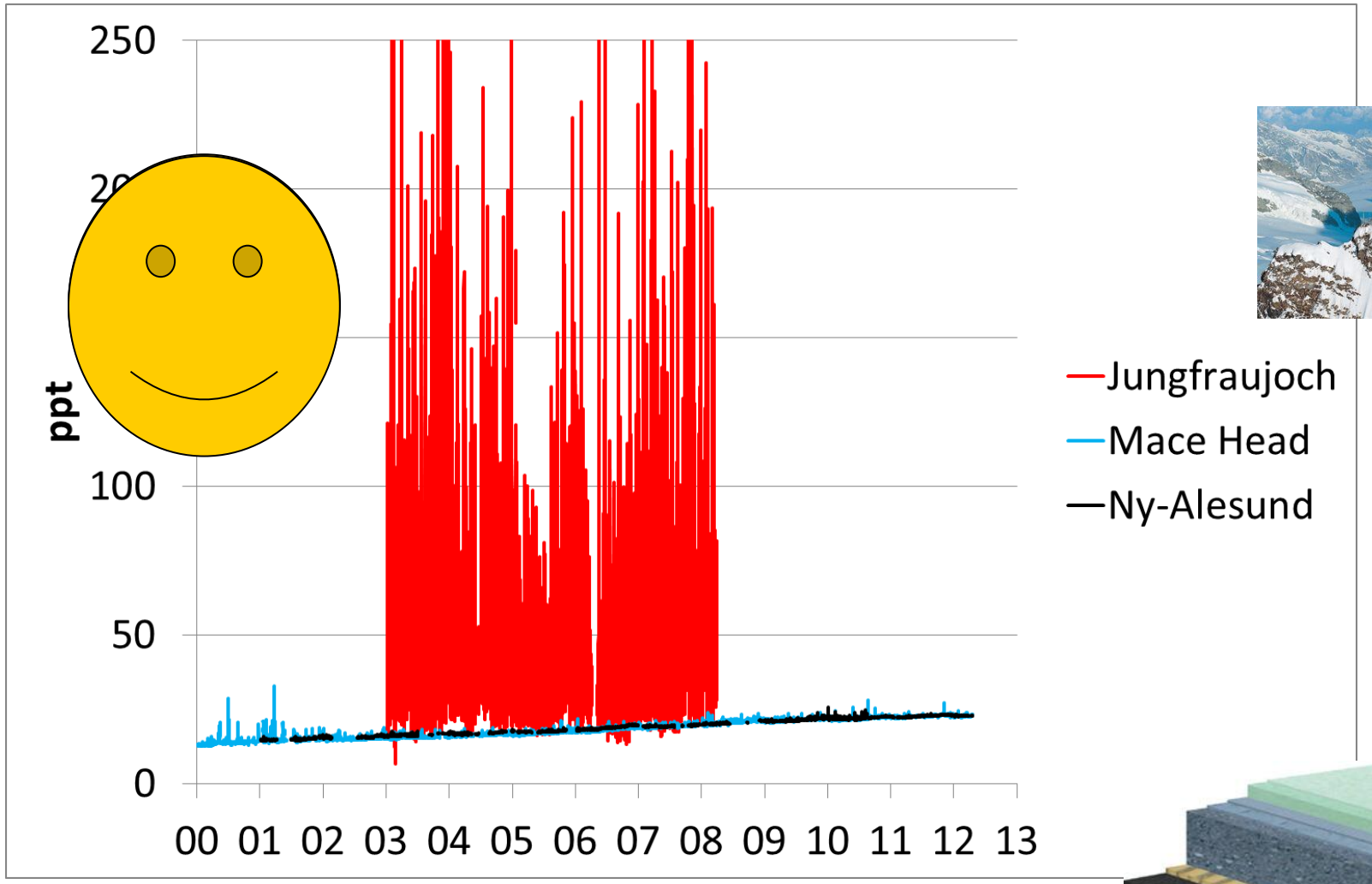
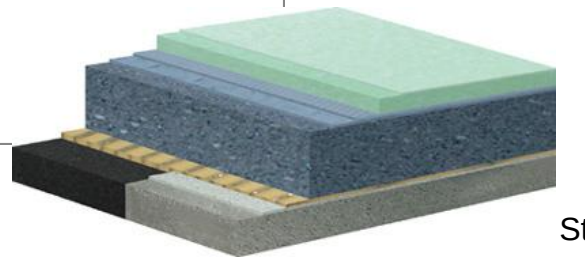
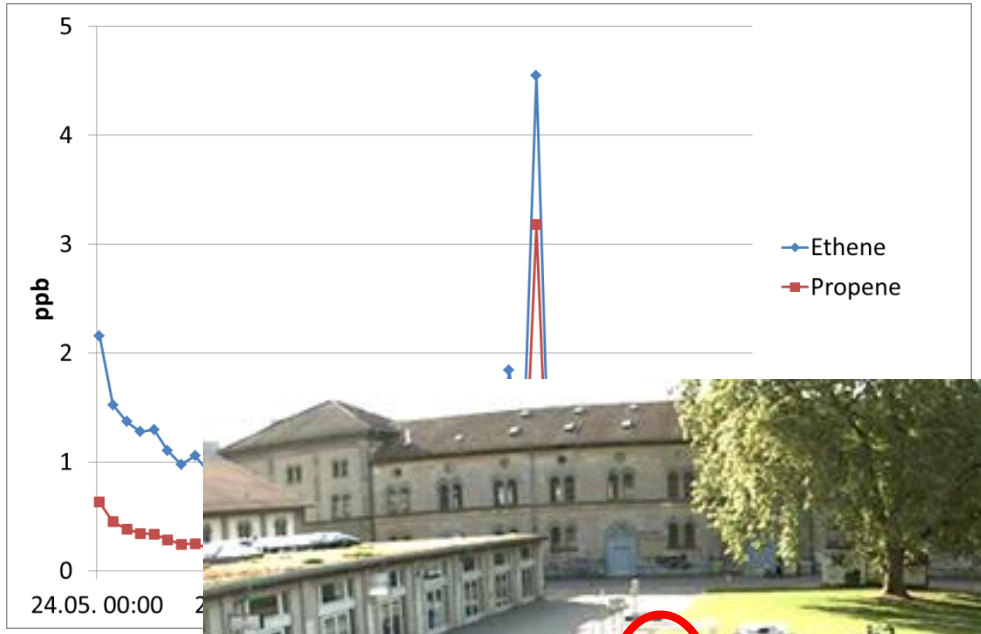
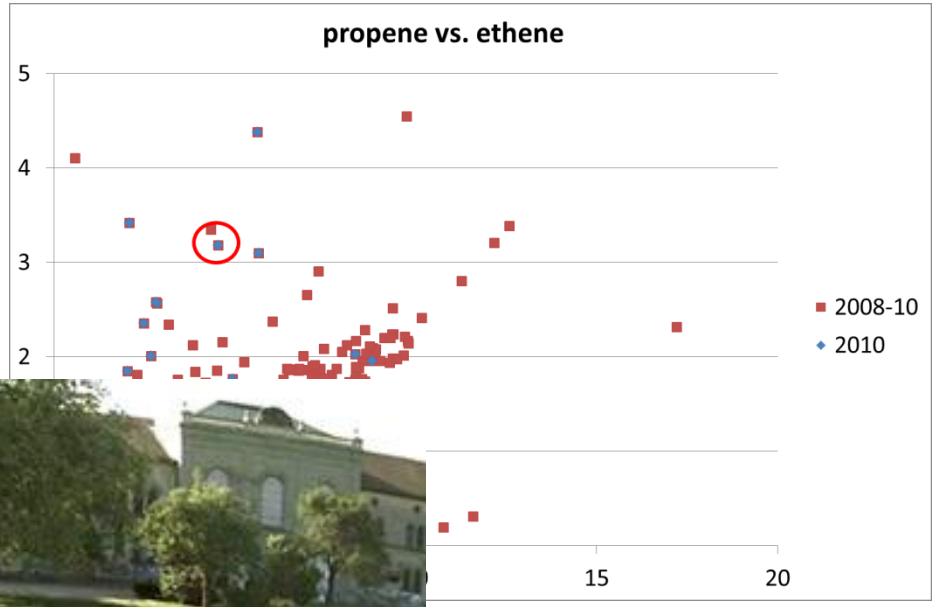




Example VOCs at Zürich, Switzerland
usage of webcam





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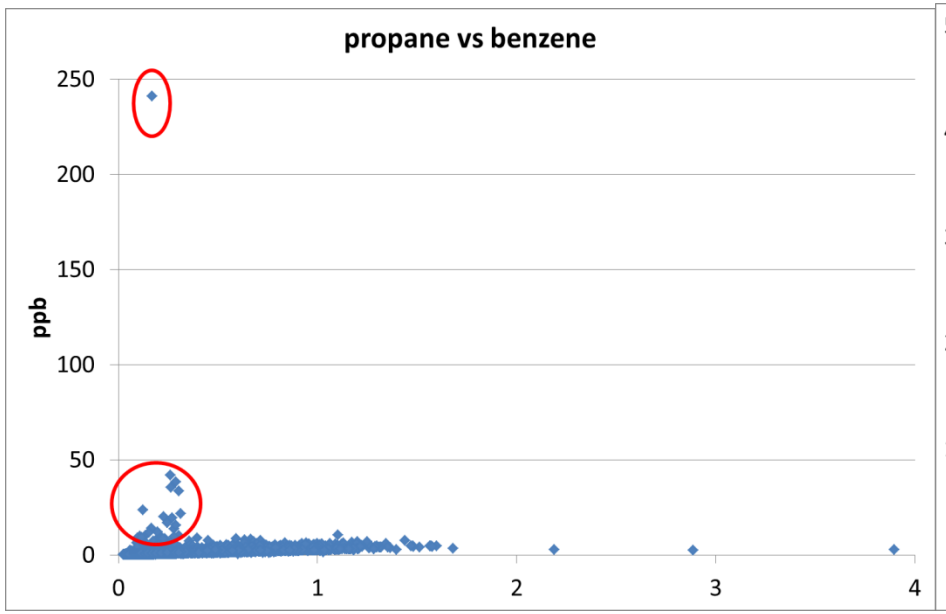
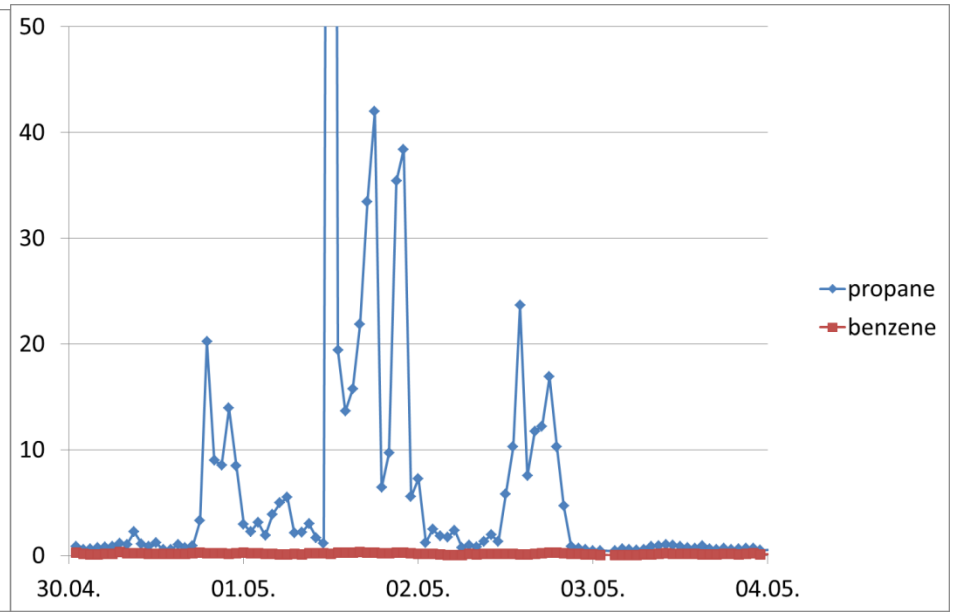
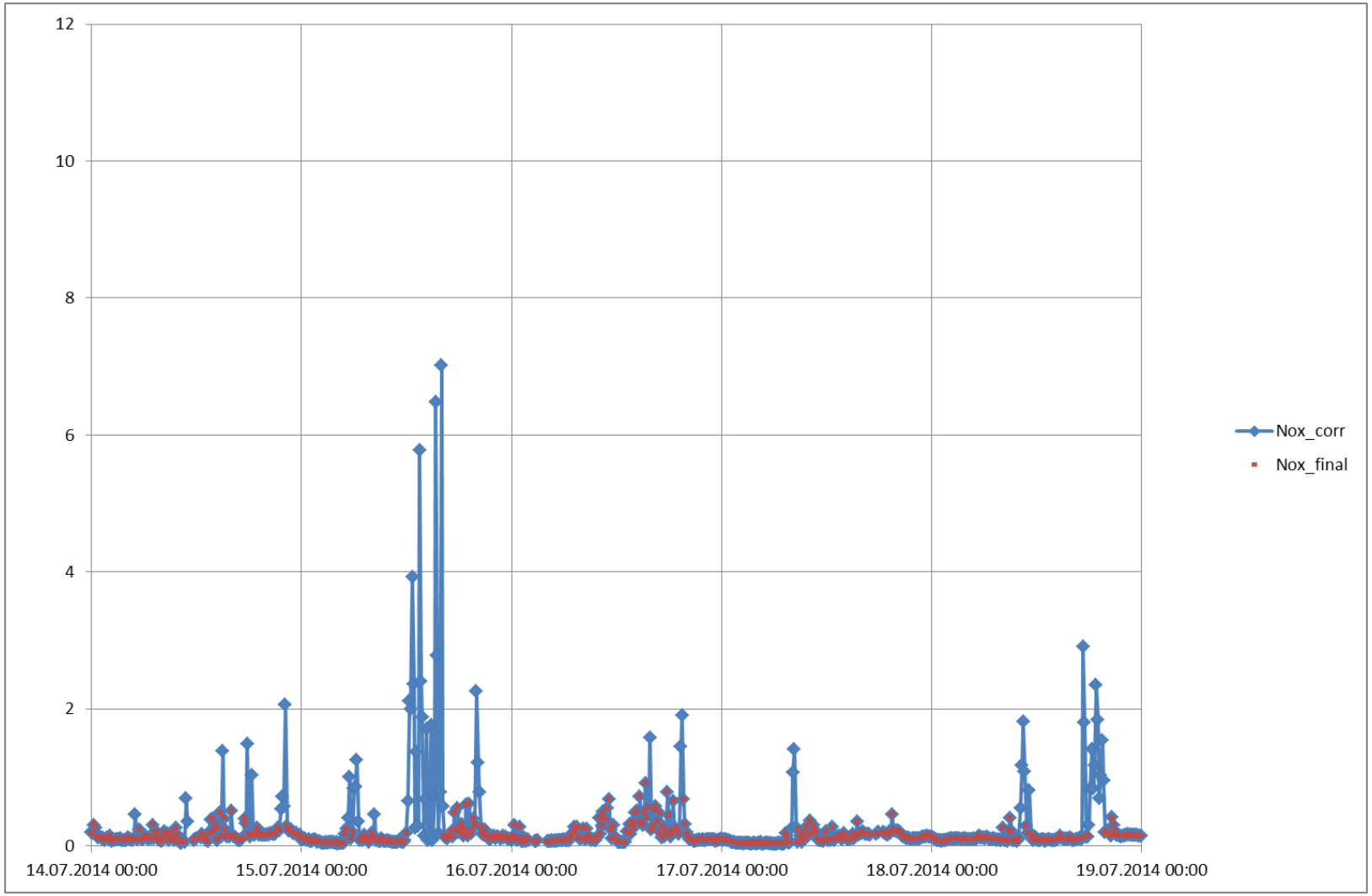




Example: Peaks of NO_2 auf dem Jungfraujoch



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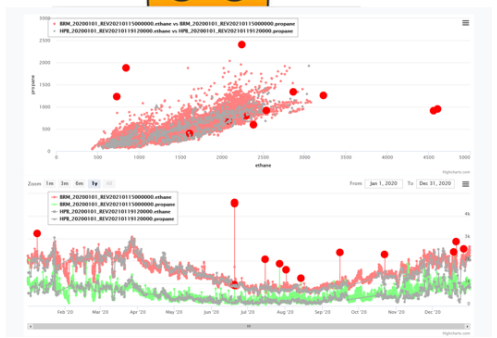

End-users/modellers