



Single Instrument Solution for Air Quality and Greenhouse Gas
Monitoring in Cities

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QC-Laser Spectrometer for Monitoring of GHGs and Air Pollutants



Highlights

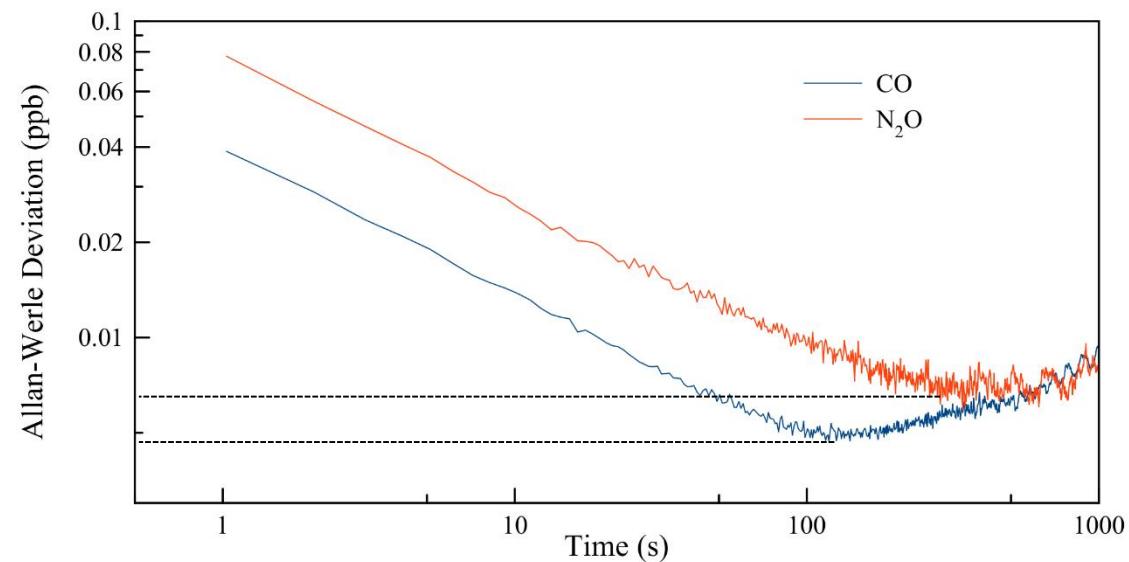
- Measures up to ten gases simultaneously
- Direct measurement of all components (incl. NO₂)
- High precision for trace gas monitoring
- High time resolution for mobile applications (<1s)
- No sample pretreatment
- Gases measured: CO, NO, NO₂, O₃, NH₃, CO₂, N₂O, H₂O, CH₄, SO₂

Specification and Performance

Precisions determined by Allan-Werle Variance

Gas	LOD (1σ) @ 1s and ~200s	Range, ppm
CO	0.05 ppb 0.01 ppb	0 – 20
NO	0.3 ppb 0.05 ppb	0 – 100
NO ₂	0.05 ppb 0.01 ppb	0 – 40
O ₃	0.7 ppb 0.1 ppb	0 – 300
NH ₃	0.07 ppb 0.01 ppb	0 – 15
CO ₂	500 ppb 80 ppb	0 – 8000
N ₂ O	0.1 ppb 0.01 ppb	0 – 20
H ₂ O	15 ppm 2 ppm	0 – 15%
CH ₄	0.7 ppb 0.1 ppb	0 – 200
SO ₂	3 ppb 0.5 ppb	0 – 150

Example of Allan-Plot



Mobile measurements of air pollutants and GHGs in cities

Mobile measurements in collaboration with Canton of Zurich (AWEL)* from 4/29-5/5/2020

- MIRO 10-gas Analyzer placed in electric mini-van
- Analyzer powered by 3kAh battery (sufficient for >10h)
- Coupled with GPS antenna and particle counter*

*We thank Jörg Sintermann and Michael Götsch (AWEL/Canton of Zurich) for performing the measurements and providing the vehicle

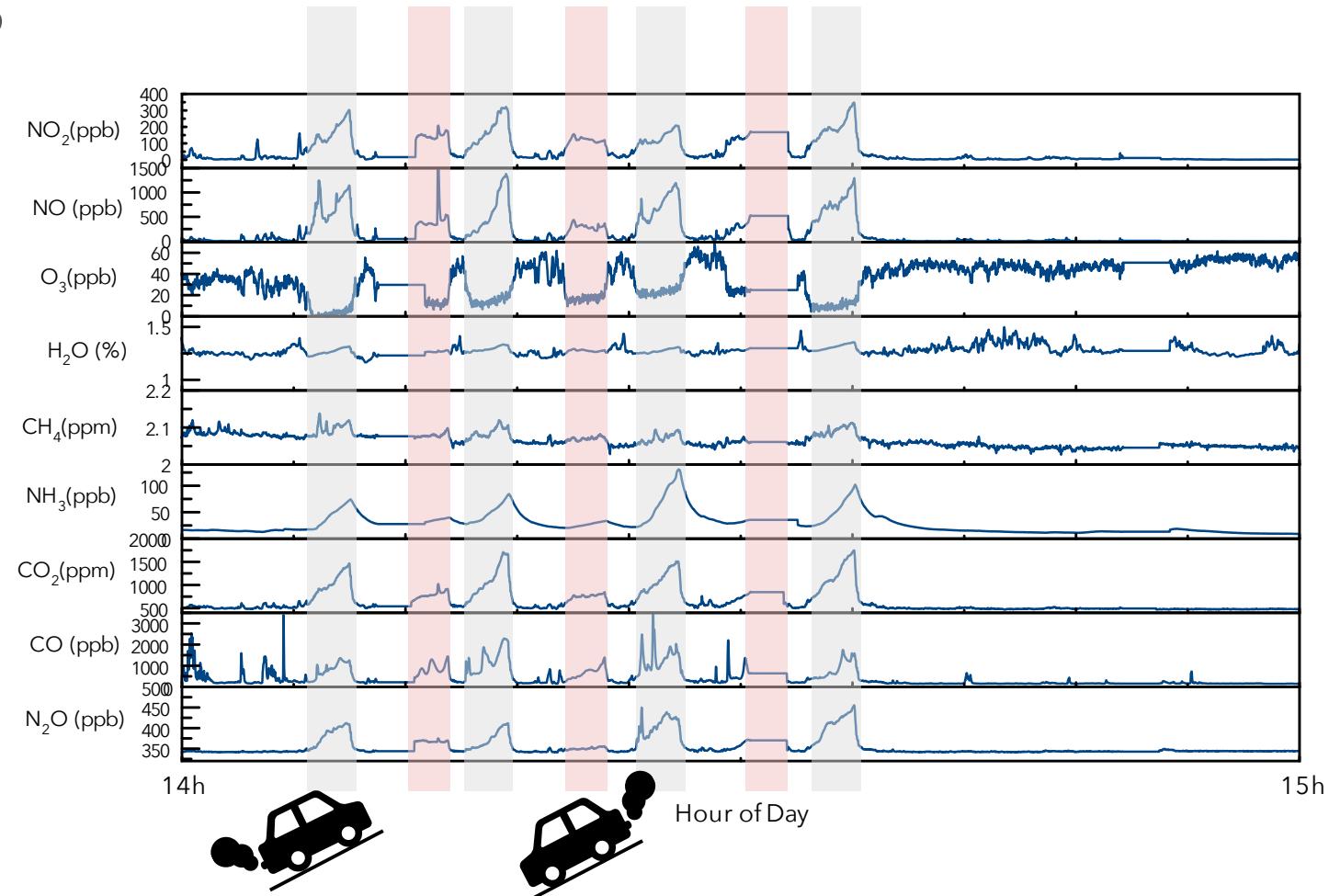


Mobile measurements of air pollutants and GHGs in cities



Tunnel-Passage (Gubrist Tunnel, Zürich)

- Measurement vehicle passed tunnel 7 times
- East-West passage is 70m uphill -> Vehicles under constant load (grey)
- West-East passage downhill (pink)

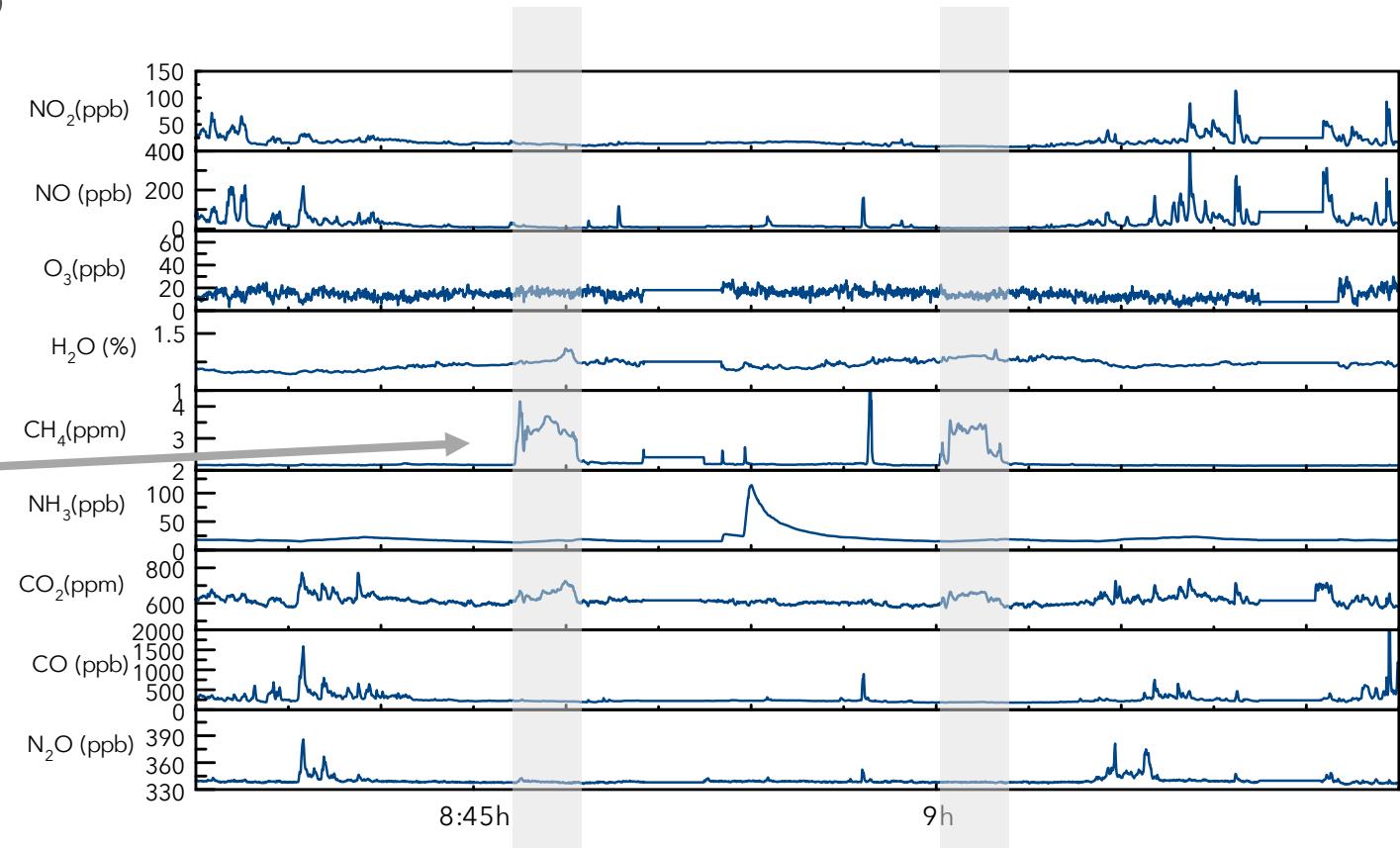


Mobile measurements of air pollutants and GHGs in cities



Lower pollution situation

- Outside Zürich
- Passing by a biomass yard (grey)



Outlook

Currently the research center Jülich is running a campaign using a MIRO Analyzer on a Zeppelin above Western Germany.

More information under:

<https://www.fz-juelich.de/portal/DE/Presse/Pressemitteilungen/2020/2020-04-28-zeppelin-corona/node.html>

Or Twitter:

@FZJuelich

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HIGH-PRECISION, MULTICOMPOND GAS ANALYZERS

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