REMOTE SENSING OF AEROSOLS AND TRACE GASES ON A MOBILE TRAILER

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RUISDAEL OBSERVATORY: MAPPING THE DUTCH SKY

Improve emission estimates of pollutants like CO₂ from cities

Satellite mission for measuring CO₂ from cities in preparation

- Possible interference with Aerosols, which are also emitted from cities
- → Measure CO₂ and aerosol column properties side-by-side to characterize potential correlations and reduce measurement biases
- → Have ground-based measurements corresponding to the satellite observations



Trailer as mobile measurement station

Column measurements of Aerosols and trace gases



Fixed measurement stations for the Ruisdael observatory

 Sun

 Photometer

 FTIR Spectrometer

 Use

 for

Use differential column data for analysing emissions



EM27 FTIR SPECTROMETER





Gisi (2012)



SUN TRACKER



Camera and Software track the reflection of sunlight around a pinhole in front of the detector



The software can also track a partially obscured sun disk







SOLAR SPECTRUM AND RETRIEVAL



Vertical profiles and meteorological data as input

Normalize by O₂ measurement to get columnar concentrations



HOUSING FOR WEATHER PROTECTION



TEST MEASUREMENTS

Kettle experiment for evaluating effect of air conditioning

Simulate the air condition exhaust with a boiling kettle in front of the instrument



Effect on water vapour and CO_2 column negligible



CIMEL SUN PHOTOMETER

Measure direct and diffuse solar radiation in 9 channels

Widely used in AERONET





TEST MEASUREMENTS ON THE ROOF





CIMEL measurements from the rooftop



SAHARAN DUST CASE



Saharan Dust passing on March 3rd

high Aerosol Optical Depth and low Ångström Exponent point to high concentrations of large particles

SAHARAN DUST CASE: AOD AND CO₂



AOD and CO₂ have only little correlation

AOD seems to have an influence on the retrieved XCO₂







Successful test measurements

- Air conditioning on trailer no major problem
- Saharan dust case looks promising for our future measurements

Looking forward to "real world" measurements



Thank You!

Questions?

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HISTORY OF AIR









