Caeli Raman lidar observations in Cabauw during TROLIX'19 and COVID-19 campaigns

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EARLINET/ACTRIS analysis of aerosol profiles during the COVID-19 lock-down and relaxation period



Location Athens Barcelona Belsk **Bucharest** Cabauw **Clermont-Ferrand** Evora Granada Kuopio Lecce Leipzig Lille Limassol Hohenpeissenberg Palaiseau Potenza **Roma-Tor Vergata** Thessaloniki Warsaw Antikythera Belgrade

| April 2020 | | | | | | | | | | |
|------------|---------|---------|---------|-----|---------|---------|--|--|--|--|
| Sun | Mon | Tue | Wed | Thu | Fri | Sat | | | | |
| | | | 1 | 2 | 3 | 4 | | | | |
| 5 | 6 | 7 | 8 | 9 | 10 □ | 11 | | | | |
| 12 _ | 13 □ | 14 □ | 15 | 16 | 17 | 18 □ | | | | |
| 19 | 20 | 21 □ | 22 □ | 23 | 24 | 25 | | | | |
| 26 | 27 | 28 | 29 | 30 | | | | | | |
| May 2020 | | | | | | | | | | |
| Sun | Mon | Tue | Wed | Thu | Fri | Sat | | | | |
| | | | | | 1 | 2 □ | | | | |

| Way 2020 | | | | | | | | | | |
|----------|--------|---------|---------|---------|---------|-----------|--|--|--|--|
| Sun | Mon | Tue | Wed | Thu | Fri | Sat | | | | |
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| 3 | 4 | 5 | 6 | 7 | 8 | 9 | | | | |
| 10 | 11 | 12 □ | 13 □ | 14 □ | 15 | 16 | | | | |
| 17 | 18 | 19 | 20 | 21 | 22 □ | 23 | | | | |
| 24 □ | 25 | 26 | 27 | 28 | 29 | 30 □ | | | | |
| 31 | | | | | | | | | | |

https://www.earlinet.org/index.php?id=covid-19



Netherlands Space

- Spatial information
- MAXDOAS and Pandora network Mobile DOAS
- Airborne mapping
- Vertical profiling
- NO2 sonde
- Tropospheric ozone lidar
- Stratospheric ozone lidar
- · Water Vapour, Aerosol and Cloud lidar
- In-situ observations
 - Chemical composition
 - Aerosols

Stratospheric **Ozone DIAL**

Tropospheric **Ozone DIAL** Raman Lidar

Ceilometer

OAS/PANDORA MAX

Poster sessions - round 2 (15:00 - 15:30) Arnoud Apituley | The Role of Cabauw in Ruisdael Observatory

CÆLI: $3\beta + 2\alpha + 1\delta + H_2O$







Vertical Profile Overview



Vertical Profile Overview – Interesting Cases



Aerosol Optical Properties





Xinya Liu | Modelling of Aerosol optical profiles based on ground sampling and comparison with Caeli Multi-Wavelength Raman Lidar

-> influence of humidity profile is important to understand properties



Water Vapor Mixing Ratio







- Lidar profile are calibrated to nearby sonde
- Tower in-situ measurements can be used to check and track calibration – high accuracy

Water Vapor Mixing Ratio – Statistical errors



Water Vapor Mixing Ratio – High Resolution Field



Conclusions and Outlook

- Caeli provides high temporal and spatial resolution vertical profile aerosol and humidity.
- Boundary layer profiles can be measured day and night
- Full tropospheric coverage at night (nautical twilight and darker)
- Ongoing aerosol analysis
 - application in study for aerosol property modeling
 - COVID-19 campaign.
- Data availability
 - Quality controlled Aerosol profile data available through ACTRIS (<u>www.actris.eu</u>)
 - Quality controlled Water vapor profile data will be made available through GRUAN (www.gruan.org)
 - Tailored data, e.g. time resolution, cloud filtering, upon request

