



LAES

Laboratory of **A**tmospheric and **E**nvironmental **S**ciences

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Professor of Environmental Physics

Institute of Physics, University of Tartu

University of Tartu:

14000 students and 3500 staff members

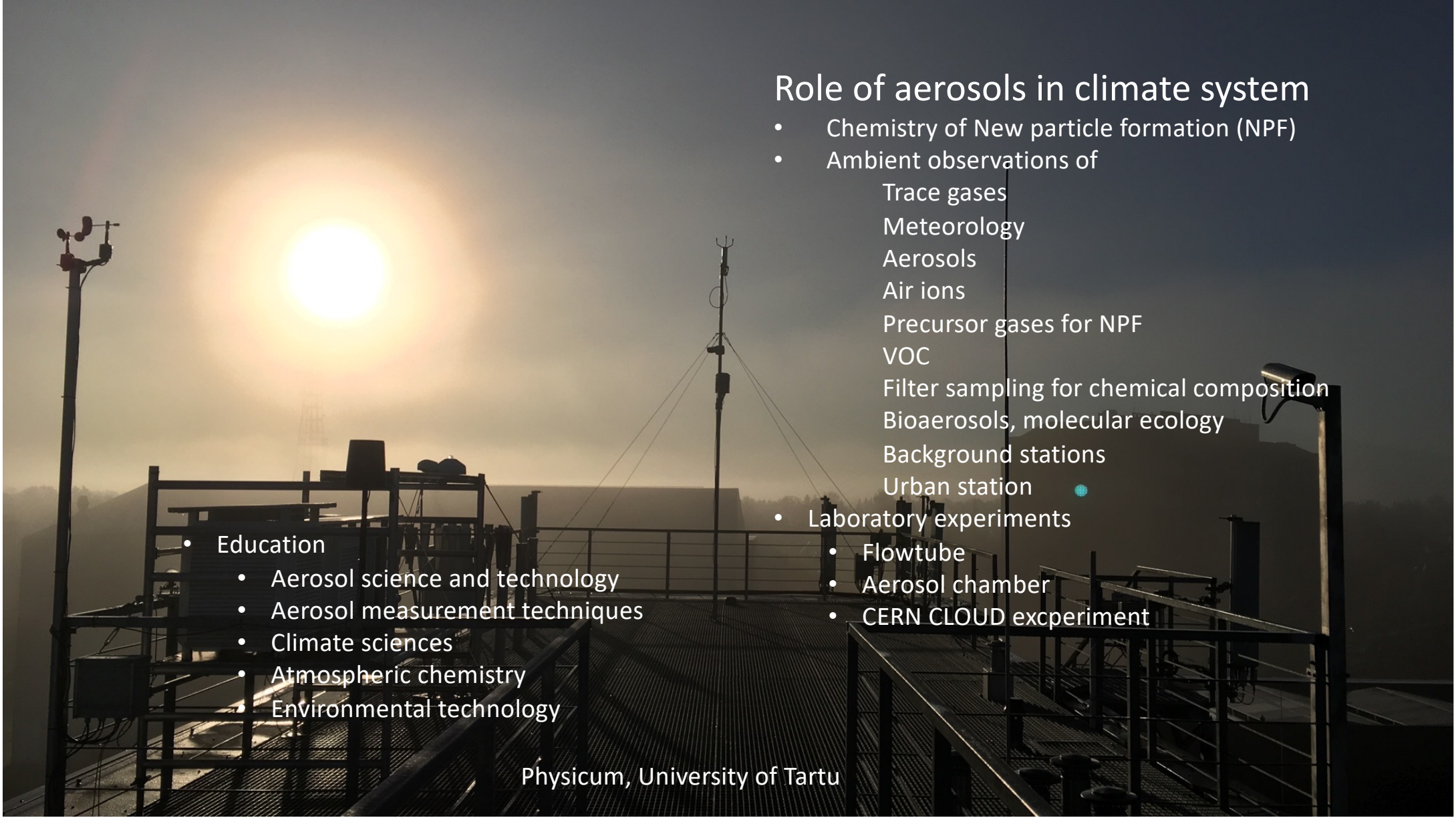
>50% publications in Estonia from UT

4 Faculties, 32 institutes

Institute of Physics:

200 scientists, 15 laboratories





Role of aerosols in climate system

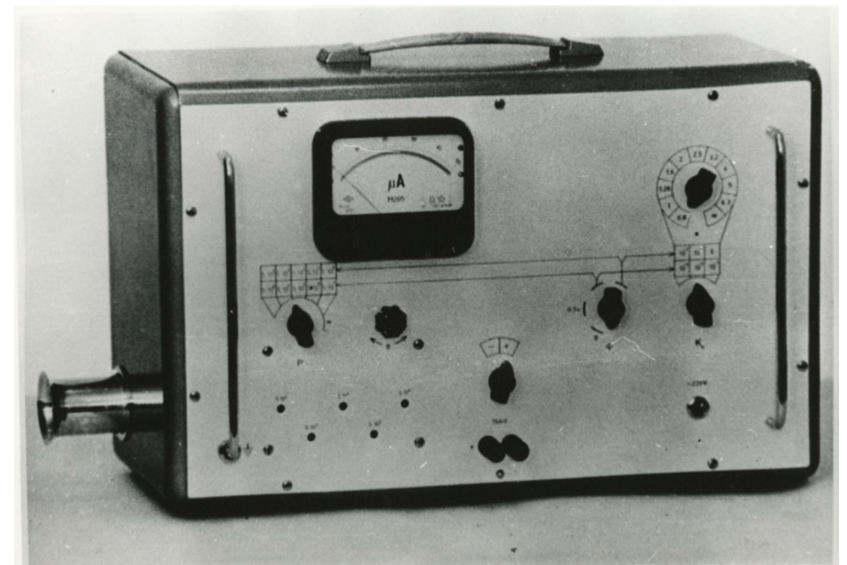
- Chemistry of New particle formation (NPF)
- Ambient observations of
 - Trace gases
 - Meteorology
 - Aerosols
 - Air ions
 - Precursor gases for NPF
 - VOC
 - Filter sampling for chemical composition
 - Bioaerosols, molecular ecology
 - Background stations
 - Urban station
- Laboratory experiments
 - Flowtube
 - Aerosol chamber
 - CERN CLOUD experiment

- Education
 - Aerosol science and technology
 - Aerosol measurement techniques
 - Climate sciences
 - Atmospheric chemistry
 - Environmental technology

Physicum, University of Tartu

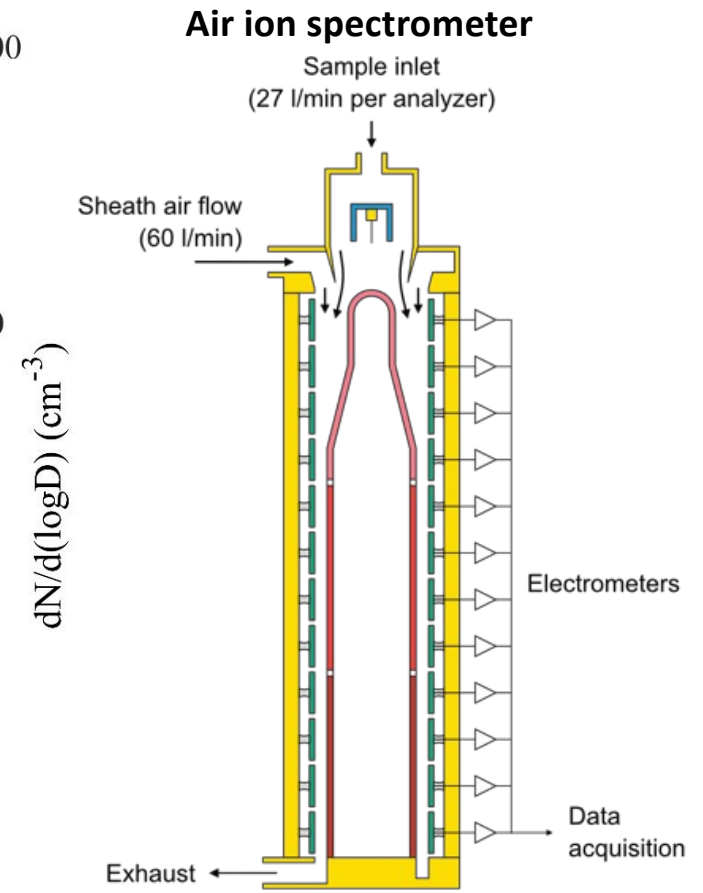
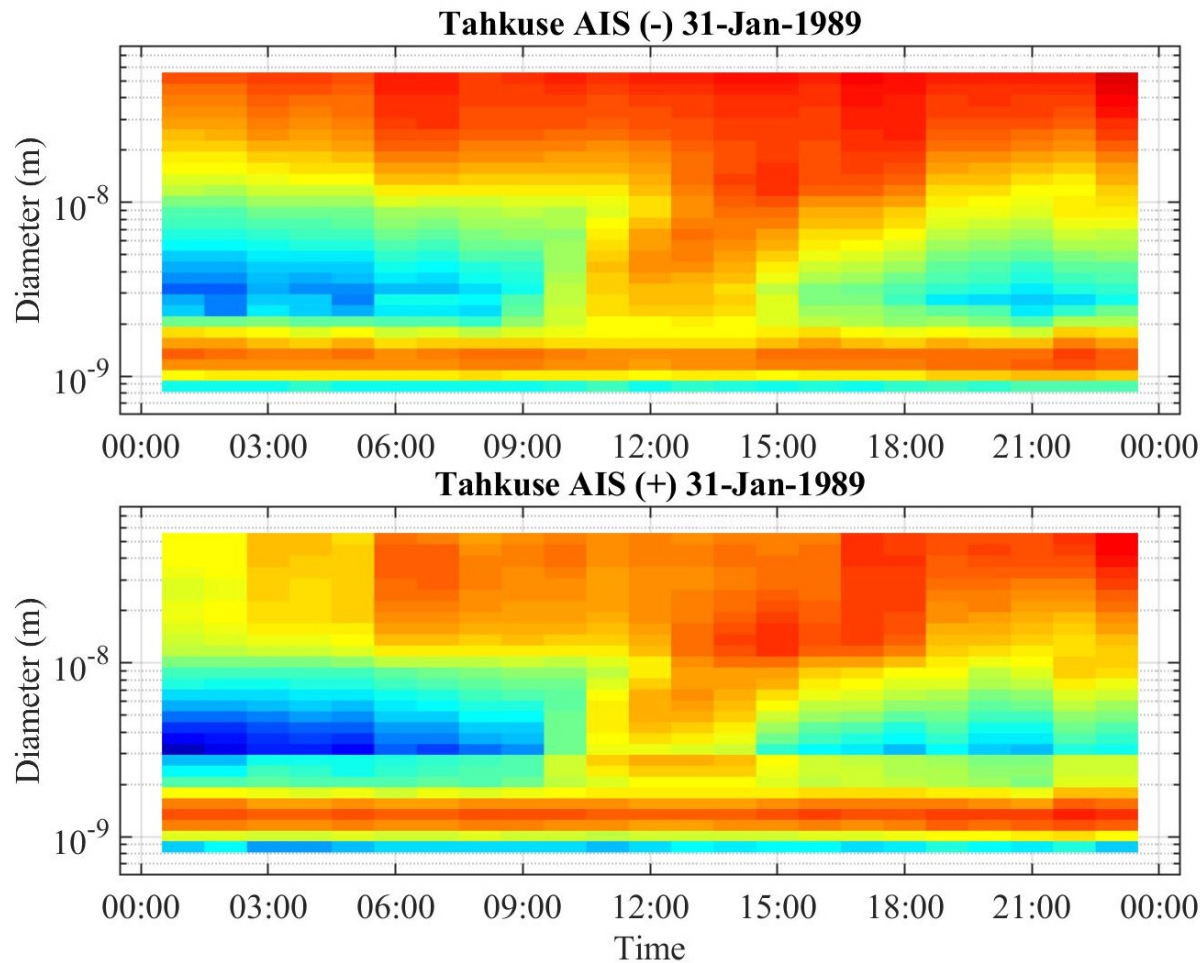
Aerosol science in Estonia is almost 100 years old

- 1930 Prof. **Johan Vilip** first Gerdien counter to Tartu (ion counter)
- 1937 full year long measurements of air ions, master student **Anatoli Mitt**.
- 1950 **Jaan Reinet** starts building air ion instruments
- 1963 **Jaan Salm** First portable ion counter
- 1972 First multichannel ion spectrometer **H. Tammet**
- 1988 starting continues air ion measurements at Tahkuse station
- 2022 first time of flight mass spectrometer, 2023 IMS-MS instrument
- **2024 LAES – Laboratory of Atmospheric and Environmental Sciences**



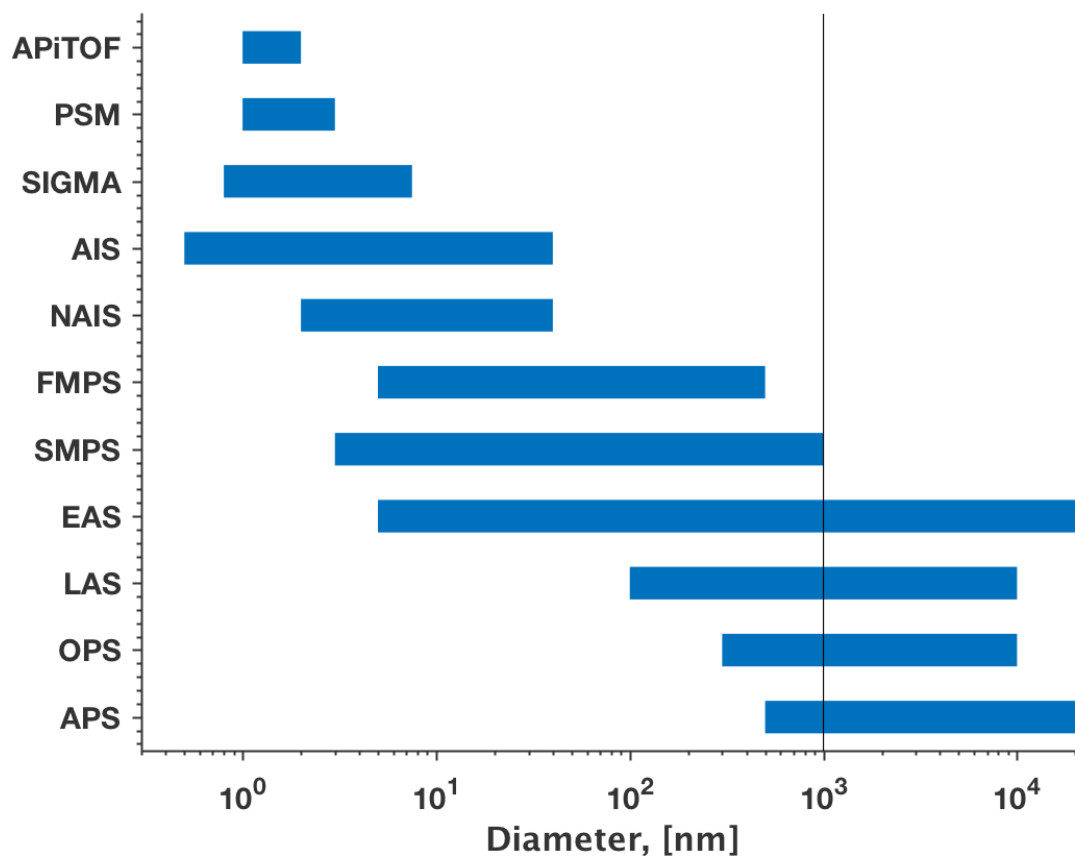
- (<https://www.muis.ee/museaalview/3354491>)

Worlds first full new particle formation event measured in Tahkuse station, Estonia



H. Tammet, E. Tamm,
A. Mirme and S. Mirme

Size range of aerosol particles we can measure



Time of flight mass spectrometers

Condensation counters

Mobility analysers

Optical counters

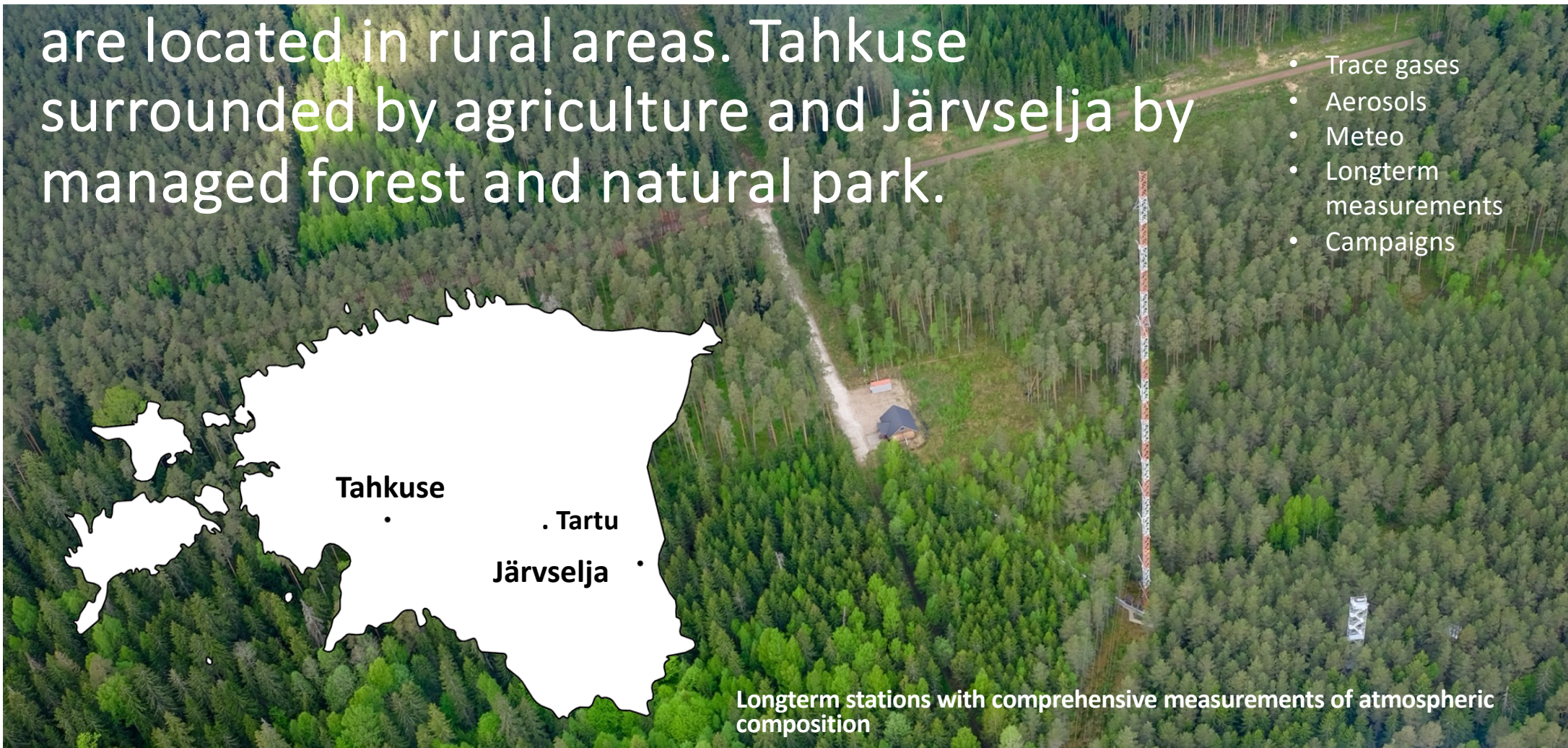
Tahkuse and Järvelja SMEAR stations



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are located in rural areas. Tahkuse surrounded by agriculture and Järvelja by managed forest and natural park.

- Trace gases
- Aerosols
- Meteo
- Longterm measurements
- Campaigns



Longterm stations with comprehensive measurements of atmospheric composition

Tahkuse and Järvelja SMEAR stations



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New wide size range aerosol measurements from 0.5nm to 10 μ m are planned on Vilsandi island



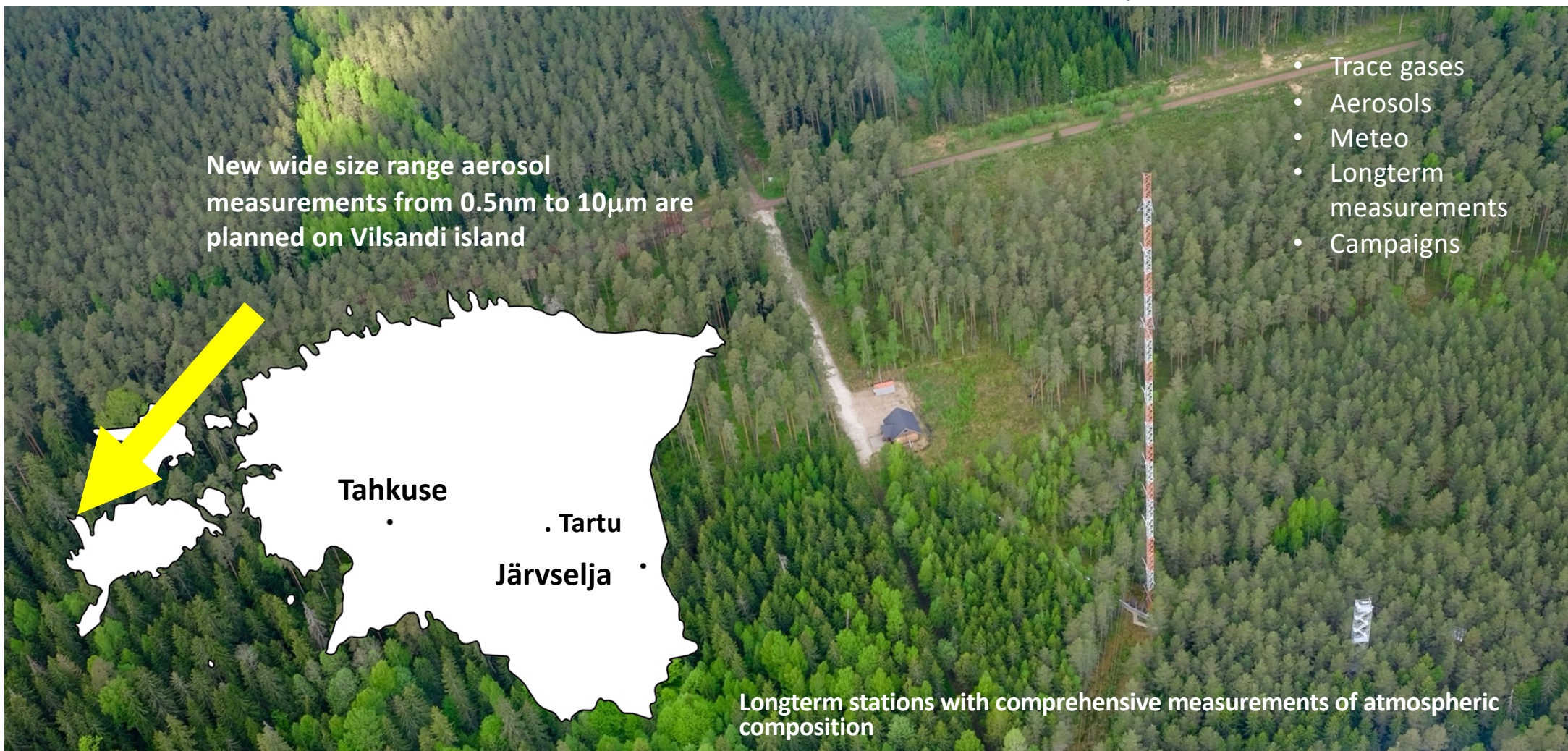
Tahkuse

. Tartu

Järvelja

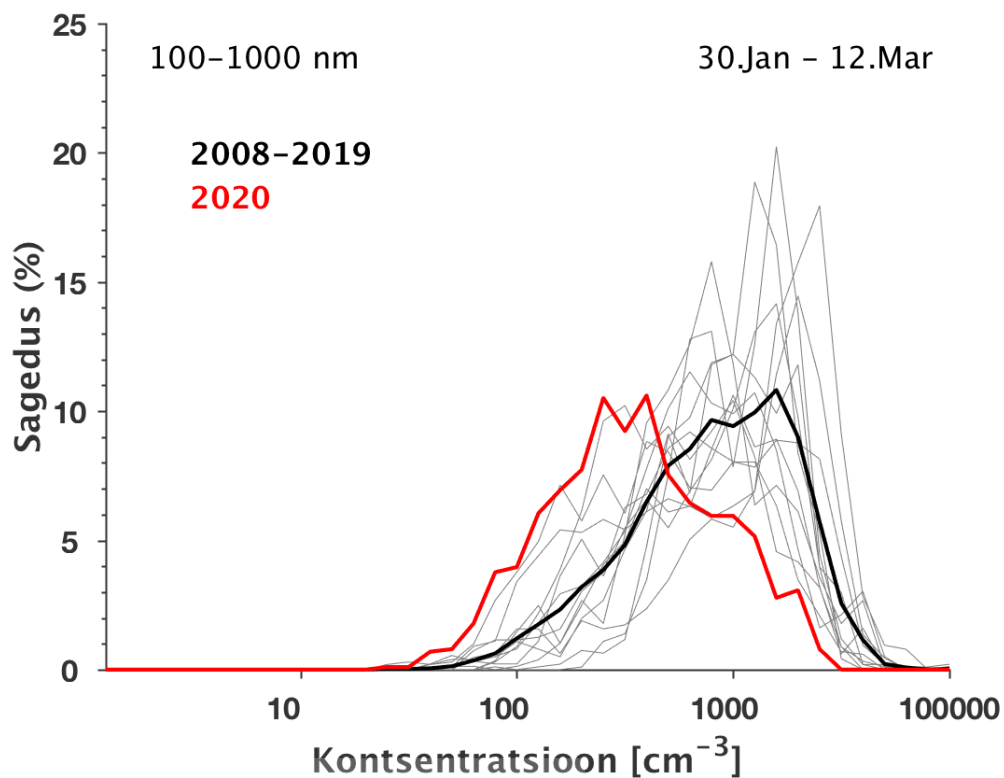
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Longterm stations with comprehensive measurements of atmospheric composition

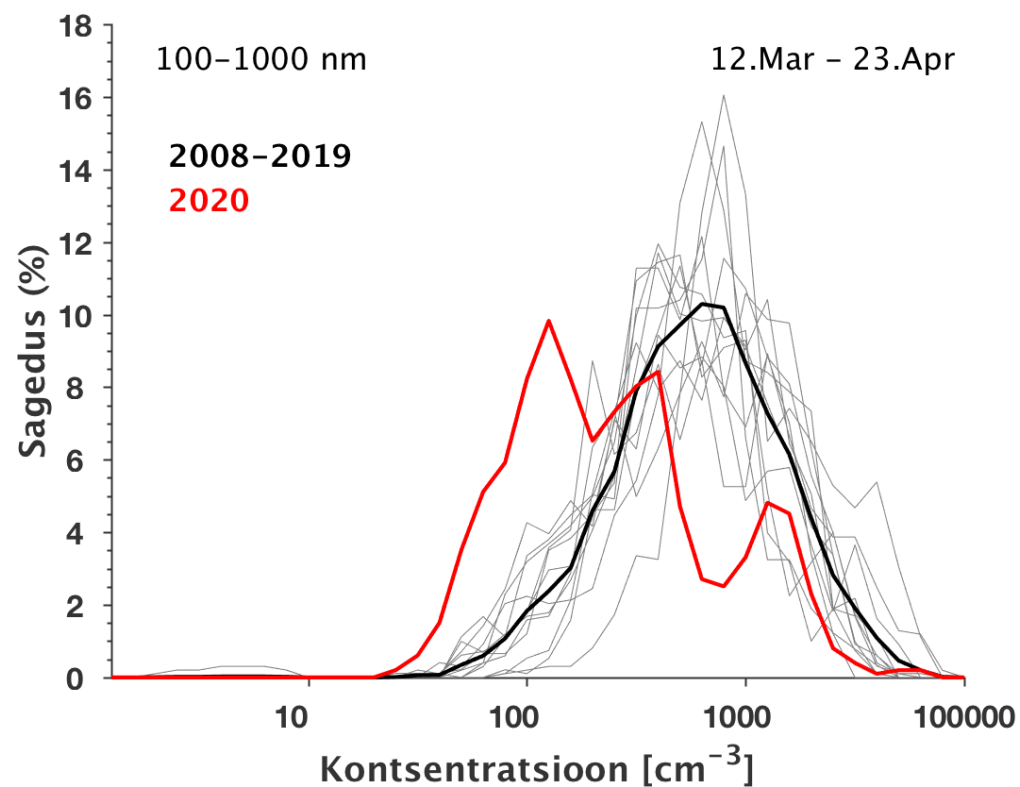


2020 was the cleanest spring in Estonia

Aerosol before lock-down

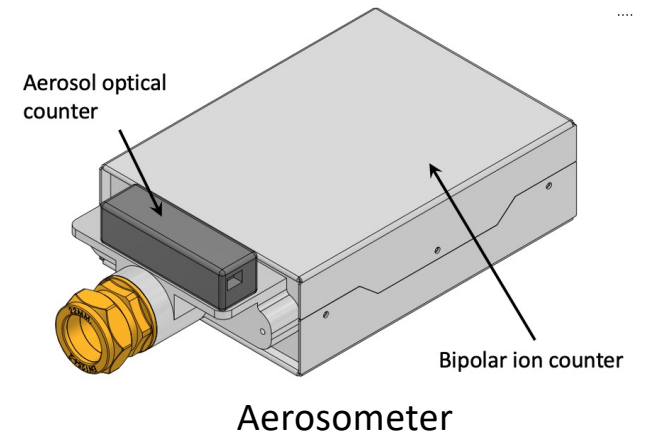
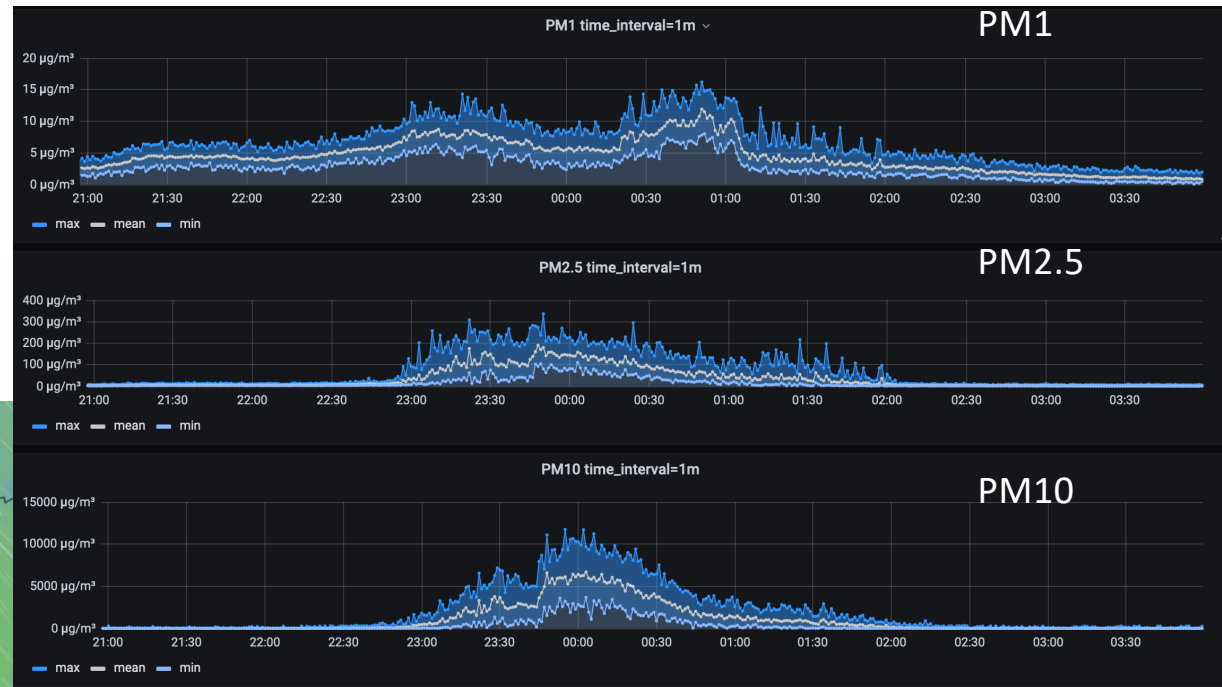
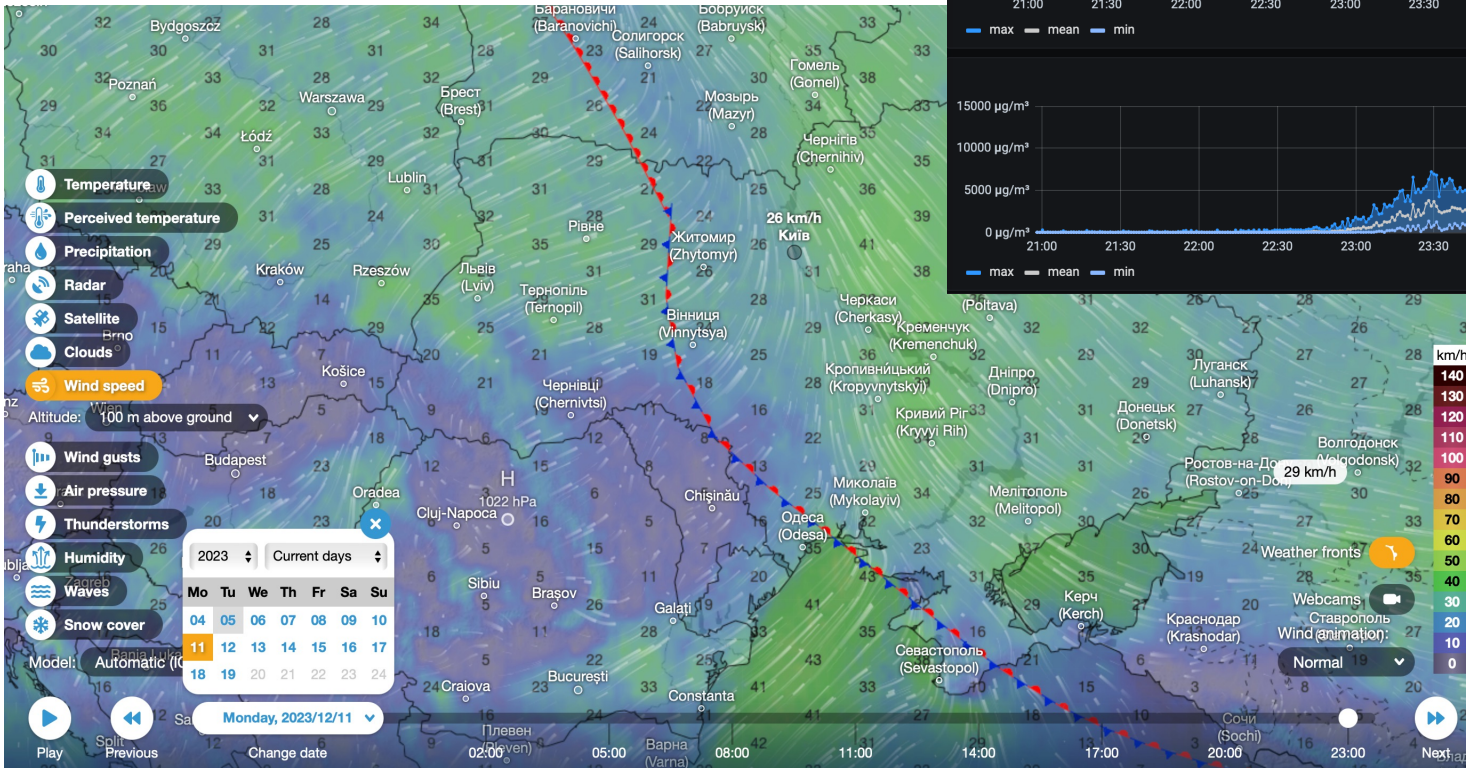


Aerosol during the lock-down

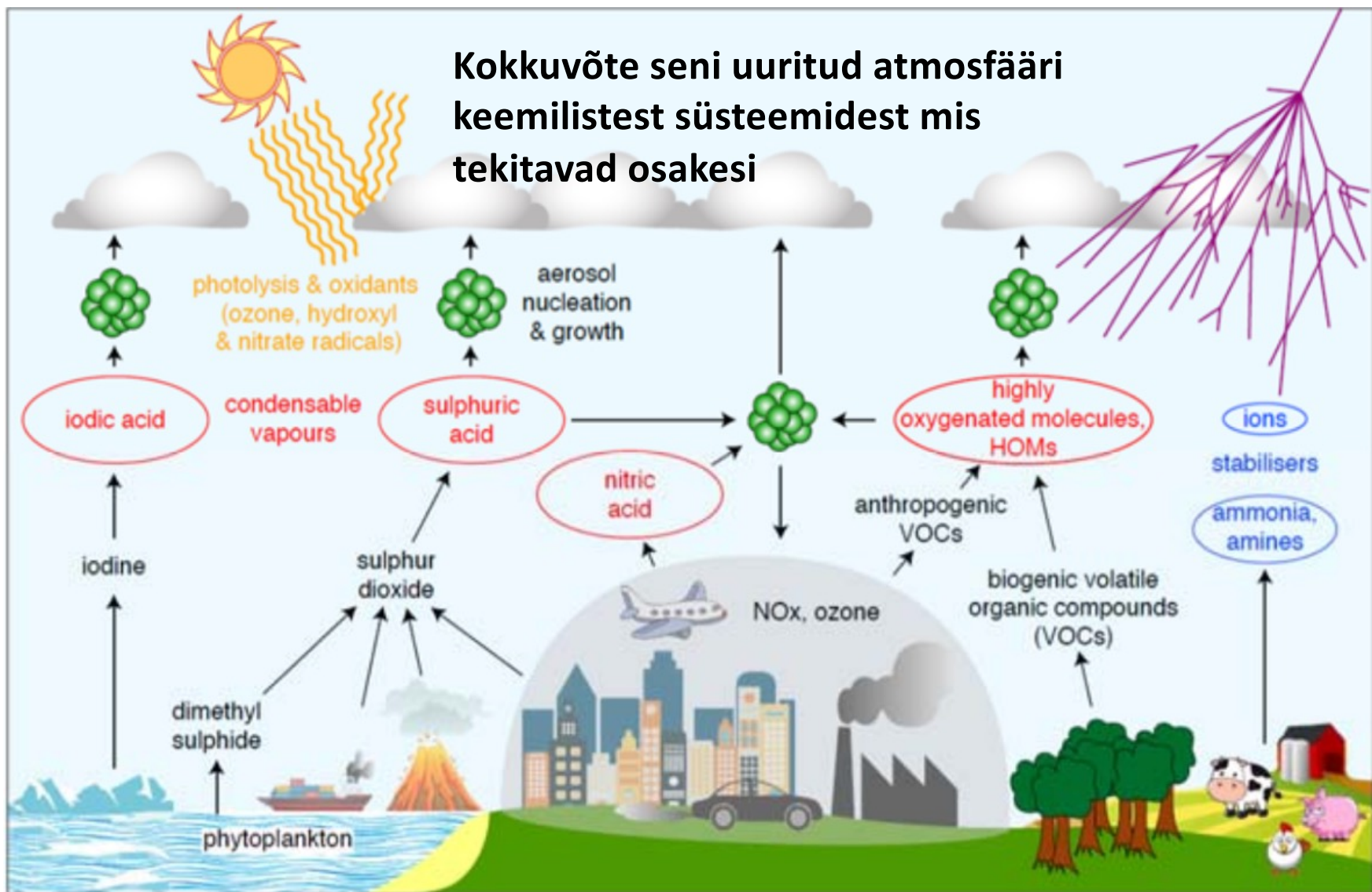


On-going measurements in Kyiv started on September 2023

Many high PM events are associated with air raids downwind Kyiv



Kokkuvõte seni uuritud atmosfääri keemilistest süsteemidest mis tekitavad osakesi

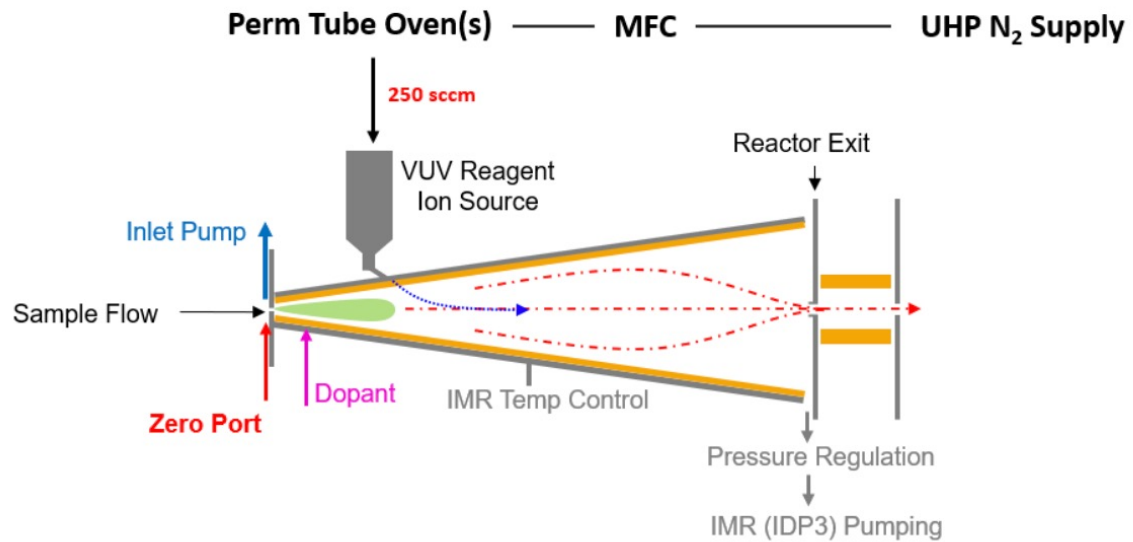


Kirkby et al. (2023) New particle formation in CERN CLOUD experiment. Science

PTR-VOCUS (APi-TOF module) and IMS-VOCUS (AIM + PTR)

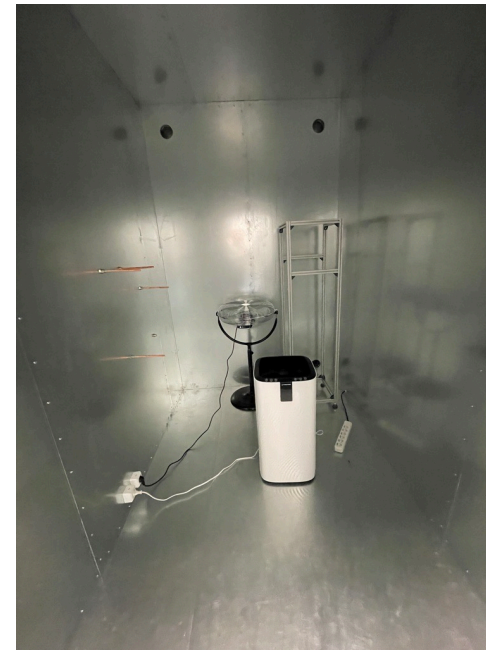
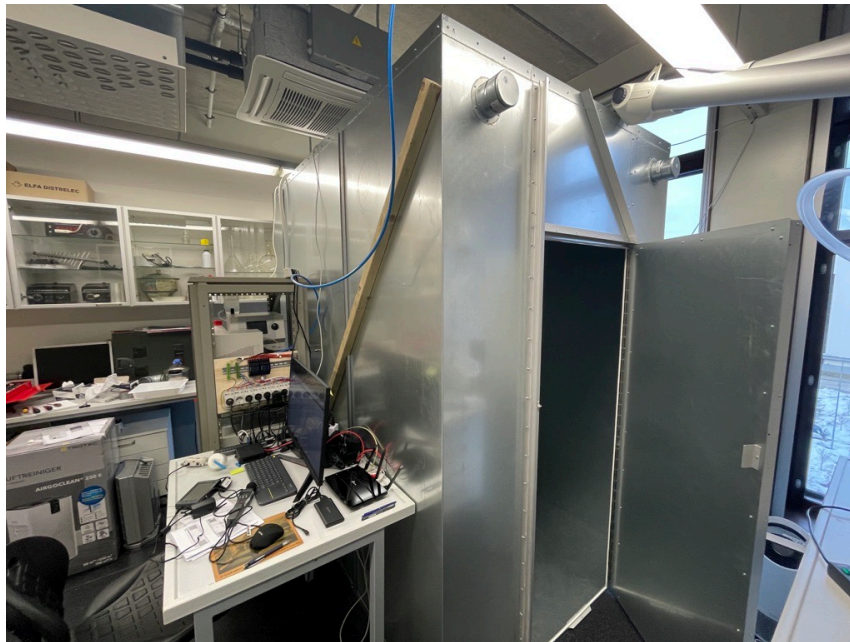
AIM source

Charger ions:
Iodite-
Acetone+
Proton+
Benzene+
Nitrate-



Aerosooli uuringute testkamber

Aerosooliosakeste genereerimine, aerosooliosakeste suurusjaotus, ioonid, osooni kontsentratsioon
õhupuustite testimine, aerosooli sensorite testimine



Lisaks maskide testimisele Atmosfääri- ja keskkonnateaduste laboris uurime:

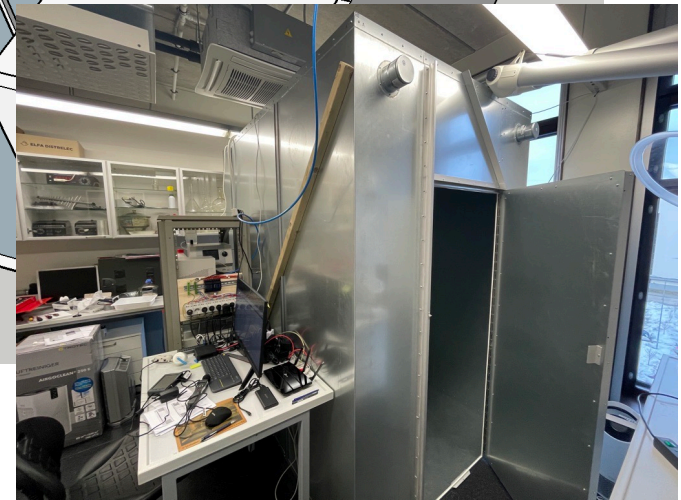
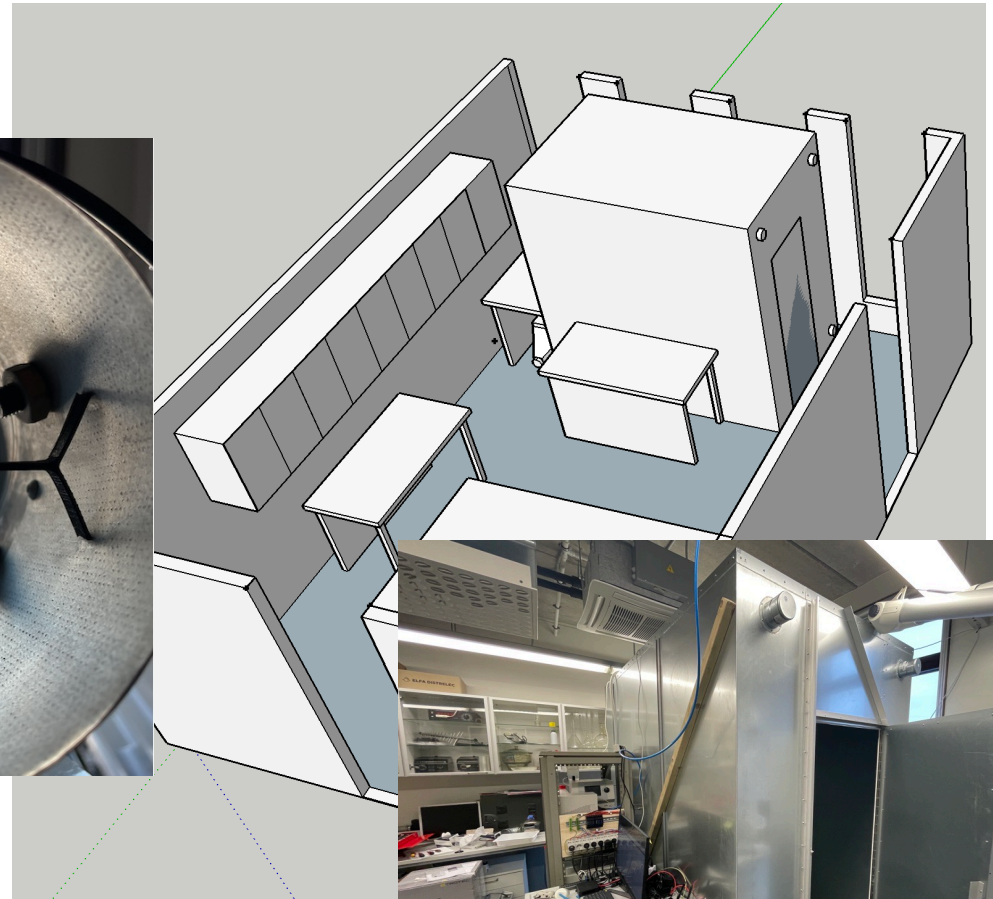
Flowtube for VOC oxidation studies



Air purifiers



Aerosol test chamber for intercomparison and air purifier tests



Thank you for your
attention!



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