

The logo for ACTRIS features the word "ACTRIS" in a white, sans-serif font. The letter "C" is replaced by a white circle. A white vertical line extends upwards from the top of the "C" circle, and a white arc curves over the top of the word "ACTRIS".

# ACTRIS

CiGas-UHEL – condensable vapours &  
direct aerosol precursors

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Condensing vapours and direct aerosol precursors such as sulfuric acid and Highly Oxygenated Molecules (HOM; e.g.  $C_{10}H_{14}O_9$ )

Centre for Reactive Trace Gases in Situ Measurements (CiGas)						
	CiGas-FZJV	CiGas-FZJN	CiGas-IMT	CiGas-UHEL	CiGas-DWD	CiGas-EMPA
Management & coordination	TC lead	Unit lead	Unit lead	Unit lead	Unit lead	Unit lead
Link with associated communities	Expert groups and networks					
Training & consultancy						
Measurement & data procedures & tools	NMHCs OVOCs	NOx	OVOCs	Condensable	NMHCs NOx	NMHCs OVOCs
Measurement & data quality monitoring						
NF labelling & evaluation	Evaluation and audits					
New scientific & technological developments	Methodology, technical and scientific developments for reactive trace gases in-situ variables and measurement techniques					

**VOC oxidation products include also highly oxygenated molecules (HOM) that partition to the aerosol phase and contribute to gas-to-particle conversion with e.g., sulfuric acid**

**Detection of condensable vapours:**  
Direct aerosol precursor measurement systems i.e., CI-API-TOF MS (chemical ionization atmospheric pressure interface time-of-flight mass spectrometer)

## Reactive Trace Gases In Situ National Facility Technical requirements

### ACTRIS PPP D5.1: Documentation on technical concepts and requirements for ACTRIS Observational Platforms:

- Measurements of condensable vapours are not required to fulfill the ACTRIS reactive trace gases in-situ minimum requirements.
- *BUT for the optimum reactive trace gases in-situ setup:*
  - **Measurements of direct aerosol precursors like HOM and sulfuric acid should be performed (e.g., by online techniques, such as CI-API-TOF) when the station also performs aerosol and gas-to-particle conversion studies.**

## CiGas-UHEL – Status

- Unit Implementation is in progress.
- Instruments and human resources available for provision of operation support.
- Finalization of the laboratory space 2023.
- Full operation of the Unit is expected starting from 2025/2026.



## CiGas-UHEL – Main activities

- ❖ **Activity 1. Management and coordination:** contribution to the management of CiGas
- ❖ **Activity 2. Links with associated communities:** Finnish Centre of Excellence VILMA (Virtual laboratory for molecular level atmospheric transformations) collaboration towards more quantitative data on condensable vapors
- ❖ **Activity 3. Training and consultancy:** consultation for condensable vapor measurements (using CIMS); training activities as part of CiGas-UHEL intercomparison workshops, ACTRIS courses etc.
- ❖ **Activity 4. Measurement and data procedures and tools:** development of CI-API-TOF SOP (expected to be ready 2025/2026); CI-API-TOF data format and submission related work in collaboration with ACTRIS DC (*to be initiated in 2023*)
- ❖ **Activity 5. Measurement and data quality monitoring:** [1<sup>st</sup> Intercomparison workshop for chemical ionization mass spectrometers 27<sup>th</sup> Feb – 10<sup>th</sup> March 2023](#); individual instrument calibrations for nitrate CI-API-TOF (at the moment: sulfuric acid calibrations, in the future also calibrations for certain HOMs); data review (starting in 2025/2026)
- ❖ **Activity 6. NF labelling and evaluation:** reviewing the labelling applications for condensables, official audits can be made when the CI-API-TOF SOP exists.
- ❖ **Activity 7. New scientific and technological developments:** method development related to calibrating the CI-API-TOF for highly oxygenated organic molecules (HOMs)

# 1st ACTRIS CiGas-UHEL intercomparison workshop in 2023

- Gathered **10 Chemical Ionization Mass Spectrometers** and **25 researchers** together for two weeks of chamber studies of **condensable vapours**
- Focused on the detection of **sulfuric acid** and different **oxidized organic compounds** (target reactive trace gases of CiGas-UHEL)
- Special focus on the effect of high RH on the detection of target compounds
- Workshop included also data analysis intercomparison exercise and discussions sessions of CIMS SOP
  
- **Organizers:** University of Helsinki (CiGas) in collaboration with OrGanic Tracers and Aerosol Constituents - Calibration Centre (OGTAC-CC, CAIS-ECAC)
- February 27th – March 10th, 2023 at TROPOS, Leipzig, Germany
- Institutes joining: *UHEL, TROPOS, Jülich (Saphir), Cyprus Institute, Tampere University, Goethe-University Frankfurt, CEAM (Euphore)*
- Participation from instrument manufacturers: *TofWerk (CH), Karsa (FI), Aerodyne (US)*



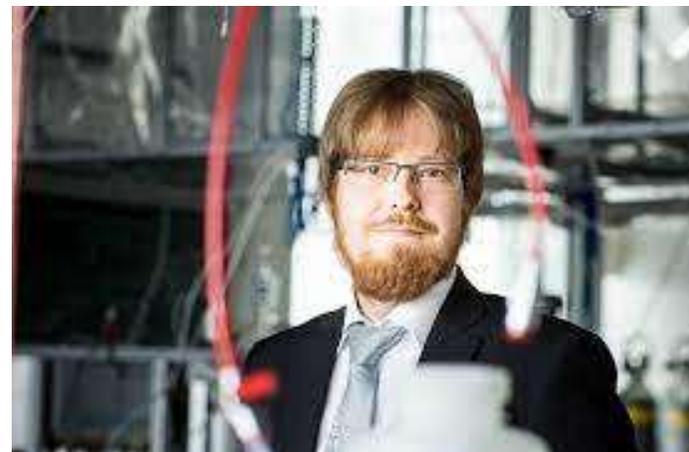
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