TNA User Report

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Project title	Instrument comparison workshop: Mobility particle size spectrometer and condensation particle counter
Name of the accessed calibration center	TROPOS
Number of users in the project	1
Project objectives (max 100 words)	The object of the comparison and calibration workshop was to see if the Condensation Particle Counter (CPC) and Mobility Particle Size Spectrometers (MPSS) meet the requirements for data quality within accepted uncertainty limit. The instruments were also cleaned and calibrated.
Description of work (max 100 words):	This project was an comparison and calibration workshop for Condensation Particle Counter (CPC) and Mobility Particle Size Spectrometers (MPSS) or differential mobility analyser (DMA). The CPC were opened and checked and a calibration were performed with WCCAP reference instrument. The CPC passed the quality standards of ACTRIS and GAW. The SMPS (CPC + DMA) is in the range required by WCCAP for the particle size from 25 nm and larger. For smaller particles the instrument has significant losses which can be due to the DMA.

Principal Investigator's and group's information	
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New user	yes

User 1 Information[4]	
First name	
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Home institution	
Institution legal status	
Email	
Gender	
User status	
New user	

User 2 Information	
First name	
Family name	
Nationality	
Activity domain	
Home institution	
Institution legal status	
Email	
Gender	
User status	
New user	

[1] Physics; Chemistry, Earth Sciences & Environment; Engineering & Technology; Mathematics; Information & Communication Technologies; Material Sciences; Energy; Social sciences; Humanities.
[2] UNI= University and Other Higher Education Organisation;
RES= Public Research Organisation (including international research organisations and private research organisations controlled by public authority);
SME= Small and Medium Enterprise;
PRV= Other Industrial and/or Profit Private Organisation;
OTH= Other type of organization.
[3] UND= Undergraduate; PGR= Post graduate; PDOC= Post-doctoral researcher; RES= Researcher EXP= Engineer; ACA= Academic; TEC= Technician.
[4] Reproduce the table for each user who accessed the infrastructure

Trans-National Access (TNA) Scientific Report

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Instructions

Please limit the report to max 5 pages, you can include tables and figures. Please make sure to address any comments made by the reviewers at the moment of the project evaluation (if applicable, in this case you were informed beforehand). Please do not alter the layout of the document and keep it in Word version. The report will be made available on the eurochamp.org website. Should any information be confidential or not be made public, please inform us accordingly (in this case it will only be accessible by the European Commission, the EUROCHAMP-2020 project partners, and the reviewers). Please include:

- Introduction and motivation
- Scientific objectives
- Reason for choosing the calibration facility
- Method and experimental set-up
- Data description
- Preliminary results and conclusions
- Outcome and future studies
- References

Name of the PI: Jan Kaiser
Calibration centre's name and location: TROPOS, Leipzig
Campaign name and period: Calibration workshop of CPC and DMPS instruments within the EUROCHAMP-2020 community, 16-20 March 2020
Text: Calibration of a Condensation Particle Counter (CPC, Model Grimm 5.400)

Introduction and motivation

This report presents the methods and results from CPC and MPSS comparison and calibration workshop held at the World Calibration Centre for Aerosol Physics (WCCAP) in Leibniz Institute for Tropospheric Research (TROPOS).

Scientific objectives

The aim of the absorption photometer comparison and calibration workshop was to verify that the instruments measure particle size distribution within the accepted uncertainty range. Comparison with a reference instrument reveals possible systematic errors and instrumental malfunctions.
The instruments were calibrated and cleaned during the workshop and therefore the workshop also gives some hands-on experience to the users about the maintenance of the instruments.

Reason for choosing the calibration facility

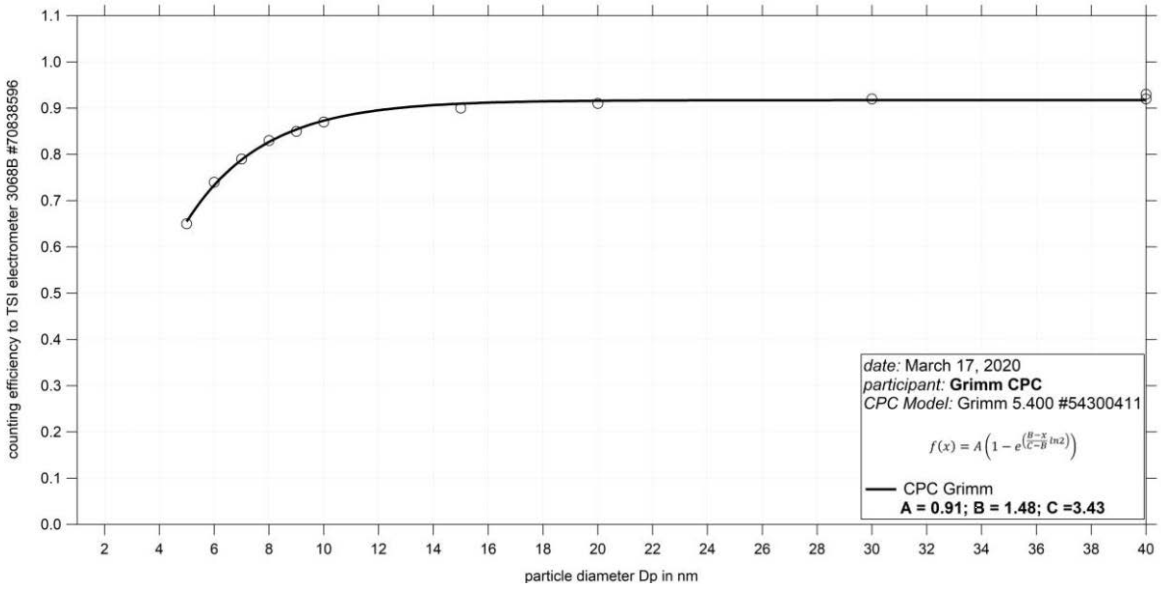
WCCAP provides regular calibration and comparison workshops for CPC and MPSS. They have a well-equipped laboratory and a lot of experience running these workshops.

Method and experimental set-up

The counting efficiency for CPC Grimm 5.400 S/N 54300411 was measured against aerosol electrometer 3068 S/N 70838596 using silver particles between 5 and 40 nm were used for calibration; the calculated Dp50 is 3.43 nm.

Data description

Figure 1 shows the CPC efficiency curve for CPC Grimm 5.400 S/N 54300411 was measured against aerosol electrometer 3068 S/N 70838596 using silver particles between 5 and 40 nm were used for calibration; the calculated Dp50 is 3.43 nm. The raw data are shown in table below the figure.



Results (using pulse output):

Particle size (nm)	40	30	20	15	10	09
Number concentration (cm-3)	1072	1248	1100	941	1664	1449
Counting efficiency []	0.92	0.92	0.91	0.90	0.87	0.85
Particle size (nm)	08	07	06	05	40	
Number concentration (cm-3)	1572	1550	1446	1070	1007	
Counting efficiency []	0.83	0.79	0.74	0.65	0.93	

Preliminary results and conclusions

The candidate did not pass the quality standards of ACTRIS and GAW. The candidate reached only 91% efficiency at 40 nm. The Dp50 is at 3.43 nm.

Outcome and future studies

TROPOS recommend sending the CPC to GRIMM for maintenance.

References

WCCAP-report-CPC-2020-1 (2020): Comparison of Condensation Particle Counter Project No.: CPC-2020-1-2, published in https://www.actris-ecac.eu/cpc-2020-1.html