



TNA User Report

*The completed and signed form below should be returned by email to
eurochamp2020@lisa.u-pec.fr*

Project title	Intercomparison of integrating nephelometers Project No.: IN-2020-2-1
Name of the accessed calibration center	WCCAP
Number of users in the project	1
Project objectives (max 100 words)	The project objective was to gather several nephelometers from different institute to inter-compare the instruments. A TROPOS nephelometer (SN 14-1408) will be used as reference for comparison.
Description of work (max 100 words):	First Dry and zero air were sent within the nephelometers to test the zero of each instruments. Then, a span calibration was performed with CO ₂ (known scattering coefficients). Ammonium sulfate aerosols were generated at different concentrations and sent to nephelometers. Finally, the measurements of back and total scattering of each nephelometer was compared to the reference.

Principal Investigator's and group's information	
First name	Suzanne
Family name	Crumeyrolle
Nationality	French
Activity domain ¹	Atmospheric science
Home institution	LOA (Lille)
Institution legal status ²	UNI
Email	Suzanne.crumeyrolle@univ-lille.fr
Gender	Female
User status ³	Researcher
New user	yes

User 1 Information ⁴	
First name	
Family name	
Nationality	
Activity domain	
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

*The completed and signed form below should be returned by email to
eurochamp2020@lisa.u-pec.fr*

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: Suzanne Crumeyrolle

Calibration center's name and location: TROPOS

Campaign name and period: 29/06/2020 – 03/07/2020

Text:

Nephelometers are widely used in the community to monitor the aerosol optical properties. A network was then built. In order to survey long range transportation of aerosols and their modifications throughout their residence time, measurements of the network will be compared and differences might be attributed to aerosol ageing. Therefore, bias from one instrument to another need to be known. The TROPOS facility allow the community to perform such tests by gathering every year several instruments together on site and test their performances for different aerosol concentrations.

During this campaign, several nephelometers were gathered and tested simultaneously with the same air coming trough all of them. First, clean air (filtered of particles) was sent to all nephelometers. Zero test were performed and the noise level of each instrument was tested as well as the background levels. For LOA nephelometers, the AURORA 3000 shows large background deviations while the 4000 was just fine. Then, a span check was performed using CO₂ (know back and total scattering coefficients). Both nephelometers passed this test after cleaning the cells and full calibration of the instruments.

Finally, for generated aerosols ranging from 100-300Mm⁻¹, both nephelometer measurements show good correlations (Fig. 1 and Fig. 2) in comparison to the reference one. Indeed, slopes and correlation coefficient were close to unity for all wavelengths.

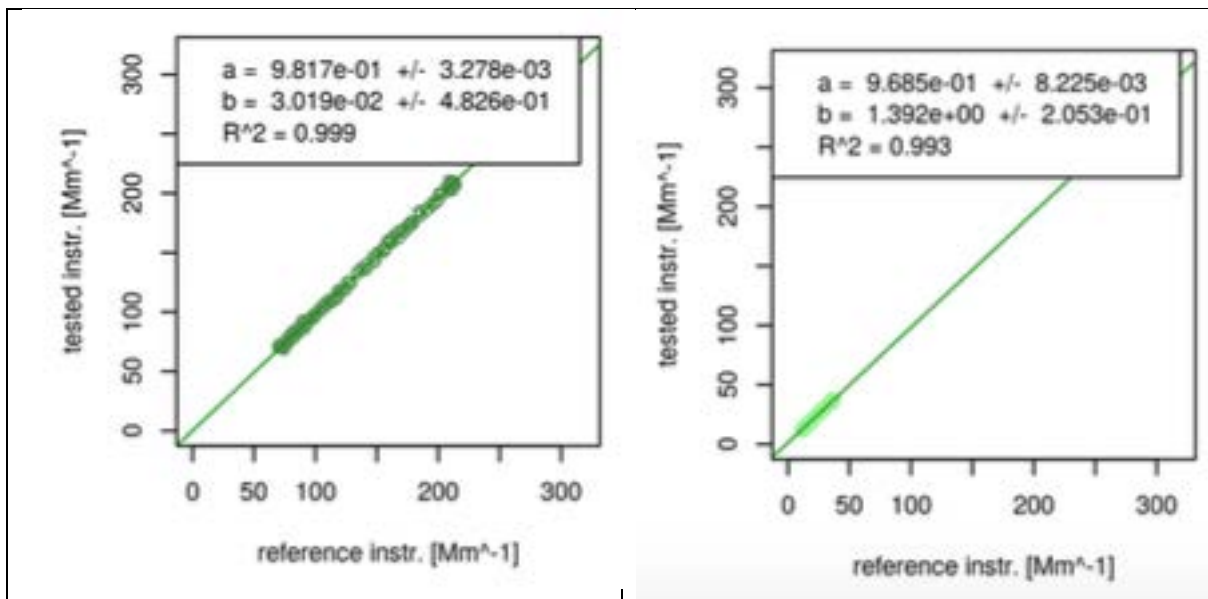


Figure 1 : Ammonium sulfate scattering (left) and back-scattering (right) coefficients from nephelometer (SN 14-0141) and reference nephelometer Aurora4000 (SN 14-1408) at 525nm.

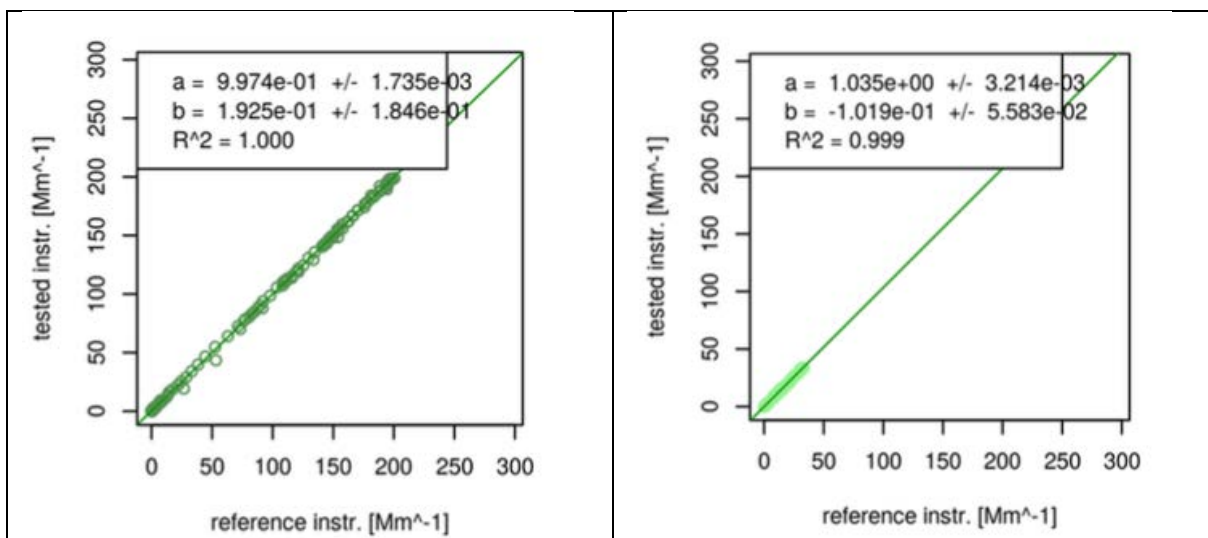


Figure 2 : Ammonium sulfate scattering (left) and back-scattering (right) coefficients from nephelometer (SN 17-0818) and reference nephelometer Aurora4000 (SN 14-1408) at 525nm.