



Leibniz Institute for
Tropospheric Research



World Calibration Centre
for Aerosol Physics

Intercomparison of Integrating Nephelometers

Project No.: IN-2017-5-4

Basic informations:

Location of the quality assurance: TROPOS, lab 121

Date: 10 November, 2017

Principal Investigator	Home Institution	Participant	Instrument
F. Truong	LSCE	F. Truong	Nephelometer, Ecotech M9003, SN 030382

1 Intercomparison summary

Status on arrival: No issues due to transportation or other damages.

Noise: The one minute instrumental noise (single standard deviation) for total scattering was 0.85 (450 nm). The noise level is slightly higher than the expected noise.

Span check: The span check before instrument inspection show deviation of 1.2%.

Comparison to a reference instrument:

Before inspection: Comparison to the reference nephelometer (Aurora 4000, SN 14-1408) showed a deviation of 8.1%

After inspection and calibration: The deviation reduces to a value of less than 2%.

The deviation is in the acceptable range.

Inspection: The instrument was contaminated with a layer of dust and encrustations.

Recommendations: No recommendations.

Overall assessment: The instrument meets the requirements.

2 Details

Instrument noise

The noise is determined by the standard deviation of a time series of 60 minutes with a temporal resolution of 10 seconds. Test aerosol was filtered room air.

	total scattering in Mm^{-1}			backscattering in Mm^{-1}		
Wavelength [nm]	450	525	635	450	525	635
Zero check (median in Mm^{-1})	-1.46	-	-	-	-	-
Zero check (average in Mm^{-1})	-1.40	-	-	-	-	-
Noise (standard deviation)	0.85	-	-	-	-	-

Span check

Percentage deviation to theoretical value. A positive number means that the instrument measure too high values.

	total scattering			backscattering		
Wavelength [nm]	450	525	635	450	525	635
before recalibration (as instrument arrived) deviation [%]	1.26	-	-	-	-	-

Comparison to reference instrument before inspection

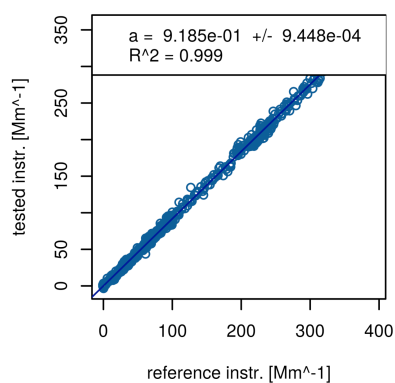
Reference nephelometer: Aurora4000 (SN 14-1408)

Test aerosol: ammonium sulphate

Measurements were done before inspection and recalibration.

(*) See span check results. Scattering coefficients were interpolated to the wavelengths of the reference nephelometer.

	total scattering			backscattering		
Wavelength [nm]	450	525	635	450	525	635
slope	0.919	-	-	-	-	-
R ²	0.999	-	-	-	-	-



Comparison to reference instrument before inspection

Reference nephelometer: Aurora4000 (SN 14-1408)

Test aerosol: ammonium sulphate

Measurements were done after inspection and recalibration.

(*) See span check results. Scattering coefficients were interpolated to the wavelengths of the reference nephelometer.

	total scattering			backscattering		
Wavelength [nm]	450	525	635	450	525	635
slope	0.985	-	-	-	-	-
R ²	0.999	-	-	-	-	-

