



Leibniz Institute for
Tropospheric Research



World Calibration Centre
for Aerosol Physics

Intercomparison of Integrating Nephelometers

Project No.: IN-2017-5-1

Basic informations:

Location of the quality assurance: TROPOS, lab 121

Date: 03 November, 2017

Principal Investigator	Home Institution	Participant	Instrument
R. Krejci	Stockholm University	M. Burgos	Nephelometer, Ecotech Aurora 3000, SN 171686

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 in the range from 0.11 for 450 nm to 0.05 for 635 nm. The noise level for all channels is very low and therefore excellent

Span check: The span check before instrument inspection show a systematic deviation for all channel (total and backscattering) of 88-89%. The reason could be an incorrect calibration.

Comparison to a reference instrument:

Before inspection: Comparison to the reference nephelometer (Aurora 4000, SN 14-1408) showed the same systematic deviation as the span check with values of 88-89%.

After inspection and calibration: The deviations for all channels are less equal 3%

All deviations are in the acceptable range.

Inspection: The instrument was in clean and in a good condition.

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 120 minutes with a temporal resolution of 1 minute. 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})	0.24	0.17	0.10	0.13	0.08	0.05
Zero check (average in Mm^{-1})	0.28	0.17	0.09	0.13	0.08	0.05
Noise (standard deviation)	0.11	0.07	0.05	0.03	0.03	0.03

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 [%]	-88.4	-88.5	-88.6	-88.2	-88.5	-88.3

Comparison to reference instrument before inspection

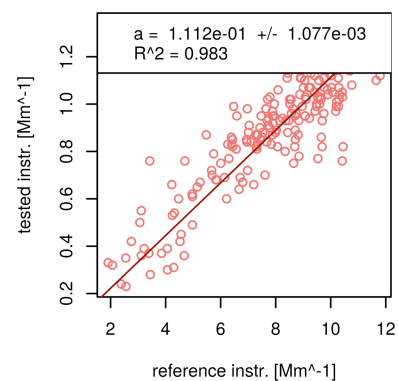
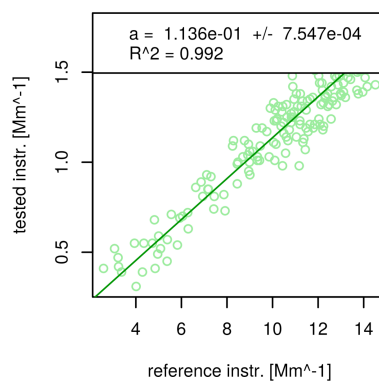
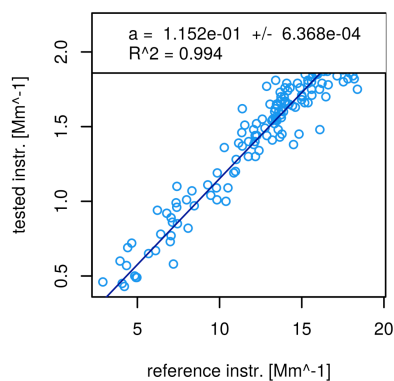
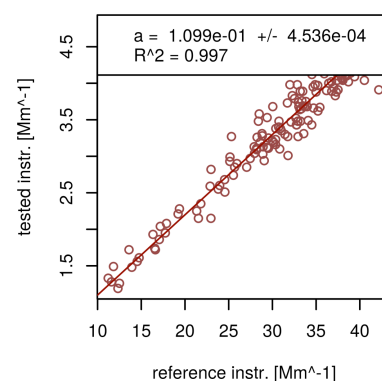
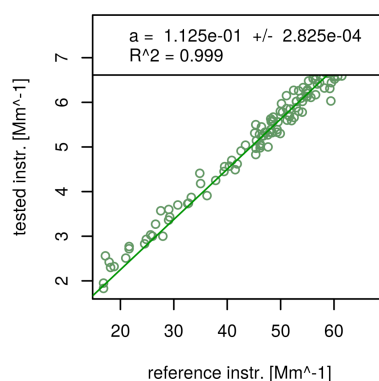
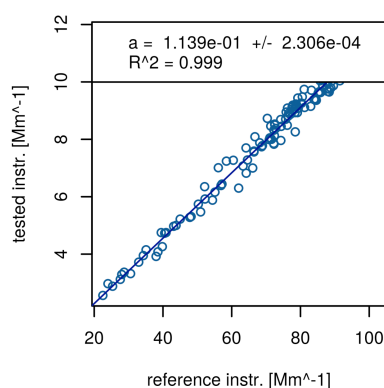
Reference nephelometer: Aurora4000 (SN 14-1408)

Test aerosol: ambient air

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	0.114	0.113	0.110	0.115	0.114	0.112
R ²	0.999	0.999	0.997	0.994	0.992	0.983



Comparison to reference instrument before inspection

Reference nephelometer: Aurora4000 (SN 14-1408)

Test aerosol: ambient air

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	0.995	0.998	0.985	0.985	0.986	1.025
R ²	0.999	0.999	0.998	0.997	0.996	0.990

