



Intercomparison of integrating nephelometers Project No.: IN-2018-3-1

Basic informations:

Location of the quality assurance: TROPOS, Lab 121
Date: 22 October - 26 October 2018

Principal Investigator	Home Institution	Participant	Instrument
B. Briel	DWD	B. Briel	70919196

1 Intercomparison summary

Status on arrival

No issues due to transportation or other damages.

Zerocheck

The noise level of the instrument is in the normal range. The average noise (1σ) for the all wavelengths was less equal 0.47 Mm^{-1} for full scattering and 0.32 Mm^{-1} for backscattering. The background level was acceptable with deviations of less equal 0.12 Mm^{-1} for full scattering and 0.24 Mm^{-1} for backscattering.

Spancheck

The span check was acceptable with deviations of less equal 2.3 %.

Inspection

The instrument was clean without any contamination. Due to the extraordinarily good results, a recalibration was not performed.

Comparison to reference nephelometer

Before inspection and recalibration

The results from intercomparison to reference device were acceptable with deviations in the range of -2.8% to 4.8% .

After inspection and recalibration

Recommendations

No recommendations.

Overall assessment

The instrument meets the requirements.

2 Details

Configuration parameters

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Table 1: Noise parameters of nephelometer (SN 70919196) measured with filtered air.

Wavelength [nm]	total scattering		backscattering	
	mean [Mm ⁻¹]	std.dev. [Mm ⁻¹]	mean [Mm ⁻¹]	std.dev. [Mm ⁻¹]
450	0.12	0.47	0.24	0.32
530	0.1	0.21	0.13	0.15
700	0.11	0.22	0.19	0.16

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Table 2: Percentage deviation of measured values from nephelometer (SN 70919196) to theoretical values for CO₂

Wavelength [nm]	total scattering	backscattering
	deviation [%]	deviation [%]
450	-0.5	1.7
530	-0.4	1.6
700	-2.3	1.1

Comparison to reference nephelometer before inspection and recalibration

Table 3: Comparison of nephelometer (SN 70919196) to reference nephelometer Aurora4000 (SN 14-1408) before inspection and recalibration. Testaerosol is ammonium sulfate.

Wavelength [nm]	total scattering		backscattering	
	slope	R2	slope	R2
450	0.992	0.999	0.989	0.996
525	1.02	0.999	1.048	0.997
635	0.972	0.999	1.033	0.995

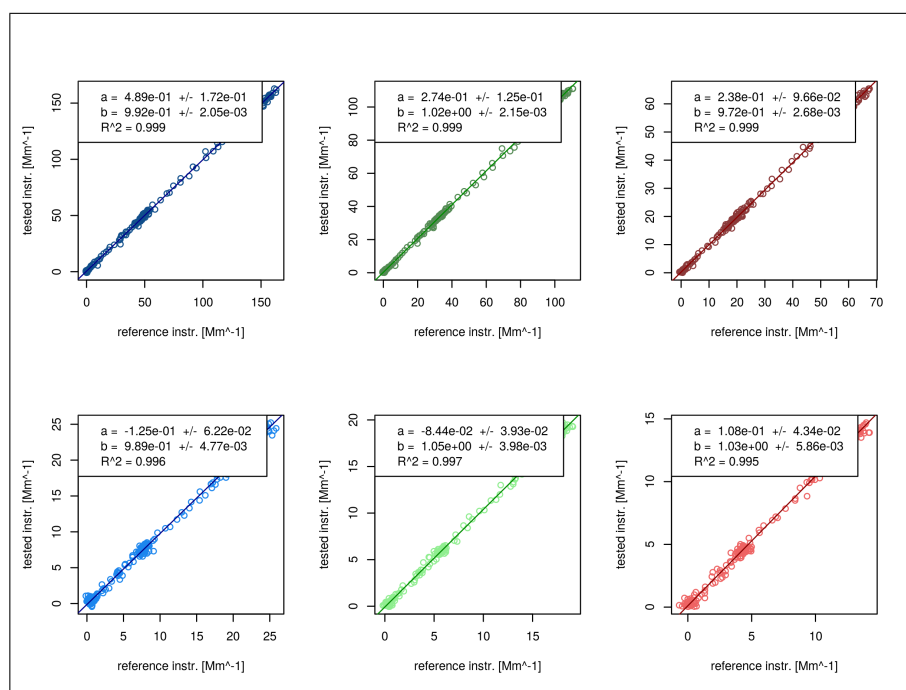


Figure 1: Correlation of scattering coefficients from nephelometer (SN 70919196) and reference nephelometer Aurora4000 (SN 14-1408) before inspection and recalibration. Testaerosol is ammonium sulfate.