



Leibniz Institute for  
Tropospheric Research



World Calibration Centre  
for Aerosol Physics

## Intercomparison of Integrating Nephelometers

Project No.: IN-2017-5-2

### **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 06-0511

### 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 7.88 (525 nm). The noise level is much higher than the expected noise.

**Span check:** The span check before instrument inspection show deviation of -43%.

**Comparison to a reference instrument:**

Before inspection: Comparison to the reference nephelometer (Aurora 4000, SN 14-1408) showed a deviation of -26.3%

After inspection and calibration: The deviation reduces to a value of 8.6%.

The deviation is in the acceptable range.

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

**Recommendations:** The PMT should be replaced

**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 $\text{Mm}^{-1}$			backscattering in $\text{Mm}^{-1}$		
Wavelength [nm]	450	525	635	450	525	635
Zero check (median in $\text{Mm}^{-1}$ )	-	-5.61	-	-	-	-
Zero check (average in $\text{Mm}^{-1}$ )	-	-3.83	-	-	-	-
Noise (standard deviation)	-	7.88	-	-	-	-

**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 [%]	-	-43.0	-	-	-	-

### Comparison to reference instrument before inspection

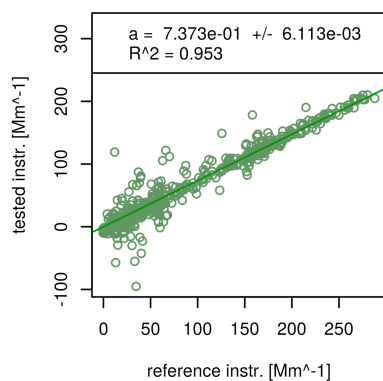
Reference nephelometer: Aurora4000 (SN 14-1408)

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	-	0.737	-	-	-	-
R <sup>2</sup>	-	0.953	-	-	-	-



### Comparison to reference instrument before inspection

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Test aerosol: ammonium sulphate

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(\*) 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	-	1.086	-	-	-	-
R <sup>2</sup>	-	0.876	-	-	-	-

