

Instrument Inter-Comparison Report

Instrument	
Type	TSI, model 3563
Serial Number	70810508
Institution	Norsk institutt for luftforskning
Contact	Markus Fiebig

Instrument inter-comparison	
Organization	Leibniz Institute for Tropospheric Research (TROPOS) World Calibration Centre for Aerosol Physics (WCCAP)
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Workshop, etc.	WCCAP-2015-6, 23-28 Nov. 2015

Report	
Status	<input type="checkbox"/> preliminary <input checked="" type="checkbox"/> final
Date	

1. Instrument inter-comparison summary

Status on arrival: ok

Noise: The on minute instrumental noise testes using filtered ambient air low with values below 0.3 Mm^{-1} for the blue wavelength and less than 0.17 Mm^{-1} for the green and red channel.

Span check: Span check using CO₂ revealed good results for the blue and read channel with less then 1.5%. the green channel was higher for total scattering and backscattering by 3.7 and 4.4 %, respectively. Deviations higher 3% require a recalibration. The higher values for this instruments test can be explained by transporting the instruments.

Inspection: The cell was clean. Temperature and pressure sensors were ok. No action required.

Comparison to other Nephelometer: The instruments agrees well in the blue and red channel to the average of four instruments of the same type. Differences in the green channel (total scattering) of 5% are explained by the span checks.

Other observation: None

Recommendations: Calibration after back transportation.

Overall assessment: The instrument meets the requirements?

2. Technical checks

Table: Noise checks for 30 minutes duration.						
The noise is determined by the standard deviation of a time series of 30 minutes with a temporal resolution of 1 minute. Test aerosol was filtered room air.						
	total scattering in Mm^{-1}			Backscattering in Mm^{-1}		
Wavelength in nm	450	550	700	450	550	700
Zero check (average in Mm^{-1})	0.213	0.114	0.131	0.180	0.081	0.082
Noise (standard deviation)	0.295	0.169	0.170	0.200	0.106	0.130

Table: Span check, deviation to theoretical value in %						
	total scattering			backscattering		
Wavelength in nm	450	550	700	450	550	700
deviation in %	0.68	3.73	1.02	1.48	4.44	0.33

3. Comparison to other Nephelometers of same type before inspection and calibration

Table: Comparison to an average of in total four TSI nephelometers model 3563						
	total scattering in Mm^{-1}			backscattering in Mm^{-1}		
Wavelength in nm	450	550	700	450	550	700
slope	1.022	1.055	1.050	0.974	1.011	0.992
intercept	1.39	1.68	0.43	0.17	0.11	0.18
R^2	0.986	0.987	0.987	0.982	0.983	0.983

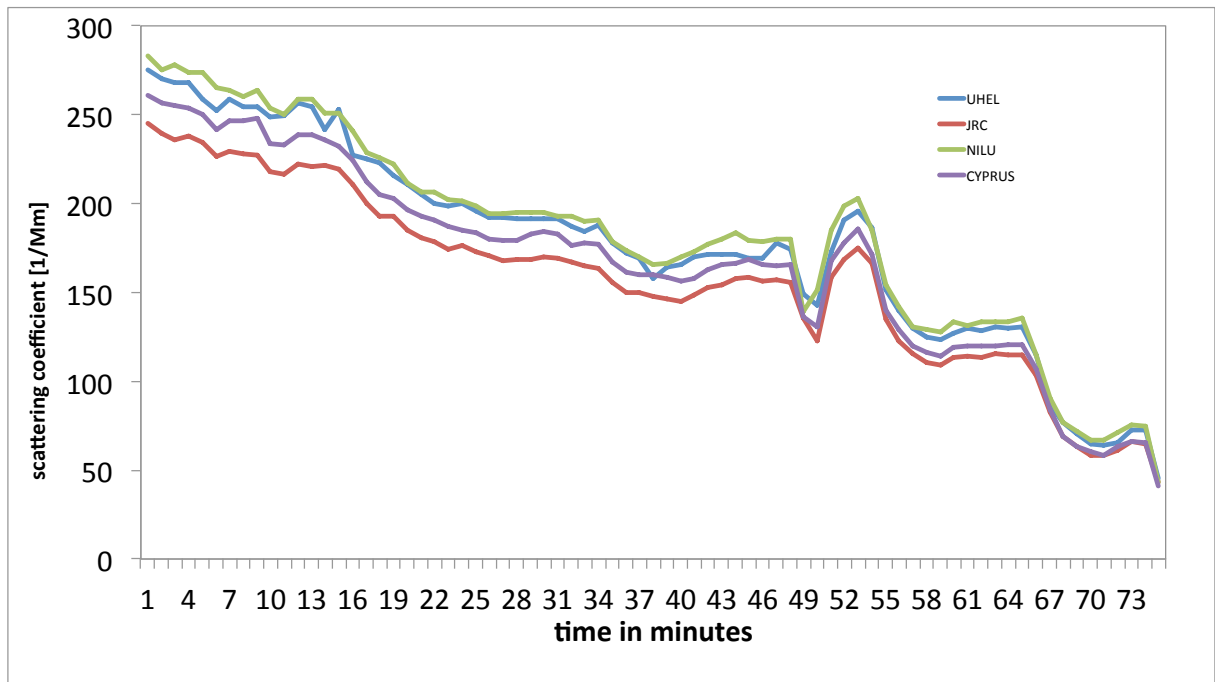


Figure 1: Comparison of four TSI nephelometers as arrived to at workshop.

4. Comparison to other Nephelometers of same type after inspection and span gas correction

Table: Comparison to an average of in total four TSI nephelometers model 3563						
	total scattering in Mm^{-1}			backscattering in Mm^{-1}		
Wavelength in nm	450	550	700	450	550	700
slope	1.025	1.046	1.059	0.991	1.008	1.027
intercept	1.39	1.65	0.43	0.17	0.11	0.17
R ²	0.998	0.995	0.976	0.887	0.941	0.986