Instrument Inter-Comparison Report

Instrument	
Type	TSI, model 3563 ,
Serial Number	3563 142101
Institution	Joint research Center, Ispra
Contact	Sebastiao dos Santos

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	☐ preliminary ☑ final
Date	

1. Instrument inter-comparison summary

Status on arrival: ok

Noise: The one minute instrumental noise is between 0.31 and 0.12 Mm^{-1} in the expected range.

Span check: Span check using CO2 showed that the read channel for both total and backscattering, and the blue channel for back scattering deviate by up to 5% to the theoretical value. In theses cases the nephelometer gives higher values. Differences could have occurred due to transportation.

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

Comparison to other Nephelometer: Comparion to the average of other nephelometers (without span adjust) showed that the nephelometer shows values lower then the average of all instruments by up to 8.6% for total scattering and values closer to the average for back scattering. This result is not consistent with span check results. After span gas correction for all nephelometers, the values for this instrument did not change significantly.

Other observation: None

Recommendations: Recalibrate instrument after back transportation.

Overall assessment: The instrument is slightly out or the required performance with on average 6% deviations in total scattering.

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			backscattering		
Wavelength in nm	450	550	700	450	550	700
Zero check (average in Mm^{-1})	0.44	0.33	0.26	0.12	0.04	0.13
Noise (standard deviation)	0.31	0.17	0.17	0.21	0.10	0.12

Table: Span check, deviation to theoretical value

	total scattering			backscattering		
Wavelength in nm	450	550	700	450	550	700
deviation in %	0.17	-0.17	4.86	3.74	0.94	4.98

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

Table: Comparison to an average of in total four TSI nephelometers of model 3563

	total scattering			backscattering		
Wavelength in nm	450	550	700	450	550	700
slope	0.949	0.914	0.951	1.007	0.962	0.992
intercept	-0.016	0.869	0.144	0.132	-0.161	0.058
R^2	0.998	0.993	0.983	0.883	0.949	0.995

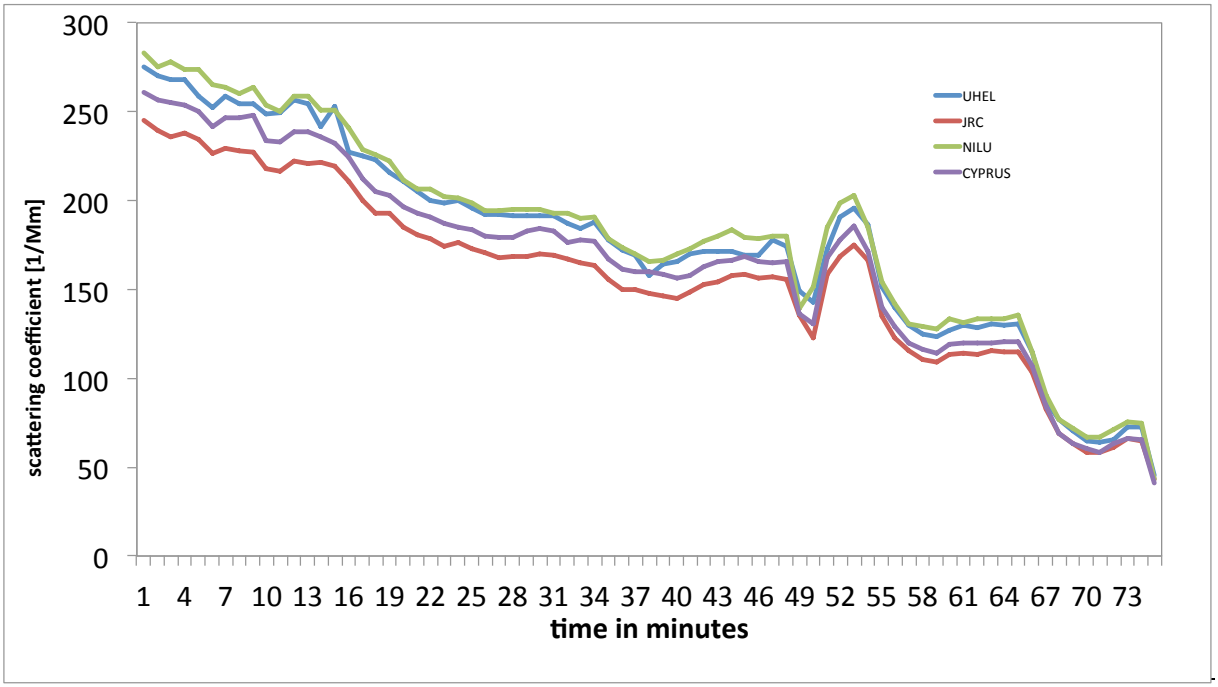

Figure 1: Comparison of four TSI nephelometers as arrived to at workshop. Shown are values for total scattering at 550 nm.

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			backscattering		
Wavelength in nm	450	550	700	450	550	700
slope	0.957	0.941	0.924	1.003	0.993	0.981
intercept	-0.016	0.854	0.143	0.129	-0.156	0.0563
R^2	0.998	0.995	0.976	0.887	0.941	0.986