

Intercomparison of Mobility Particle Size Spectrometers

Project No.: MPSS-2022-4-4

Participant: TROPOS MPSS – UBA Zugspitze

Software TROPOS: V7.0
Classifier Model: TROPOS
Classifier HV Power Supply: Positive
Neutralizer Model: Ni63
Impactor Model: none
DMA Model: TROPOS
Detector Model: TSI 3772
Detector Model SN: 3772161407
Detector Model Dp50: 10nm
Manuf. Date CPC: -
Firmware: -

Location of the quality assurance: TROPOS Leipzig, WCCAP

Comparison period: May 02, 2022 – May 06, 2022

Summary of Intercomparison:

The TROPOS MPSS UBA Zugspitze participated in the WCCAP workshop in May 2022. The candidate showed a PSL peak at 204.99 nm. The candidate used the TSI CPC model 3772.

Date of arrival of instrument in calibration lab: *May 02, 2022*

Instrument: *Size Spectrometer TROPOS*

Model and serial number of instrument: *TROPOS MPSS*

Result of physical inspection: *no damages*

Result of functional test: *functional test successful, no problems*

Internal parameters of instrument: *nominal flow rate 1.0 l/min*

Model and identification number of TROPOS Reference MPSS: *TROPOS MPSS (positive HV)*

Date of calibration: *May 02-06, 2022*

Lab temperature and pressure: *22.0°C, 1003 mbar*

Measured aerosol flow rate of CPC: *1.019 l/min*

Uncertainty in measured flow rate: *3%*

Flowmeter used: *Gilian Gilibrator 3; Basis: 21181001005, cell:21191010004,20491011010, 21191012002; May, 2021*

Particles and gases used for calibration: *ambient aerosol*

Zero measurement of instrument: *0 particles/cm³ in 10 minutes*

	Unit	Status
Model	-	TSI 3772
SN	-	3772161407
Firmware	-	2.16
Date	-	2022
last service date	-	-
Saturator Temperature	°C	39
Condenser Temperature	°C	23.6
Optics Temperature	°C	40
Cabinet Temperature	°C	33.4
Ambient Pressure	kPa	100.0
Vacuum Pressure	kPa	-
Inlet Pressure	kPa	-
Critical Orifice Pressure	hPa	74.8
Aerosol Nozzle Pressure	kPa	2.6
Laser Current	mA	42
Liquid Level	-	full
Aerosol Flow (Gili)	l/min	1.019
Internal Aerosol Flow	l/min	-
Zero	avg 10 min	0

PSL Scan: Latex 203 nm +/- 4 nm

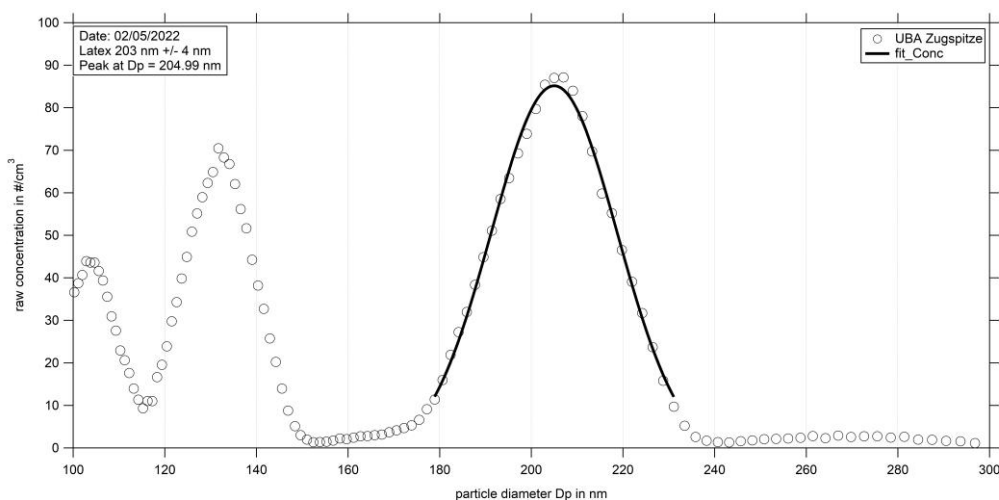


Figure 01: Measurement of latex 203 nm – TROPOS MPSS: Particle size distribution of latex 203 nm on May 02th, 2022. The peak shows at 204.99nm.

Intercomparison between TROPOS Reference MPSS and MPSS Zugspitze

03.05.2022 06:00 PM – 04.05.2022 06:00 PM

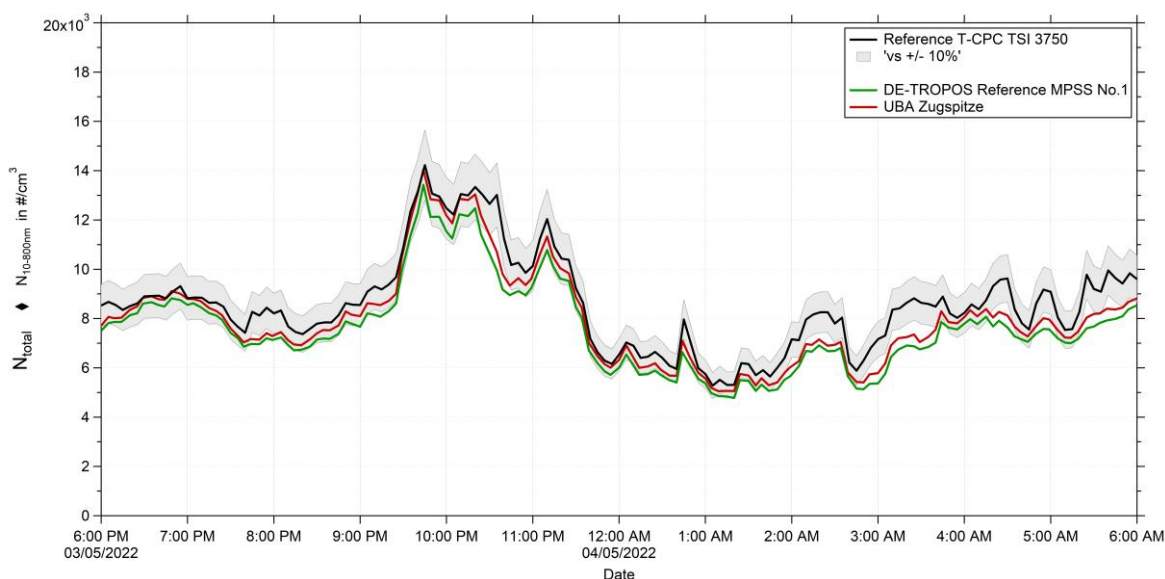


Figure 02: Time series (May 03, 2022 06 PM – May 04, 2022 06 AM) of the integrated particle number concentration ($N_{10-800nm}$) of the MPSS and total number concentration (N_{total}) of the Reference TSI-CPC Model 3750. Multiple charge correction, internal diffusion losses, CPC flow corrections.

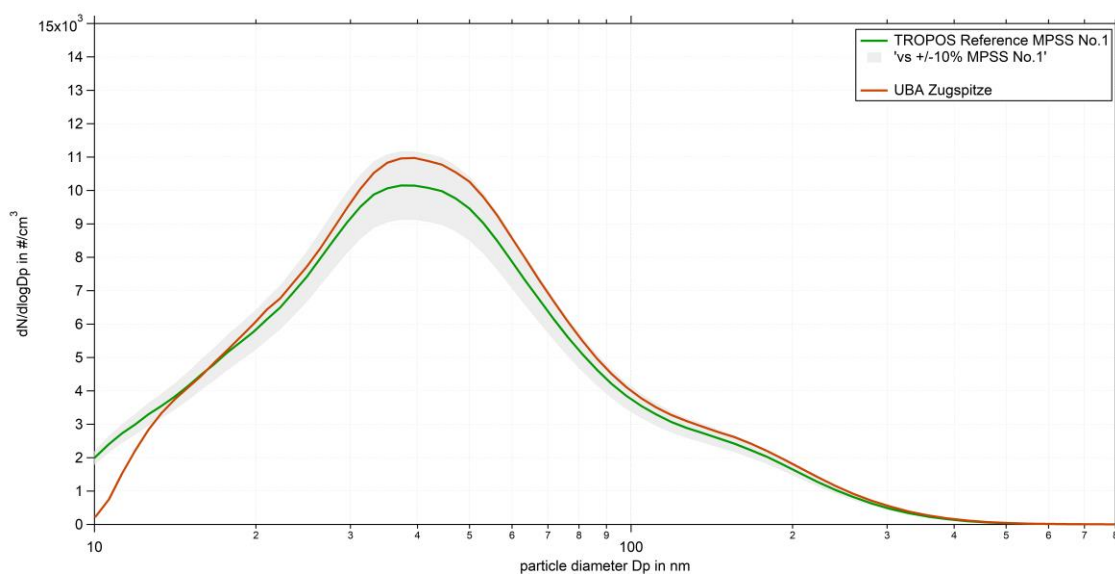


Figure 03: Particle size distribution for TROPOS Reference MPSS and MPSS Zugspitze, flow corrections, multiple charge correction and diffusion loss corrections are included.

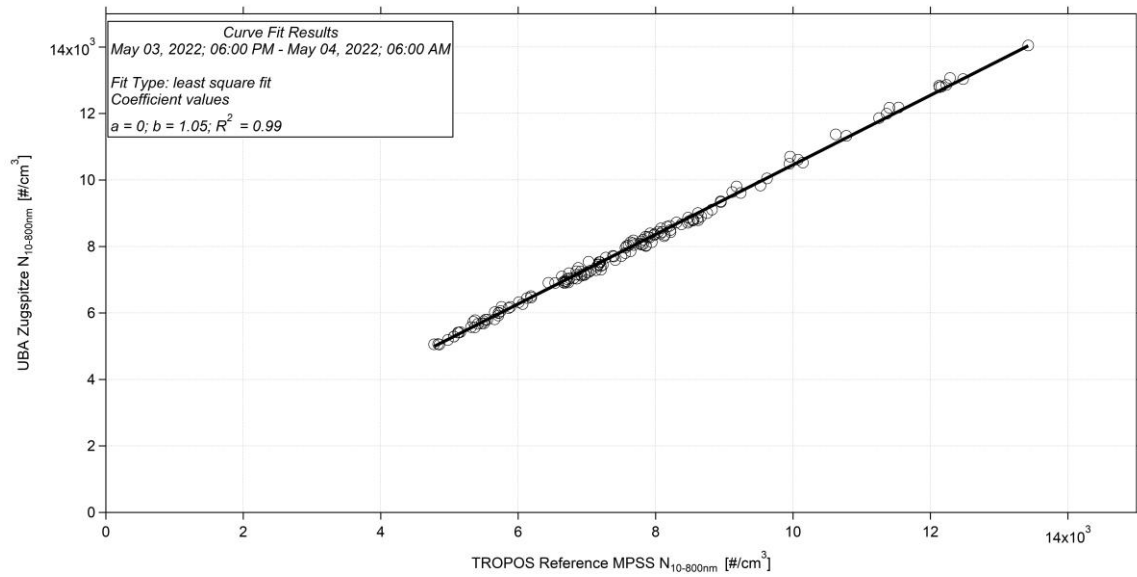


Figure 04: Linear regression between TROPOS Reference MPSS and MPSS Zugspitze.

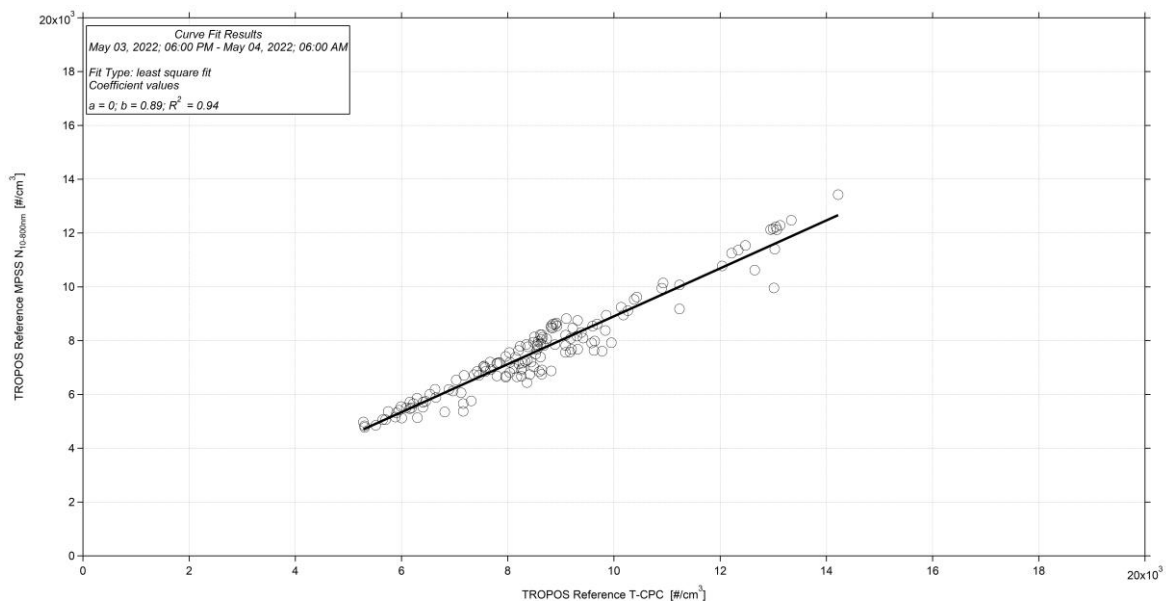


Figure 05: Linear regression between TROPOS Reference T-CPC and TROPOS Reference MPSS.

Date of issue: May, 2022

Reviewed: TROPOS / WCCAP