

Intercomparison of Mobility Particle Size Spectrometers

Project No.: MPSS-2020-3-7

Principal Investigator: Ing. Benjamin Bergmans

Home Institution: Institut Scientifique de Service Public (ISSeP)

Participant: -

Candidate: GUAN MPSS No.02

Made by: **TROPOS**

Counter (SN): TSI CPC 3772

Location of the quality assurance: TROPOS Leipzig, lab 118

Comparison period: July 13, 2020 – July 14, 2020

Last Intercomparison (with Project No.):

Status July 13, 2020

Table No. 1:

Institute: GUAN No.2							
Station: -							
Date of checking list: July 13, 2020							
Instrument/ Components	info	SN	Date/Code	CPC-Status		HV-Status	
MPSS/Classifier:	TROPOS	-		ST	-	OFF	
Firmware Classifier:	-			CT	-	4mv	4.95
Firmware Software:	TROPOS			OT	-	800mv	1001
DMA type:	Hauke Medium	-	-	CabT	-	200mv	250.0
CPC model:	TSI 3772			AP	-	0	0
Firmware CPC:			-	OP	-		
radioactive source:	TROPOS one	-	-	NP	-		
Flow CPC (l/min):	1.008			LC	-		
Flow Inlet (l/min):	1.005						
Sheath air flow (l/min):	5.0						
Zero (#/cm ³):	0						
Maintenance							
Aerosol inlet:				cleaned			
Aerosol Nafion dryer:				changed			
Sheath Nafion dryer:				changed			
Source:				From TROPOS			
HV power supply:				Checked			
DMA:				Checked and cleaned			
Aerosol/sheath RH/T- sensor:				No changes			
Pressure sensor:				No changes			
Filter:				changed			
NI-card:				Reset and calibrated			
CPC:				cleaned			
Impactor:				No changes			
Setup settings over night:				Ambient			

Institute: TROPOS							
Station: Reference Instrument No.1							
Date of checking list: July 13, 2020							
Instrument/ Components	info	Serial Number	Date/Code	CPC-Status		HV-Status	
MPSS/Classifier:	TROPOS	A201800002		ST	39.0	0 V	0
Firmware Classifier:				CT	22.0	5 mV	4.99
Firmware Software:	TROPOS 6.68			OT	40.0	800 mV	999.9
DMA type:	Hauke medium		142	CabT	28	200 mV	250.1
CPC model:	TSI 3772	3772141701		AP	100.3	0 V	0
Firmware CPC:	2.15			OP	78.0		
Radioactive source:	Ni.63			NP	2.8		
Flow Inlet (l/min):	0.987			LC	50		
Zero (#/cm ³):	0						

Institute: TROPOS							
Station: Reference T-CPC							
Date of checking list: July 13, 2020							
Instrument/ Components	info	Serial Number	Cut off	CPC-Status			
CPC model:	TSI 3772	3772154301	D_{p50} 10 nm	ST			
Firmware CPC:	2.15			CT			
Flow Inlet (l/min):	1.020			OT			
Zero (#/cm ³):	0			CabT			
				AP			
				OP			
				NP			
				LC			

PSL Scan: Latex 203 nm +/- 4 nm

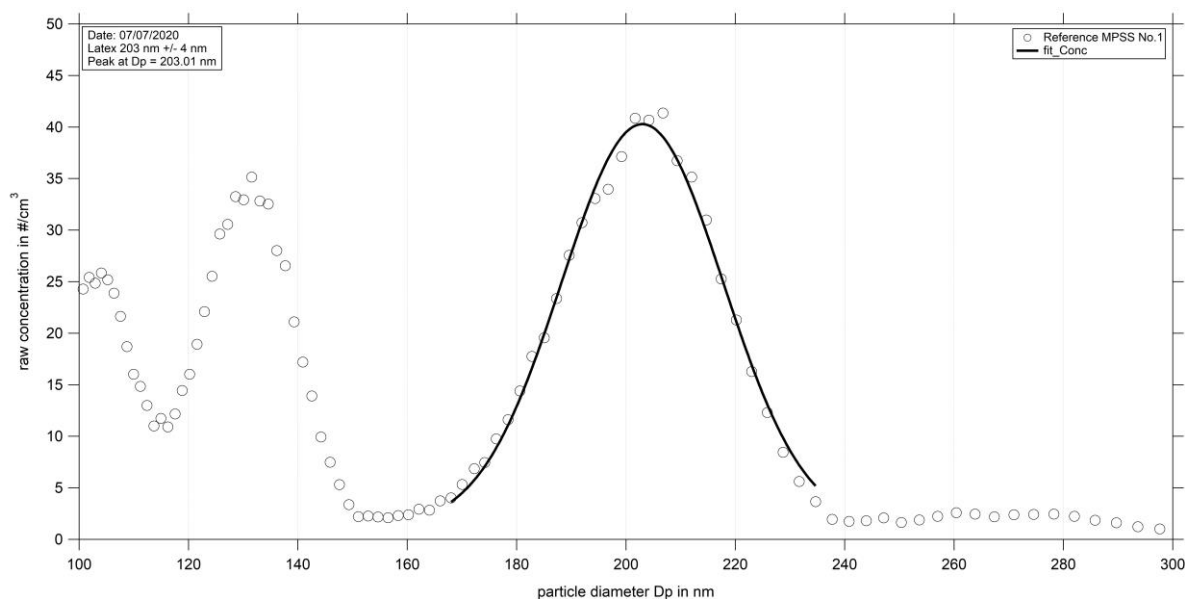


Figure 01: Measurement of latex 203 nm – TROPOS Reference Instrument No. 1: Particle size distribution of latex 203 nm on July 07th, 2020. The peak shows at 203.01nm

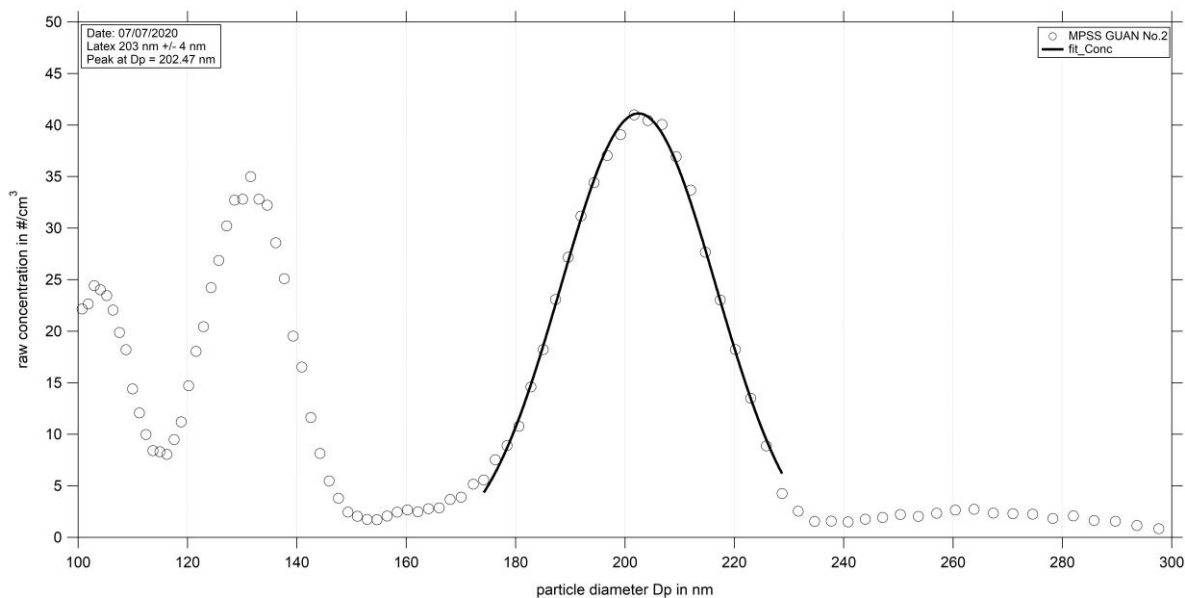


Figure 02: Measurement of latex 203 nm – MPSS GUAN No.02: Particle size distribution of latex 203 nm on July 07th, 2020. The peak shows at 202.47nm.

Intercomparison between TROPOS Reference Instrument No. 1 and MPSS GUAN No.02
13.07.2020 18:00 PM – 14.07.2020 06:00 AM

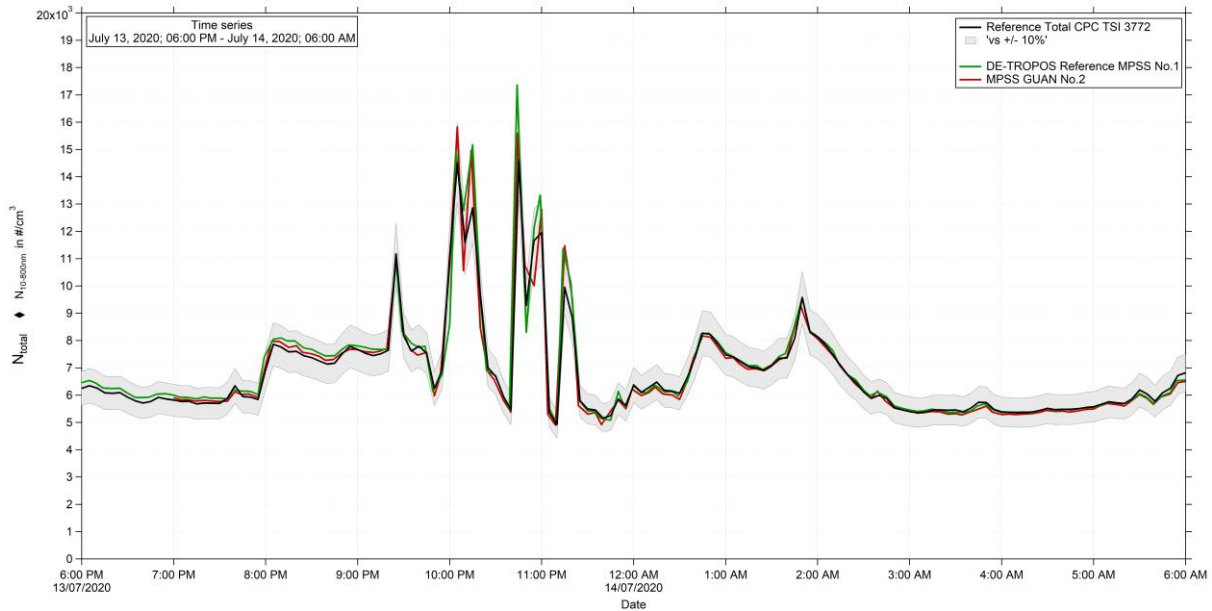


Figure 03: Time series (July 13, 2020 6 PM – July 14, 2020 6 AM) of the integrated particle number concentration ($N_{10-800nm}$) of the MPSS and total number concentration (N_{total}) of the Reference TSI-CPC Model 3772. Multiple charge correction, internal diffusion losses, CPC flow corrections. The candidate is running with a Kr.85 source from TROPOS.

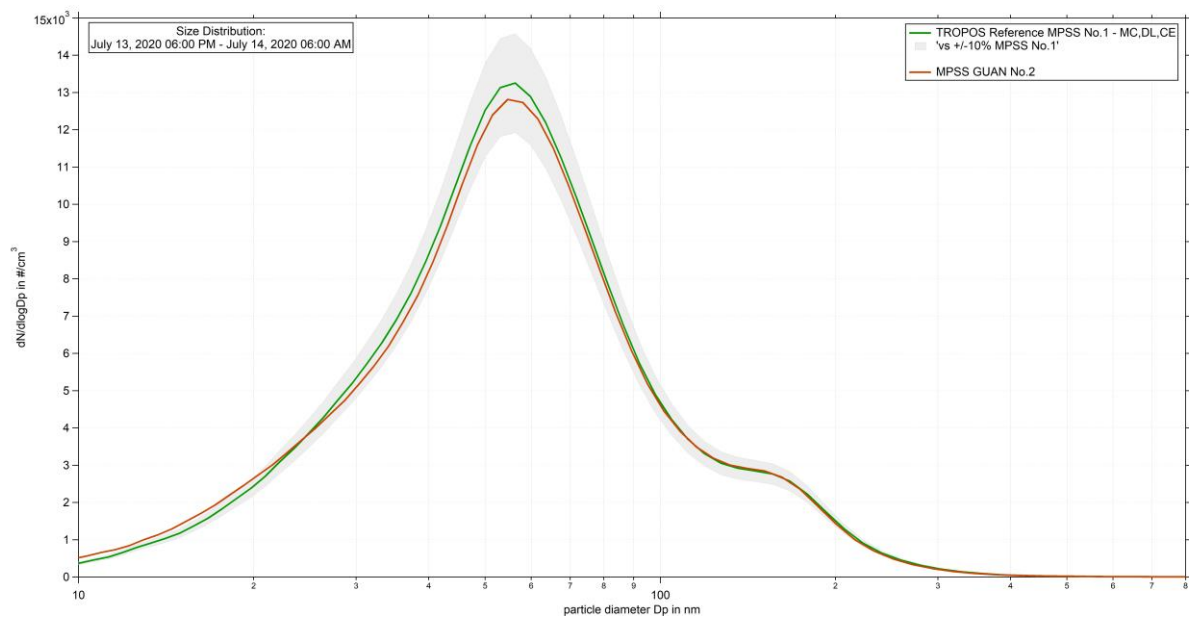


Figure 04: Particle size distribution for TROPOS Reference MPSS No.1 and MPSS GUAN No.02, flow corrections, multiple charge correction and diffusion loss corrections are included.

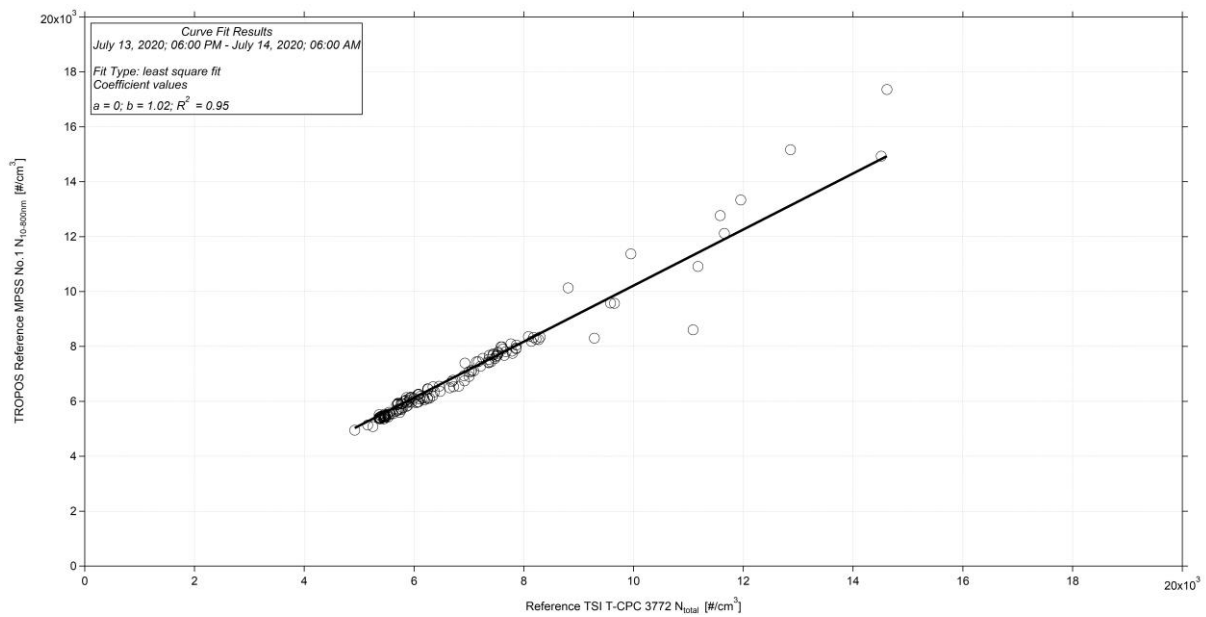


Figure 07: Linear regression between DE-TROPOS Reference T-CPC Model 3772 and DE-TROPOS Reference MPSS No.1.

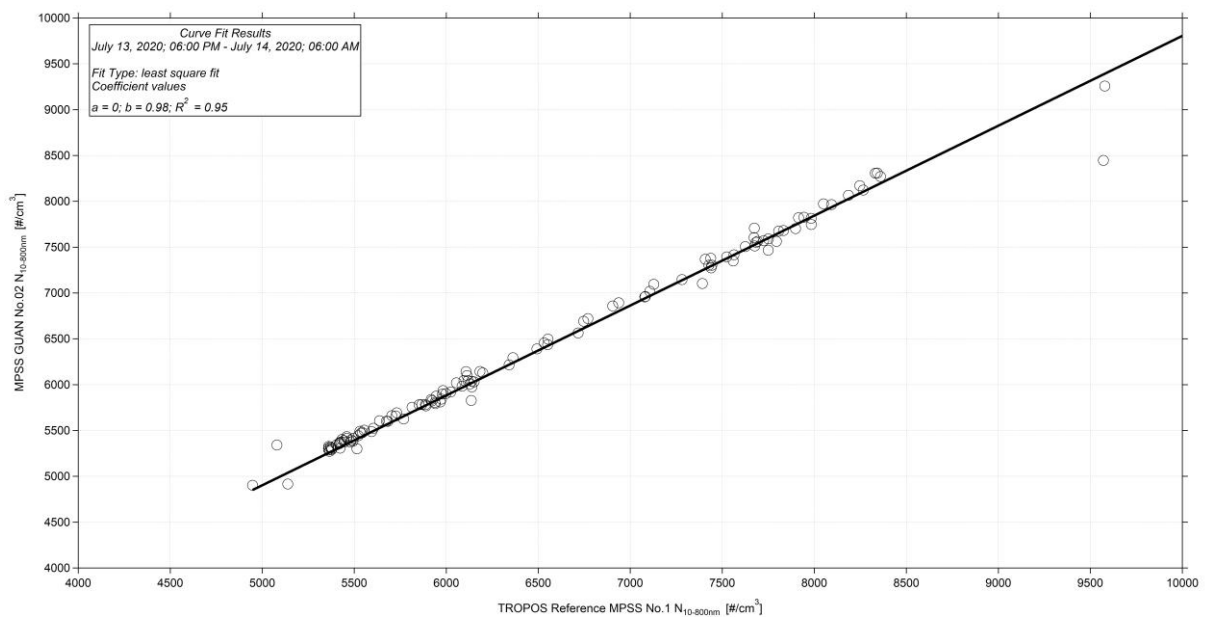


Figure 08: Linear regression between DE-TROPOS Reference MPSS No.1 and MPSS GUAN No.02.

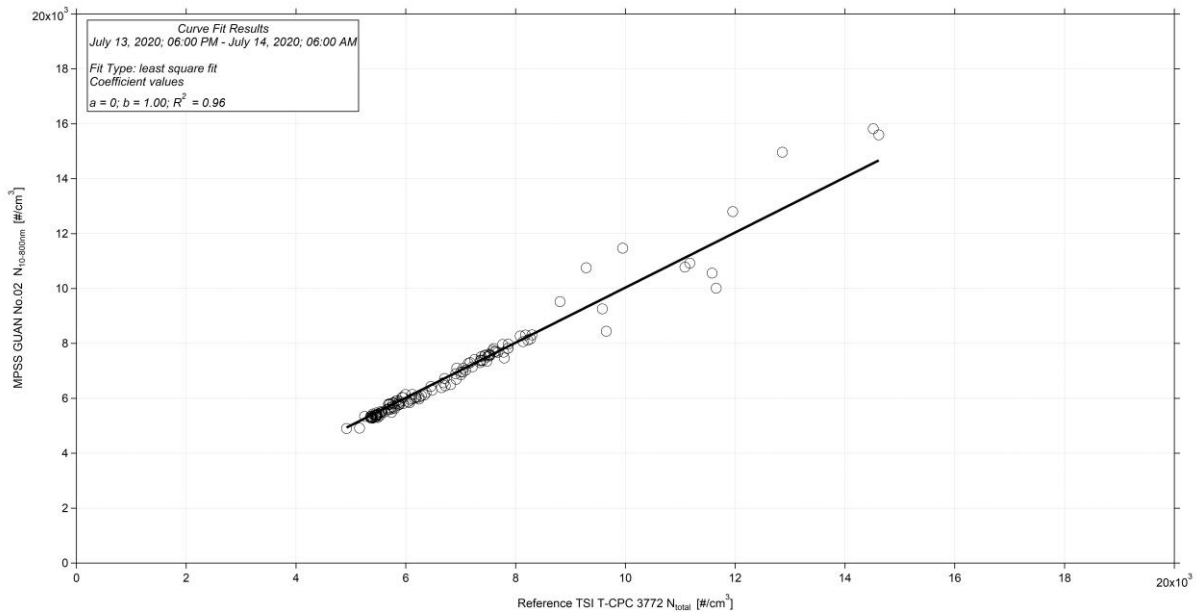


Figure 09: Linear regression between DE-TROPOS Reference T-CPC Model 3772 and MPSS GUAN No.02.