

## Intercomparison of Mobility Particle Size Spectrometers

*Project No.:* MPSS-2020-3-6

*Principal Investigator:* Ing. Benjamin Bergmans

*Home Institution:* Institut Scientifique de Service Public (ISSeP)

*Participant:* -

*Candidate:* GUAN MPSS No.01

*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**

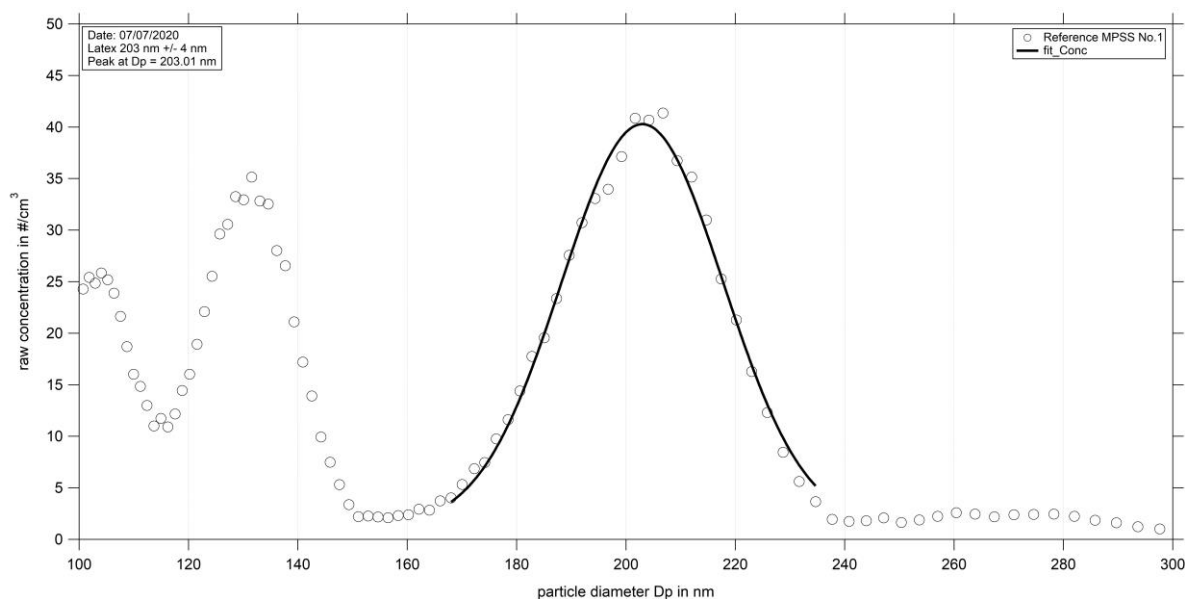
Table No. 1:

Institute: <b>GUAN No.1</b>							
Station: -							
Date of checking list: <b>July 13, 2020</b>							
Instrument/ Components	info	SN	Date/Code	CPC-Status		HV-Status	
MPSS/Classifier:	<b>TROPOS</b>	-		ST	-	OFF	
Firmware Classifier:	-			CT	-	4mv	<b>5.1</b>
Firmware Software:	<b>TROPOS</b>			OT	-	800mv	<b>1000</b>
DMA type:	<b>Hauke Medium</b>	-	-	CabT	-	200mv	<b>250.1</b>
CPC model:	<b>TSI 3772</b>			AP	-	0	<b>0</b>
Firmware CPC:			-	OP	-		
radioactive source:	<b>TROPOS one</b>	-	-	NP	-		
Flow CPC (l/min):	<b>1.022</b>			LC	-		
Flow Inlet (l/min):	<b>1.020</b>						
Sheath air flow (l/min):	<b>5.0</b>						
Zero (#/cm <sup>3</sup> ):	<b>0</b>						
Maintenance							
Aerosol inlet:				<b>cleaned</b>			
Aerosol Nafion dryer:				<b>changed</b>			
Sheath Nafion dryer:				<b>changed</b>			
Source:				<b>From TROPOS</b>			
HV power supply:				<b>Checked</b>			
DMA:				<b>Checked and cleaned</b>			
Aerosol/sheath RH/T- sensor:				<b>No changes</b>			
Pressure sensor:				<b>No changes</b>			
Filter:				<b>changed</b>			
NI-card:				<b>Reset and calibrated</b>			
CPC:				<b>cleaned</b>			
Impactor:				<b>No changes</b>			
Setup settings over night:				<b>Ambient</b>			

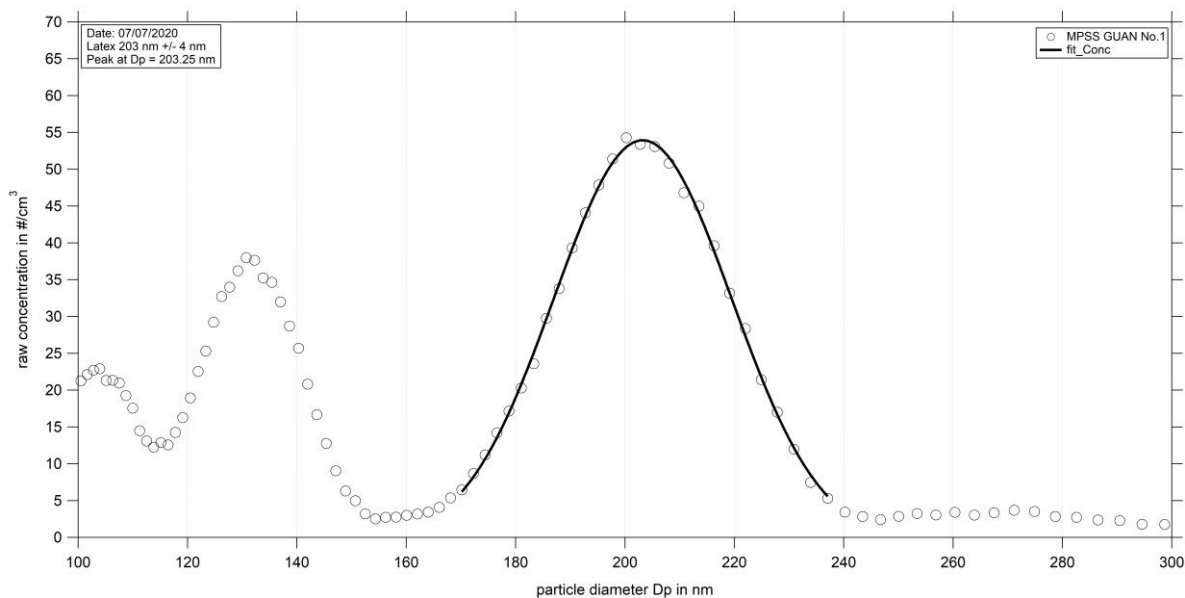
Institute: <b>TROPOS</b>							
Station: <b>Reference Instrument No.1</b>							
Date of checking list: <b>July 13, 2020</b>							
Instrument/ Components	info	Serial Number	Date/Code	CPC-Status		HV-Status	
MPSS/Classifier:	<b>TROPOS</b>	<b>A201800002</b>		ST	<b>39.0</b>	0 V	<b>0</b>
Firmware Classifier: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

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

**PSL Scan: Latex 203 nm +/- 4 nm**

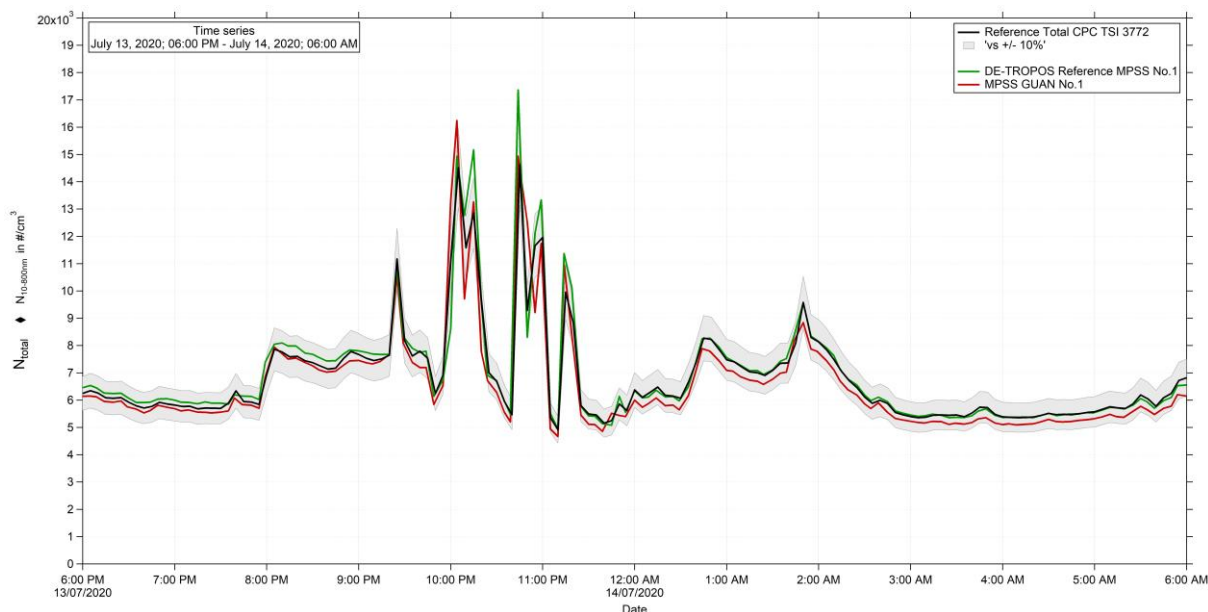


**Figure 01:** Measurement of latex 203 nm – TROPOS Reference Instrument No. 1: Particle size distribution of latex 203 nm on July 07<sup>th</sup>, 2020. The peak shows at 203.01nm

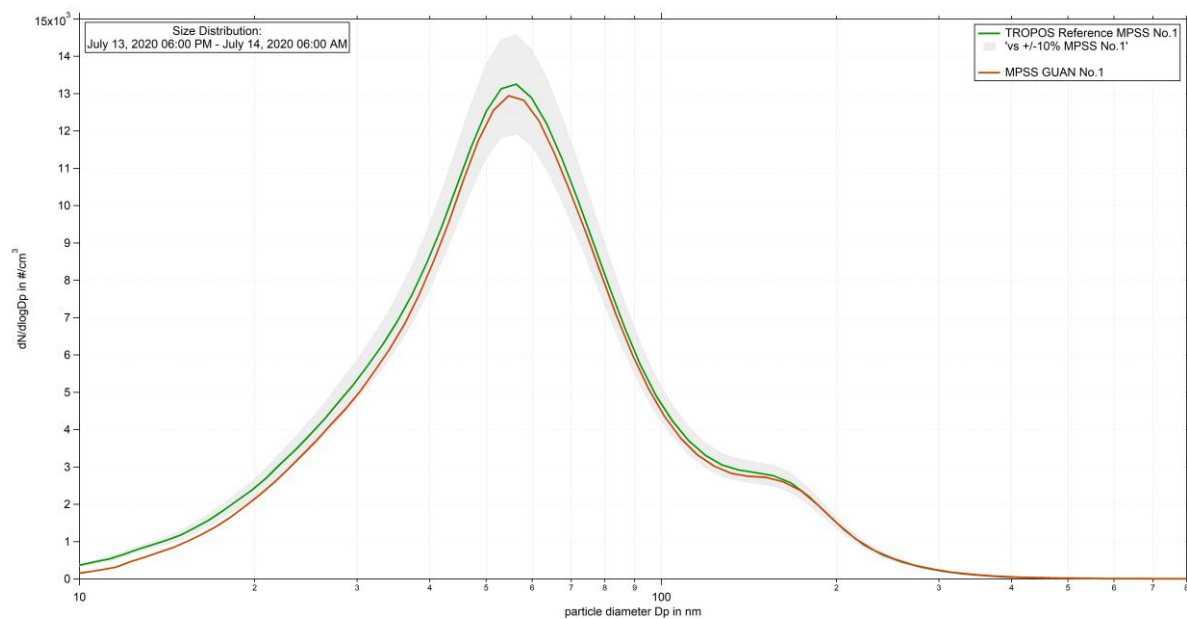


**Figure 02:** Measurement of latex 203 nm – MPSS GUAN No.01: Particle size distribution of latex 203 nm on July 07<sup>th</sup>, 2020. The peak shows at 203.25nm.

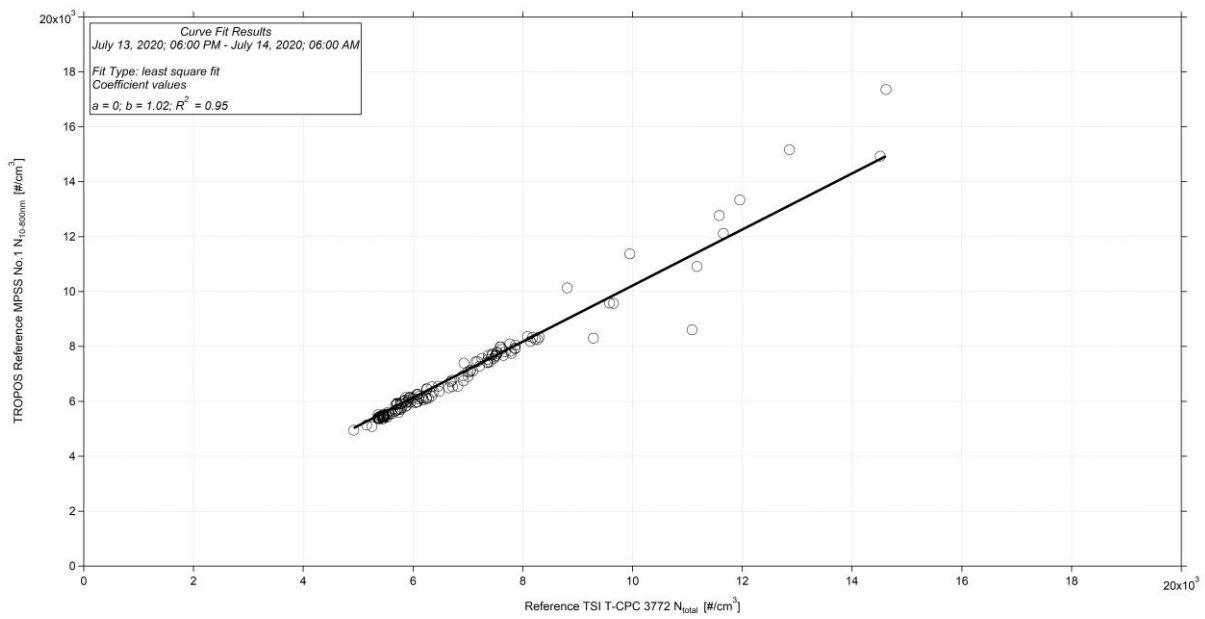
**Intercomparison between TROPOS Reference Instrument No. 1 and MPSS GUAN No.01**  
**13.07.2020 18:00 PM – 14.07.2020 06:00 AM**



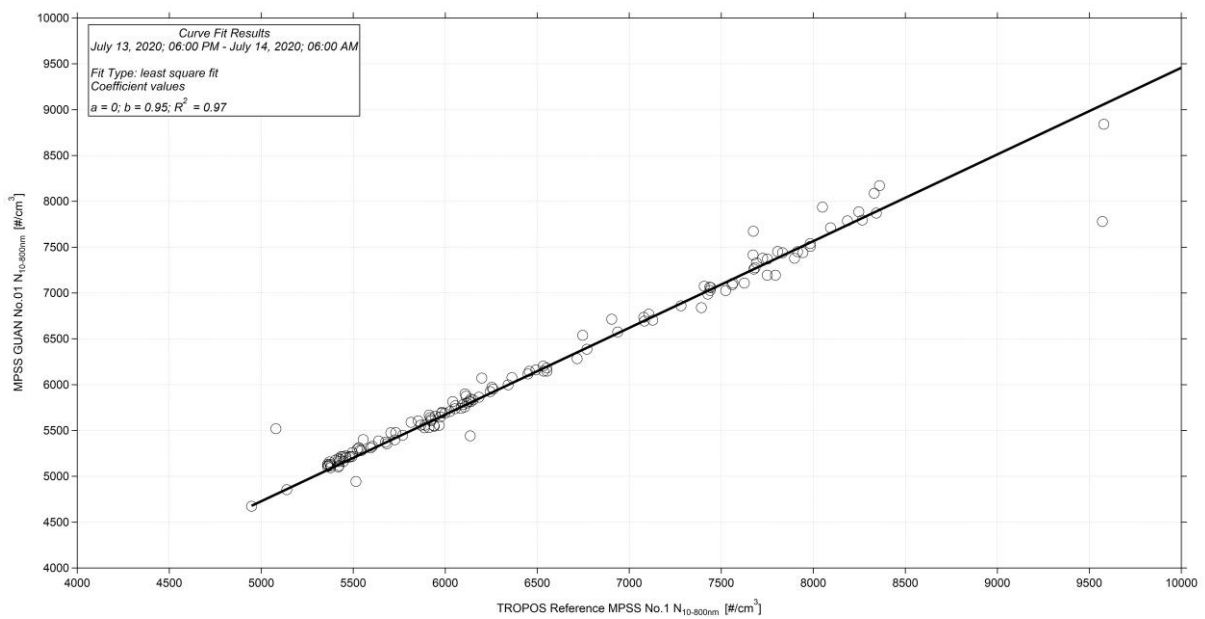
**Figure 03:** Time series (July 13, 2020 6 PM – July 14, 2020 6 AM) of the integrated particle number concentration ( $N_{10-800nm}$ ) of the MPSS and total number concentration ( $N_{total}$ ) of the Reference TSI-CPC Model 3772. Multiple charge correction, internal diffusion losses, CPC flow corrections.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



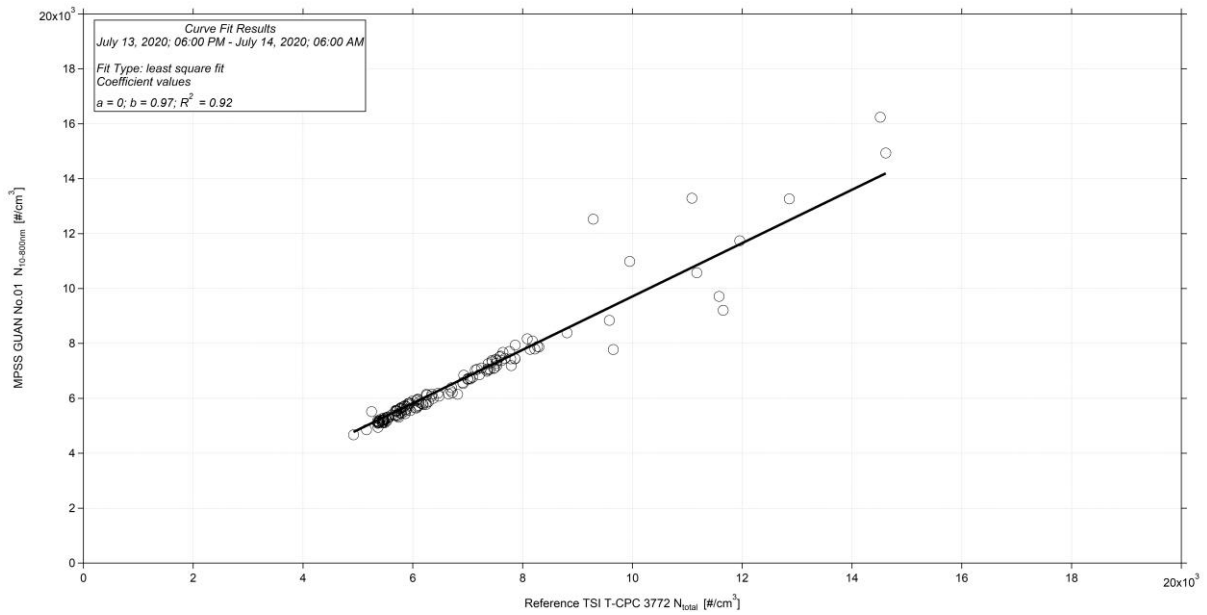
**Figure 04:** Particle size distribution for TROPOS Reference MPSS No.1 and MPSS GUAN No.01, flow corrections, multiple charge correction and diffusion loss corrections are included.



**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.01.



**Figure 09:** Linear regression between DE-TROPOS Reference T-CPC Model 3772 and MPSS GUAN No.01.