

Intercomparison of Mobility Particle Size Spectrometers

Project No.: MPSS-2019-3-9

Principal Investigator: Laurent Poulain

Home Institution: TROPOS

Participant: -

Candidate: TROPOS MPSS Chemie

Made by: **TROPOS Homemade**

Counter (SN): -

Location of the quality assurance: TROPOS Leipzig, lab 118

Comparison period: July 12, 2019 – July 15, 2019

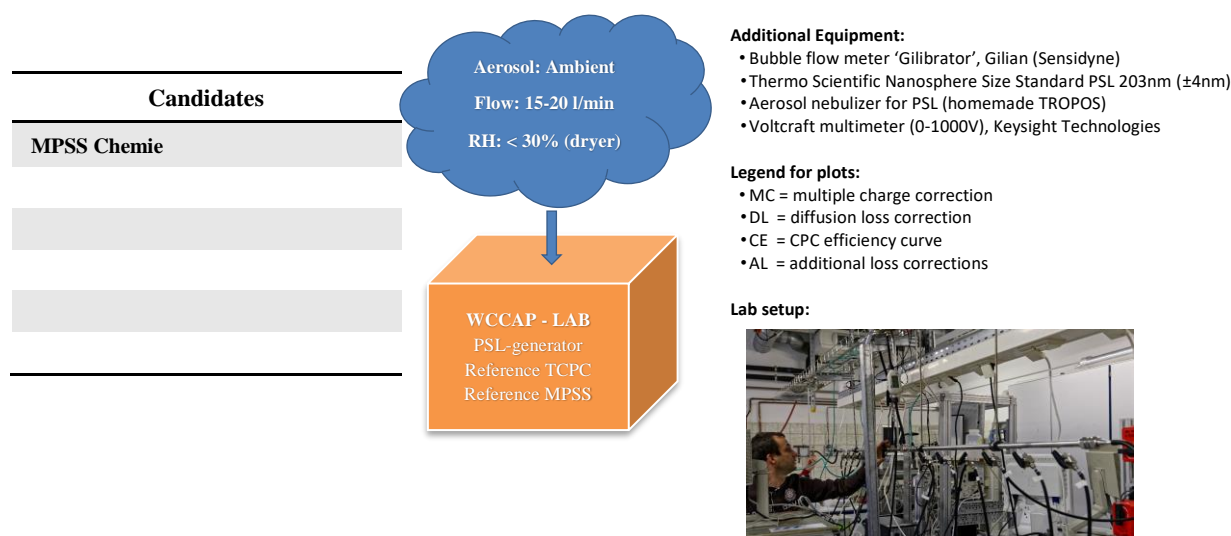
Last Intercomparison (with Project No.):

Summary of Intercomparison:

Status:

The final run took place from July 12, 2019 8 PM – July 15, 2019 6 AM. Running the candidate using the original source Kr.85 and the TSI CPC Model 3010 the performance showed a concentration 2% higher than the TROPOS Reference Instrument No.1. The candidate passed the standards of ACTRIS and GAW under the conditions, using the TROPOS Reference CPC No.1.

Laboratory Setup and Legend



Instrument Settings, Time Series, Particle Number Size Distribution and Correlation

Table No. 1:

Institute: TROPOS							
Station: MPSS Chemie							
Date of checking list: 12.07.2019							
Instrument/ Components	info	SN	Date/Code	CPC-Status		HV-Status	
MPSS/Classifier:	TROPOS			ST	-	OFF	
Firmware Classifier:	TROPOS			CT	-	4mv	5.1V
Firmware Software:				OT	-	800mv	1000.5
DMA type:	Vienna		211	CabT	-	200mv	250.2
CPC model:	TSI CPC 3010	-		AP	-	0	0.1
Firmware CPC:				OP	-		
radioactive source:	Kr.85			NP	-		
Flow CPC (l/min):				LC	full		
Flow Inlet (l/min):	0.999						
Flow Display (l/min):							
Zero (#/cm ³):							
Maintenance							
Aerosol inlet:							
Aerosol Nafion dryer:							
Sheath Nafion dryer:							
Source:							
HV power supply:							
DMA:							
Aerosol/sheath RH/T- sensor:							
Pressure sensor:							
Filter:							
NI-card:							
CPC:							
Impactor:							
Setup settings over night:							

Institute: TROPOS							
Station: Reference Instrument No.1							
Date of checking list: July 12, 2019							
Instrument/ Components	info	Serial Number	Date/Code	CPC-Status		HV-Status	
MPSS/Classifier:	TROPOS	No.1		ST	39.0	0 V	0
Firmware Classifier:				CT	22.0	5 mV	4.98
Firmware Software:	TROPOS 6.68			OT	40.0	800 mV	999.8
DMA type:	Hauke medium		142	CabT	27.3	200 mV	250.0
CPC model:	TSI 3772	3772141701		AP	98.5	0 V	0
Firmware CPC:	2.15			OP	72.1		
Radioactive source:	Kr.85	NER 8275	002/13	NP	2.8		
Flow Inlet (l/min):	1.031			LC	50		
Zero (#/cm ³):	0						

Institute: TROPOS							
Station: Reference Total CPC							
Date of checking list: July 12, 2019							
Instrument/ Components	info	Serial Number	Cut off	CPC-Status			
CPC model:	TSI 3010	2410	Dp50 10 nm	ST			
Firmware CPC:	2.15			CT			
Flow Inlet (l/min):	1.015			OT			
Zero (#/cm ³):	0			CabT			
				AP			

	OP		
	NP		
	LC		

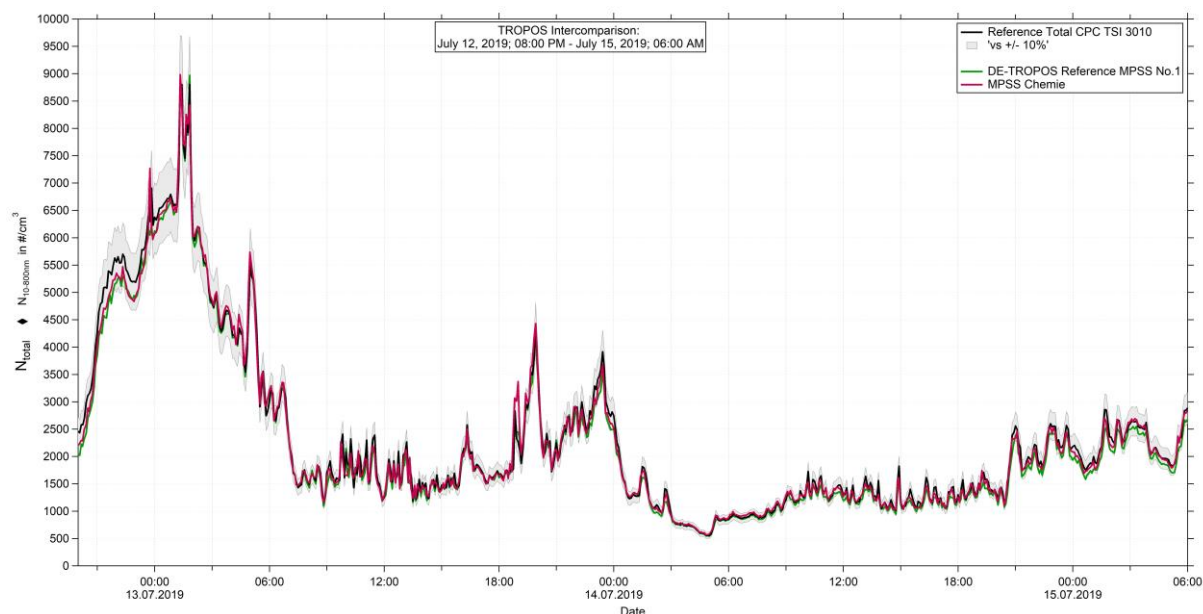


Figure 01: Time series (July 12, 2019 8 PM – July 15, 2019 6 AM) of the integrated particle number concentration ($N_{10-800nm}$) of the MPSS and total number concentration (N_{total}) of the Reference TSI-CPC Model 3010. Multiple charge correction, internal diffusion losses and CPC flow corrections are included. The candidate is running with the Kr.85 source.

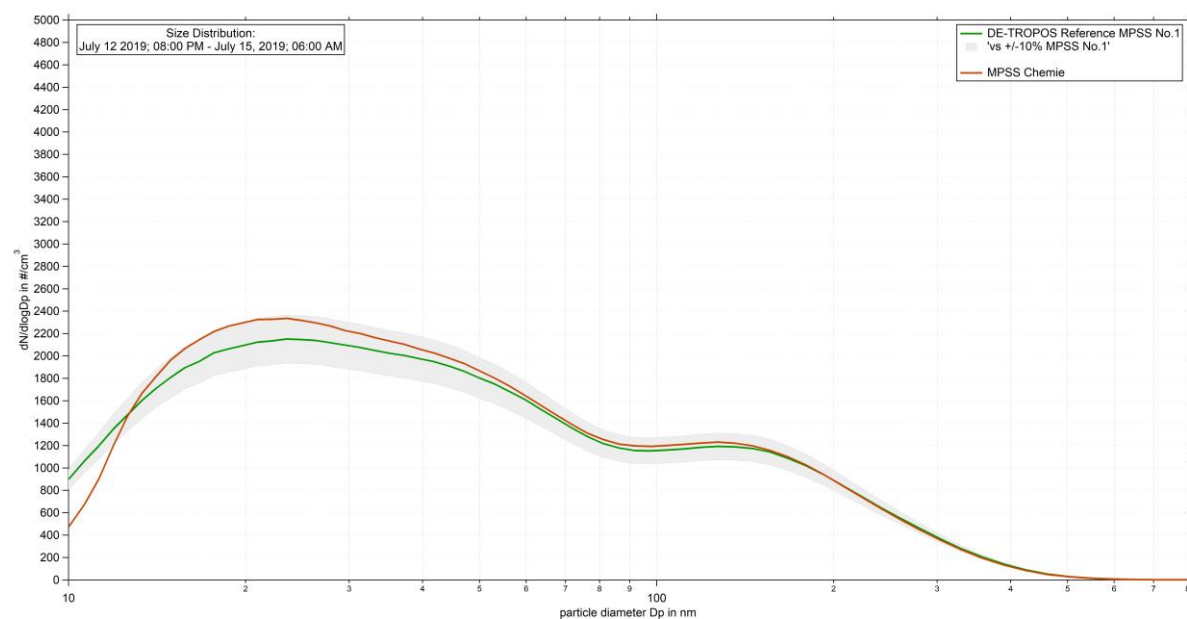


Figure 02: Comparison of mean particle number size distribution of TROPOS Reference MPSS No.1 against TROPOS-MPSS Chemie from July 12, 2019 8 PM – July 15, 2019 6 AM. Multiple charge correction, internal diffusion losses and CPC efficiency are included.

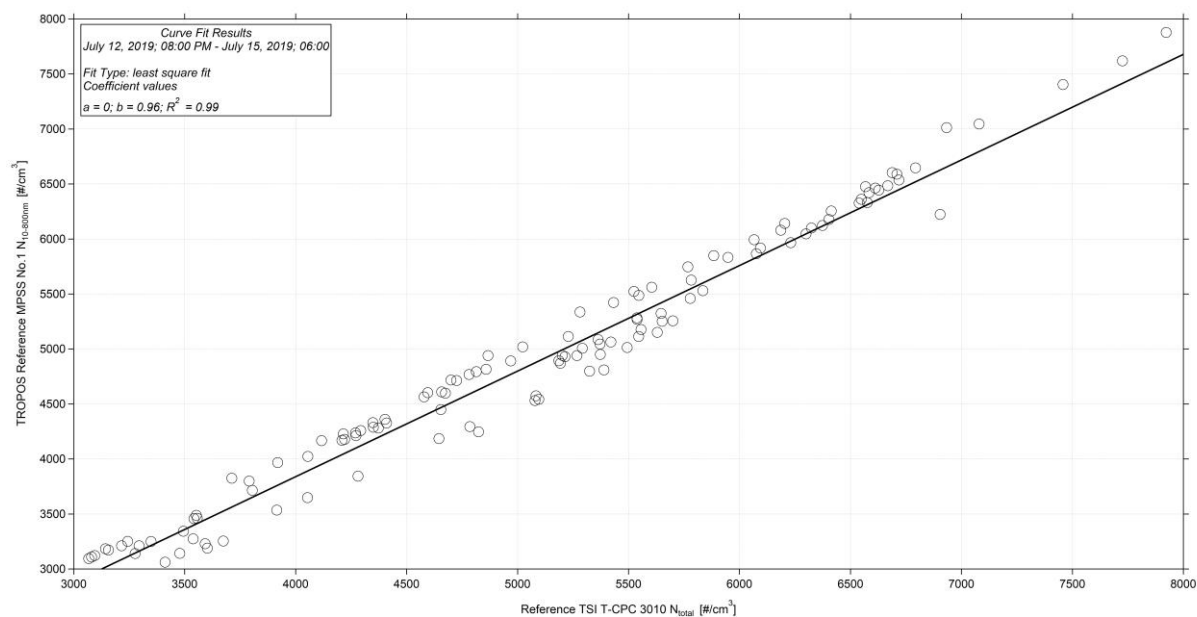


Figure 03: Linear regression between the number concentrations of the TROPOS Reference TSI T-CPC Model 3010 and TROPOS Reference MPSS No.1. Multiple charge correction, internal diffusion losses and CPC efficiency are included.

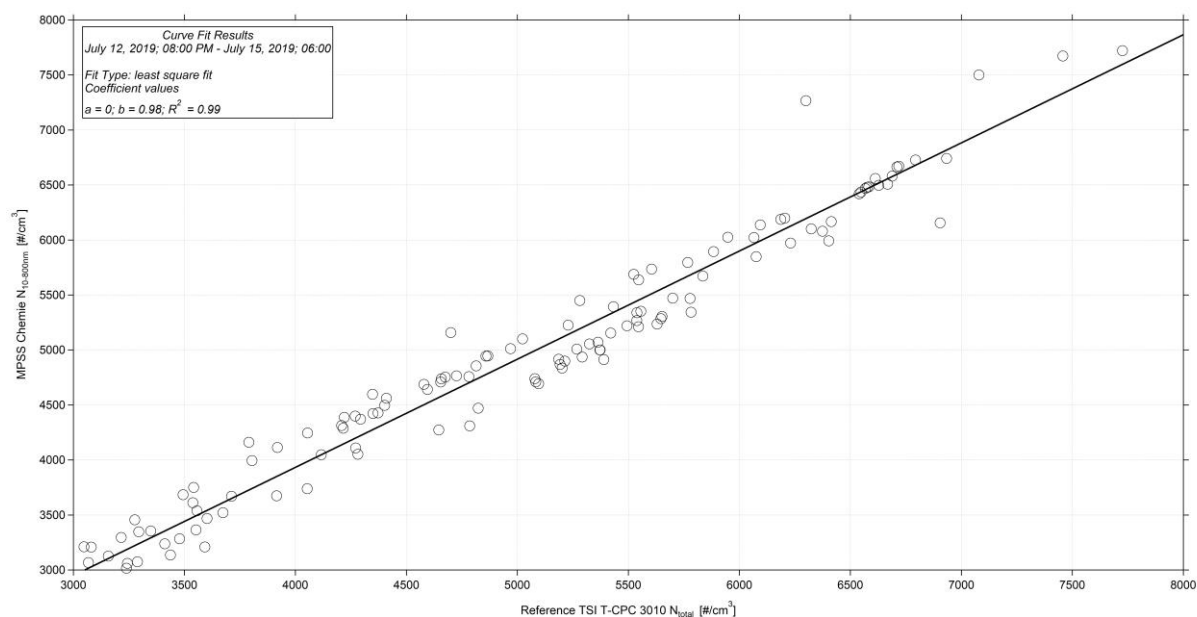


Figure 04: Linear regression between the number concentrations of the TROPOS Reference TSI T-CPC Model 3010 and TROPOS-MPSS Chemie. Multiple charge correction, internal diffusion losses and CPC efficiency are included.

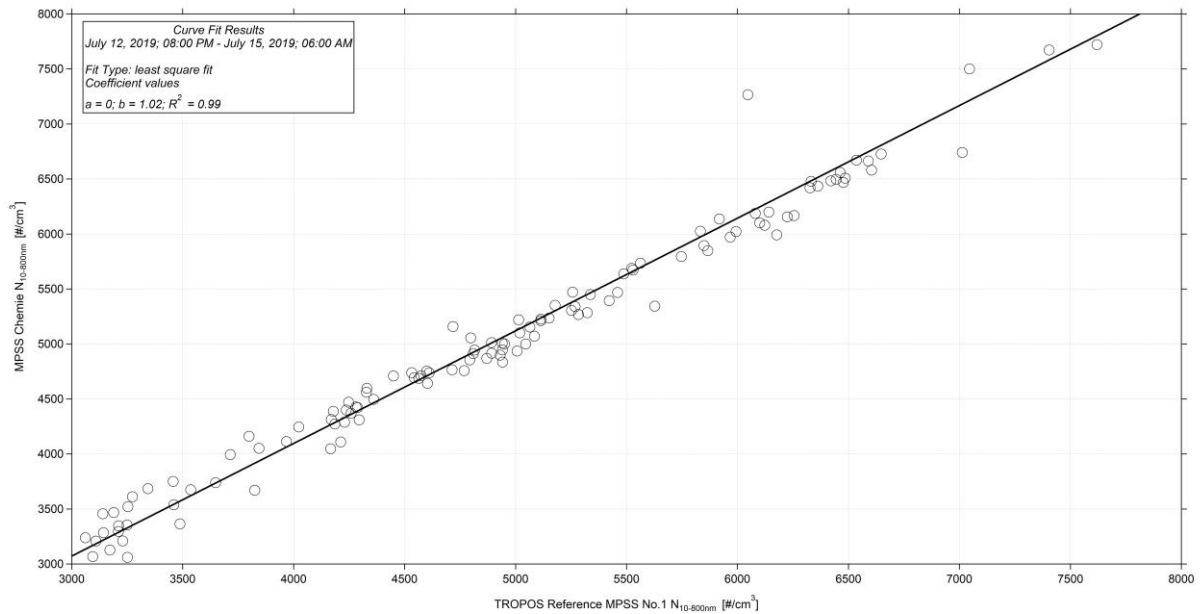


Figure 05: Linear regression between the number concentrations of the TROPOS Reference MPSS No.1 and TROPOS-MPSS Chemie. Multiple charge correction, internal diffusion losses and CPC efficiency are included.