Intercomparison of Mobility Particle Size Spectrometers

Project No.:	*MPSS-2019-3-1*
Principal Investigator:	
Home Institution:	*Danish Technological Institute*
Participant:	Søren Nielsen Skov
Candidate:	TSI MPSS DTI
Made by:	**TSI**
Counter (SN):	TSI CPC 3776 SN70701030
Location of the quality assurance:	TROPOS Leipzig, lab 118
Comparison period:	June 3, 2019 – June 7, 2019
Last Intercomparison (with Project No.):	

Leibniz-Institut für Troposphärenforschung e.V.
Telefon: +49 341 2717-7060
Telefax: +49 341 2717-99-7060
info@tropos.de
http://www.tropos.de

Commerzbank Leipzig
KTO 102 14 50
BLZ 860 400 00
IBAN: DE77 8604 0000 0102 1450 00
SWIFT CODE: COBADEFF 860

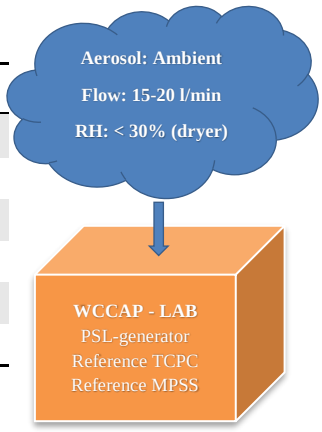
Summary of Intercomparison:

Pre-Status:
The candidate from MPSS-DTI participated in the ACTRIS workshop from June 03, 2018 to June 07, 2019 with the participant. The setup of the candidate was done on Monday, June 3rd, afternoon. During the Pre-Status the candidate was running under the same settings, with their own TSI Kr.85 source, like on the Institute. The performance of the candidate showed a concentration more than 10% lower than the TROPOS Reference Instrument No.1. On Tuesday, June 04th, after the CPC-Workshop the MPSS was checked and the first part of maintenance was done. The performance of the CPC is shown in the Report of the CPC-Workshop. The TSI CPC 3776 passed the CPC Workshop after maintenance. For more information, please look at the CPC-workshop report. During the workshop week, the whole candidate was checked and cleaned. More details are in the Tables for each night run. The participant was instructed and trained how to optimize his instrument. In addition, the station setup and quality assurance procedures were discussed.

Final-Status:
The final run took place from June 05 to June 06, 2019. Running the candidate using the original source Kr.85 and the repaired UCPC 3776 from DTI the performance showed a concentration 1% lower than the TROPOS Reference Instrument No.1. The original CPC from MPSS-DTI had technical problems that was solved after cleaning. The candidate passed the standards of ACTRIS and GAW.

Laboratory Setup and Legend

Candidates
MPSS DTI



Additional Equipment:
- Bubble flow meter 'Gilibrator', Gilian (Sensidyne)
- Thermo Scientific Nanosphere Size Standard PSL 203nm (±4nm)
- Aerosol nebulizer for PSL (homemade TROPOS)
- Voltcraft multimeter (0-1000V), Keysight Technologies

Legend for plots:
- MC = multiple charge correction
- DL = diffusion loss correction
- CE = CPC efficiency curve
- AL = additional loss corrections

Lab setup:

Leibniz-Institut für Troposphärenforschung e.V.
Telefon: +49 341 2717-7060
Telefax: +49 341 2717-99-7060
info@tropos.de
http://www.tropos.de

Commerzbank Leipzig
KTO 102 14 50
BLZ 860 400 00
IBAN: DE77 8604 0000 0102 1450 00
SWIFT CODE: COBADEFF 860

TROPOS Reference Instruments No. 1 and Reference T-CPC TSI 3010

June 03 – June 04, 2019: Time Series, Particle Number and Correlation

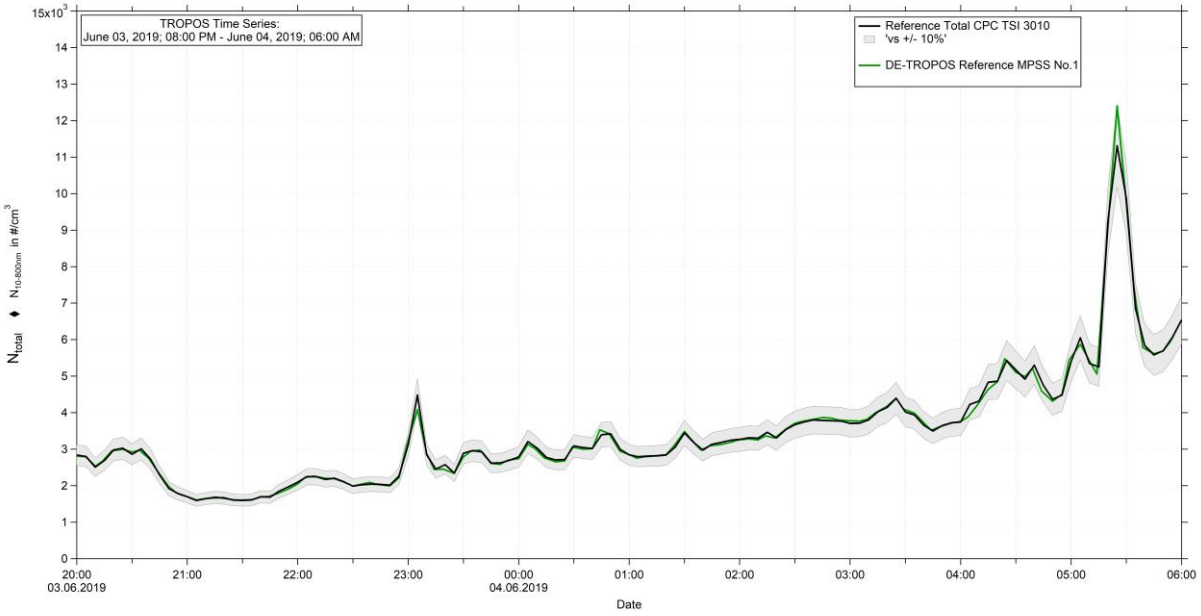


Figure 01: Time series (June 03, 2019 8 PM – June 04, 2019 6 AM) of the integrated particle number concentration ($N_{10\text{-}800nm}$) of the TROPOS Reference MPSS and total number concentration (N_{total}) of the Reference TSI-CPC Model 3010. Multiple charge correction, internal diffusion losses and CPC flow corrections are included.

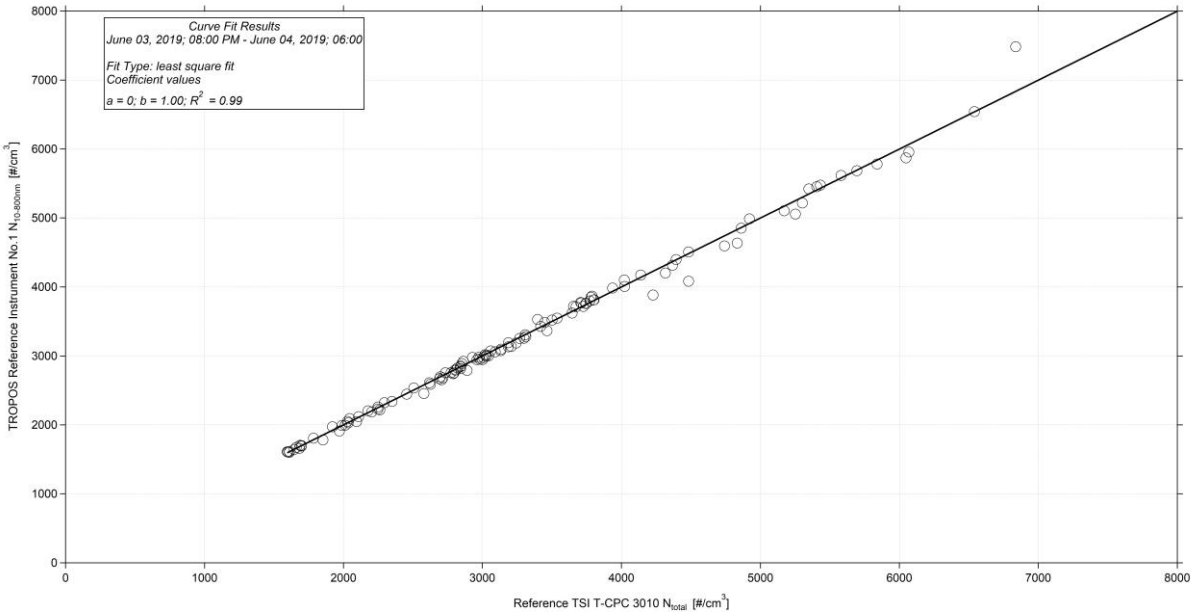


Figure 02: Linear regression between the number concentrations of the TROPOS Reference TSI T-CPC Model 3010 and TROPOS Reference MPSS No.1. Multiple charge correction, internal diffusion losses and CPC efficiency are included.

Leibniz-Institut für Troposphärenforschung e.V.
Telefon: +49 341 2717-7060
Telefax: +49 341 2717-99-7060
info@tropos.de
http://www.tropos.de

Commerzbank Leipzig
KTO 102 14 50
BLZ 860 400 00
IBAN: DE77 8604 0000 0102 1450 00
SWIFT CODE: COBADEFF 860

Mitglied der Leibniz-Gemeinschaft

PSL Scan: Latex 203 nm +/- 4 nm

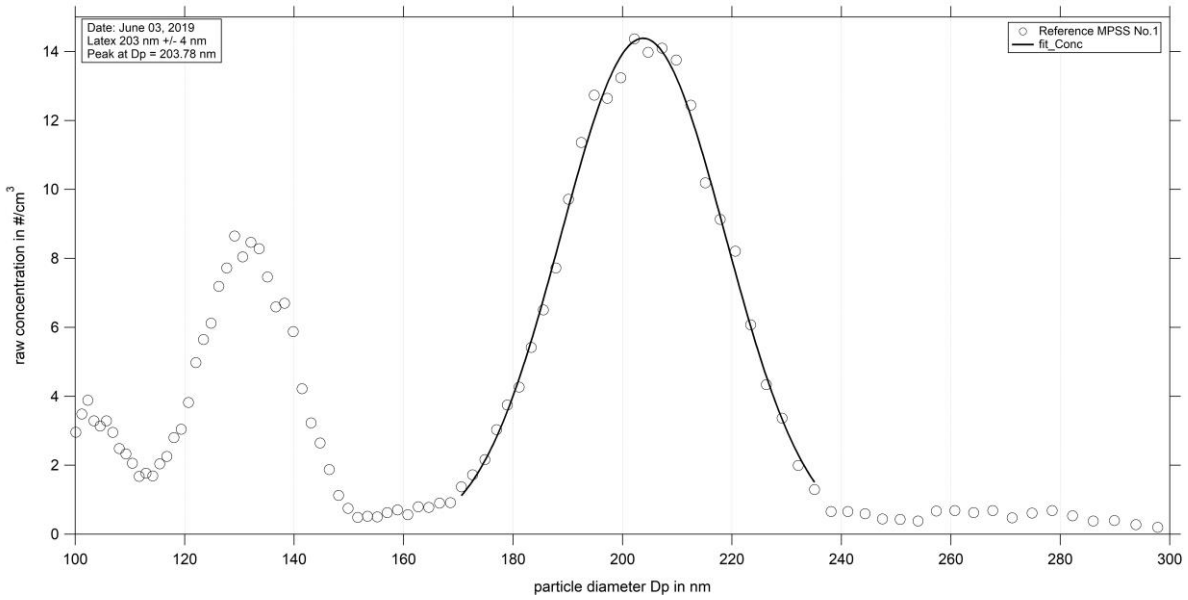


Figure 03: Measurement of latex 203 nm - Reference MPSS No.1: Particle size distribution (raw concentration) for latex 203 nm on October 15th 2018.

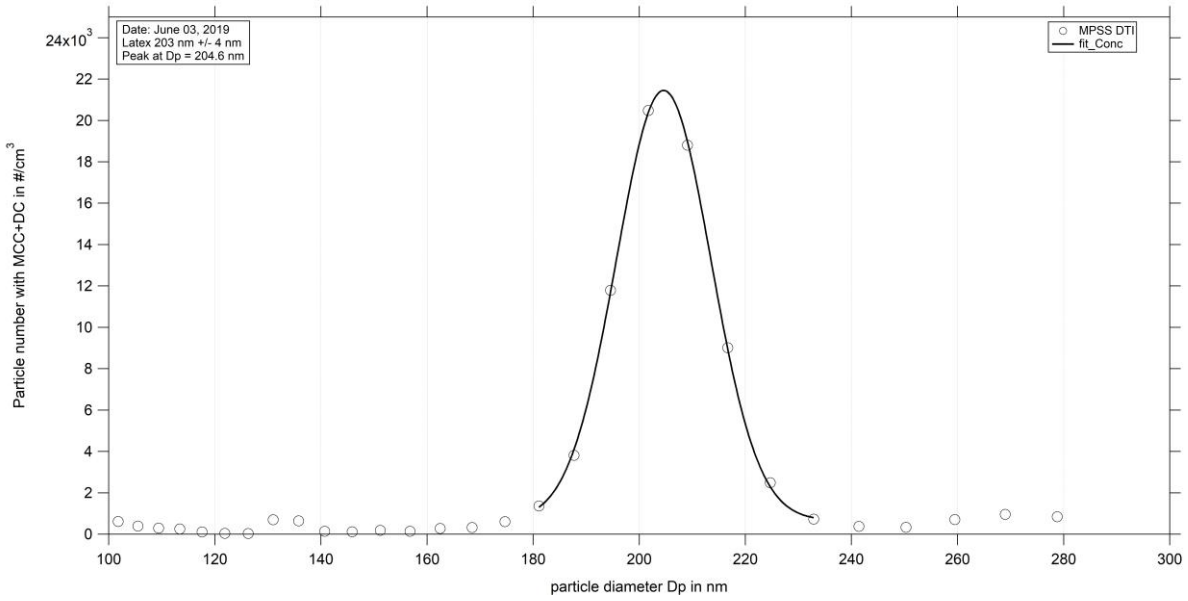


Figure 04: Measurement of latex 203 nm for the candidate MPSS-DTI: Particle size distribution for latex 203 nm on June 03rd 2019 with a peak at 204.61 nm.

Leibniz-Institut für Troposphärenforschung e.V.
Telefon: +49 341 2717-7060
Telefax: +49 341 2717-99-7060
info@tropos.de
http://www.tropos.de

Commerzbank Leipzig
KTO 102 14 50
BLZ 860 400 00
IBAN: DE77 8604 0000 0102 1450 00
SWIFT CODE: COBADEFF 860

Pre-Status June 03 – 04, 2019

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

Table No. 1:

Institute: ***Danish Technological Institute***							
Station: Denmark							
Date of checking list: ***3.6.2019***							
Instrument/ Components	*info*	*SN*	*Date/Code*	*CPC-Status*		*HV-Status*	
MPSS/Classifier:	**TSI 308200**	**3082001382001**		*ST*	**39.0**	*OFF*	**0**
Firmware Classifier:				*CT*	**10**	*5 V*	**5**
Firmware Software:				*OT*	**40**	*10 V*	**10**
DMA type:	**TSI DMA**	**3080**		*CabT*	**33.3**	*1000 V*	**999**
CPC model:	**TSI CPC 3776**	**70701030**		*AP*	**98.8**	*250 V*	**250**
Firmware CPC:				*OP*	**60.2**	*5 V*	**5**
radioactive source:	**Kr.85**	**77A-0074**		*NP*	**2.3**		
Flow CPC (l/min):	**0.31**			*LC*	**full**		
Flow Inlet (l/min):							
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: ***03.06.2019***							
Instrument/ Components	*info*	*Serial Number*	*Date/Code*	*CPC-Status*		*HV-Status*	
MPSS/Classifier:	**TROPOS**	**No.1**		*ST*	**39.0**	*0 V*	**0.1**
Firmware Classifier:				*CT*	**22.0**	*5 mV*	**4.8**
Firmware Software:	**TROPOS 6.68**			*OT*	**40.0**	*800 mV*	**999.7**
DMA type:	**Hauke medium**		**142**	*CabT*	**30.2**	*200 mV*	**249.6**
CPC model:	**TSI 3772**	**3772141701**		*AP*	**99.6**	*0 V*	**0**
Firmware CPC:	**2.15**			*OP*	**74.3**		
Radioactive source:	**Kr.85**	**NER 8275**	**002/13**	*NP*	**2.8**		
Flow Inlet (l/min):	**1.026**			*LC*	**50**		
Zero (#/cm^3):	**0**						

Leibniz-Institut für Troposphärenforschung e.V.
Telefon: +49 341 2717-7060
Telefax: +49 341 2717-99-7060
info@tropos.de
http://www.tropos.de

Commerzbank Leipzig
KTO 102 14 50
BLZ 860 400 00
IBAN: DE77 8604 0000 0102 1450 00
SWIFT CODE: COBADEFF 860

Institute: **TROPOS**					
Station: **Reference Total CPC**					
Date of checking list: **03.06.2019**					
Instrument/ Components	*info*	*Serial Number*	*Cut off*	*CPC-Status*	
CPC model:	**TSI 3010**	**2410**	**D_{p50} 10 nm**	*ST*	
Firmware CPC:	**2.15**			*CT*	
Flow Inlet (l/min):	**1.002**			*OT*	
Zero (#/cm^3):	**0**			*CabT*	
				AP	
				OP	
				NP	
				LC	

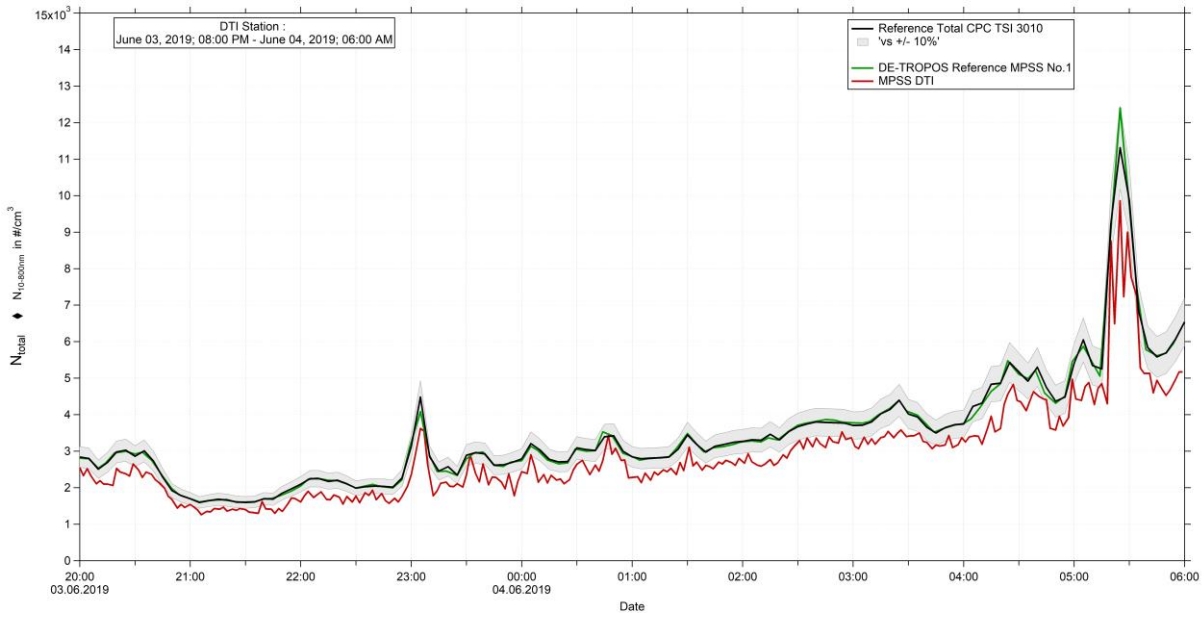


Figure 05: Time series (June 03, 2019 8 PM – June 04, 2019 6 AM) of the integrated particle number concentration ($N_{10\text{-}800nm}$) of the MPSS and total number concentration (N_{total}) of the Reference TSI-CPC Model 3010. Multiple charge correction, internal diffusion losses and CPC flow corrections are included. The candidate is running with the Kr.85 source.

Leibniz-Institut für Troposphärenforschung e.V.
Telefon: +49 341 2717-7060
Telefax: +49 341 2717-99-7060
info@tropos.de
http://www.tropos.de

Commerzbank Leipzig
KTO 102 14 50
BLZ 860 400 00
IBAN: DE77 8604 0000 0102 1450 00
SWIFT CODE: COBADEFF 860

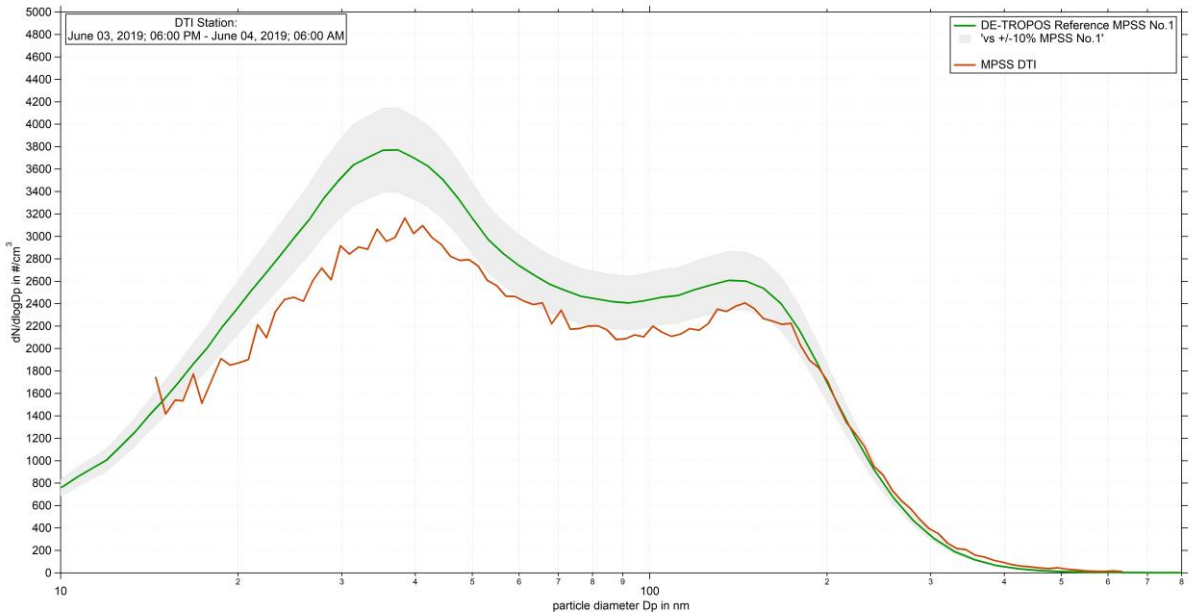


Figure 06: Comparison of mean particle number size distribution of TROPOS Reference MPSS No.1 against MPSS-DTI from June 03, 2019 8 PM – June 04, 2019 06:00 AM. Multiple charge correction, internal diffusion losses.

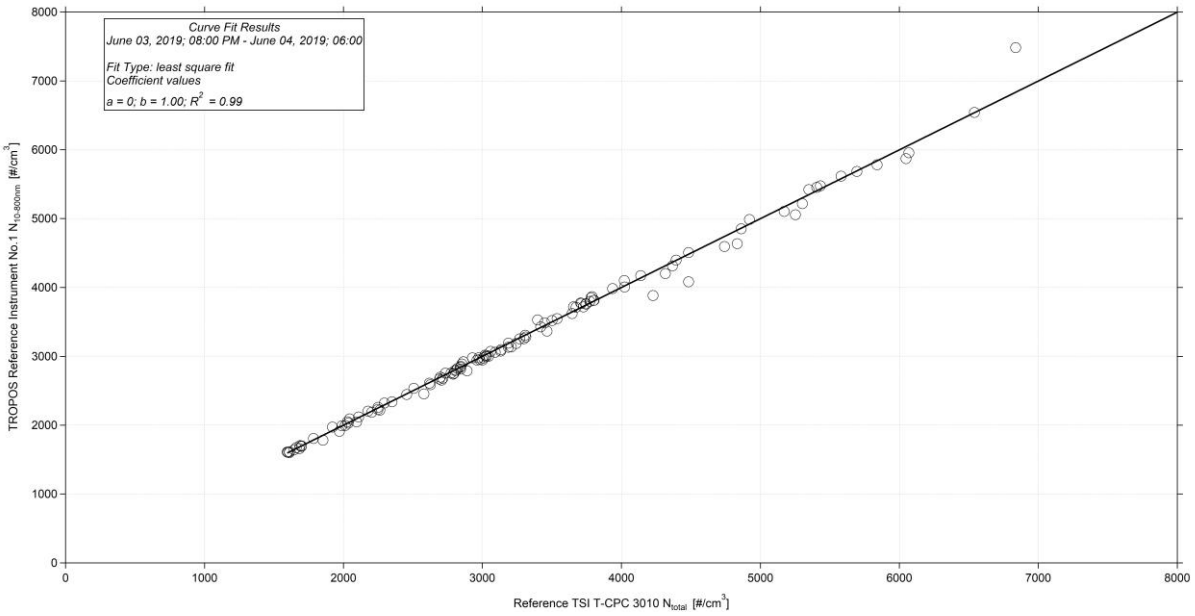


Figure 07: Linear regression between the number concentrations of the TROPOS Reference TSI T-CPC Model 3010 and TROPOS Reference MPSS No.1. Multiple charge correction, internal diffusion losses and CPC efficiency are included.

Leibniz-Institut für Troposphärenforschung e.V.
Telefon: +49 341 2717-7060
Telefax: +49 341 2717-99-7060
info@tropos.de
http://www.tropos.de

Commerzbank Leipzig
KTO 102 14 50
BLZ 860 400 00
IBAN: DE77 8604 0000 0102 1450 00
SWIFT CODE: COBADEFF 860

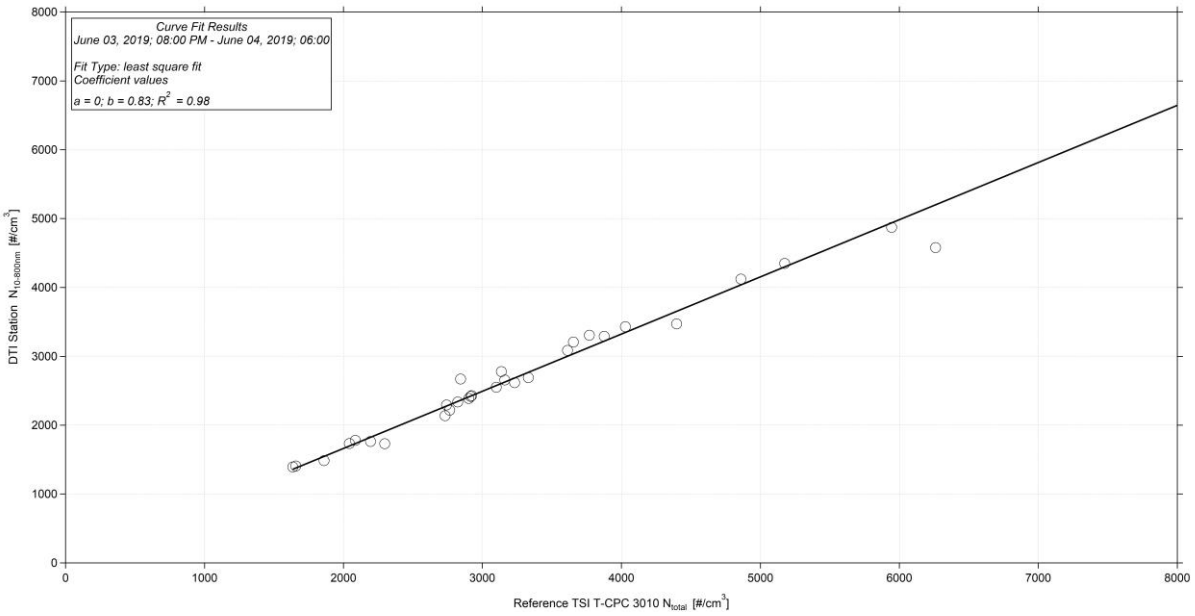


Figure 08: Linear regression between the number concentrations of the TROPOS Reference TSI T-CPC Model 3010 and DTI-MPSS. Multiple charge correction, internal diffusion losses and CPC efficiency are included.

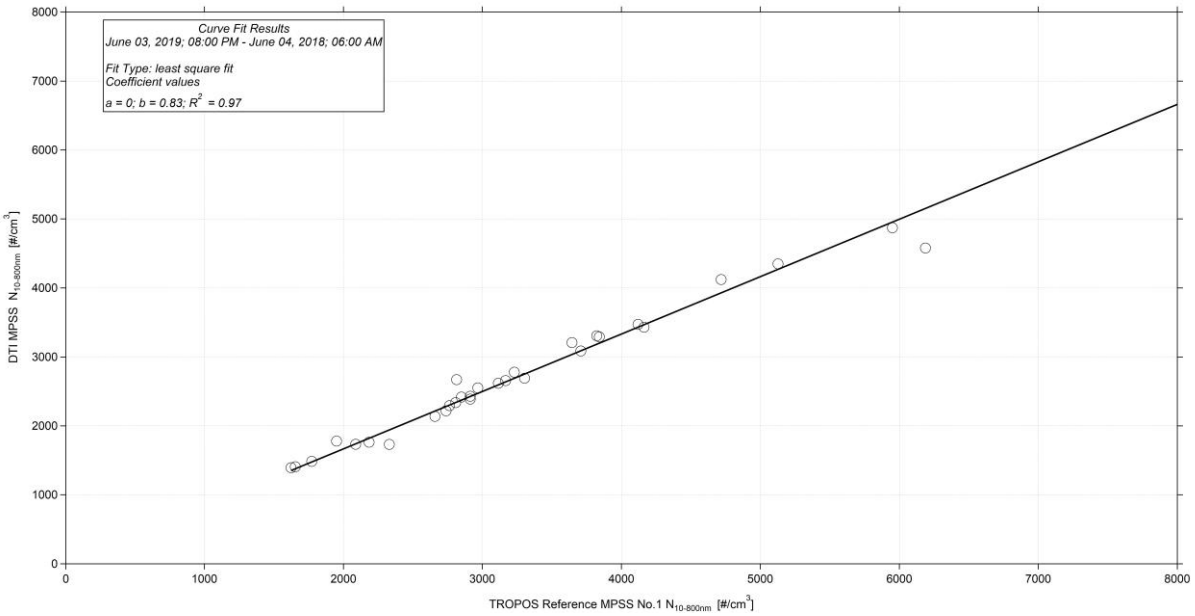


Figure 09: Linear regression between the number concentrations of the TROPOS Reference MPSS No.1 and DTI-MPSS. Multiple charge correction, internal diffusion losses and CPC efficiency are included.

Leibniz-Institut für Troposphärenforschung e.V.
Telefon: +49 341 2717-7060
Telefax: +49 341 2717-99-7060
info@tropos.de
http://www.tropos.de

Commerzbank Leipzig
KTO 102 14 50
BLZ 860 400 00
IBAN: DE77 8604 0000 0102 1450 00
SWIFT CODE: COBADEFF 860

Status June 04 – 05, 2019

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

Table No. 2:

Institute: ***Danish Technological Institute***							
Station: Denmark							
Date of checking list: ***04.06.2019***							
Instrument/ Components	*info*	*SN*	*Date/Code*	*CPC-Status*		*HV-Status*	
MPSS/Classifier:	**TSI 308200**	**3082001382001**		*ST*		*OFF*	
Firmware Classifier:				*CT*		*5 V*	
Firmware Software:				*OT*		*10 V*	
DMA type:	**TSI DMA**	**3080**		*CabT*		*1000 V*	
CPC model:	**TSI CPC 3772**	**3772154301**	**Box4 TROPOS**	*AP*		*250 V*	
Firmware CPC:				*OP*		*5 V*	
radioactive source:	**Kr.85**	**77A-0074**		*NP*		*400 V*	
Flow CPC (l/min):				*LC*		*600 V*	
Flow Inlet (l/min):	**1.040**					*800 V*	
Flow Display (l/min):						*700 V*	
Zero (#/cm^3):						*650 V*	
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:	**UCPC Changed with BOX4 TROPOS SN3772154301**						
Impactor:							
Setup settings over night:							

Institute: **TROPOS**							
Station: **Reference Instrument No.1**							
Date of checking list: **June 04, 2019**							
Instrument/ Components	*info*	*Serial Number*	*Date/Code*	*CPC-Status*		*HV-Status*	
MPSS/Classifier:	**TROPOS**	**No.1**		*ST*		*0 V*	
Firmware Classifier:				*CT*		*5 mV*	
Firmware Software:	**TROPOS 6.68**			*OT*		*800 mV*	
DMA type:	**Hauke medium**		**142**	*CabT*		*200 mV*	
CPC model:	**TSI 3772**	**3772141701**		*AP*		*0 V*	
Firmware CPC:	**2.15**			*OP*			
Radioactive source:	**Kr.85**	**NER 8275**	**002/13**	*NP*			
Flow Inlet (l/min):	**1.022**			*LC*			
Zero (#/cm^3):	**0**						

Leibniz-Institut für Troposphärenforschung e.V.
Telefon: +49 341 2717-7060
Telefax: +49 341 2717-99-7060
info@tropos.de
http://www.tropos.de

Commerzbank Leipzig
KTO 102 14 50
BLZ 860 400 00
IBAN: DE77 8604 0000 0102 1450 00
SWIFT CODE: COBADEFF 860

Institute: **TROPOS**						
Station: **Reference Total CPC**						
Date of checking list: **June 04, 2019**						
Instrument/ Components	*info*	*Serial Number*	*Cut off*	*CPC-Status*		
CPC model:	**TSI 3010**	**2410**	**D_{p50} 10 nm**	*ST*		
Firmware CPC:	**2.15**			*CT*		
Flow Inlet (l/min):	**1.011**			*OT*		
Zero (#/cm³):	**0**			*CabT*		
				AP		
				OP		
				NP		
				LC		

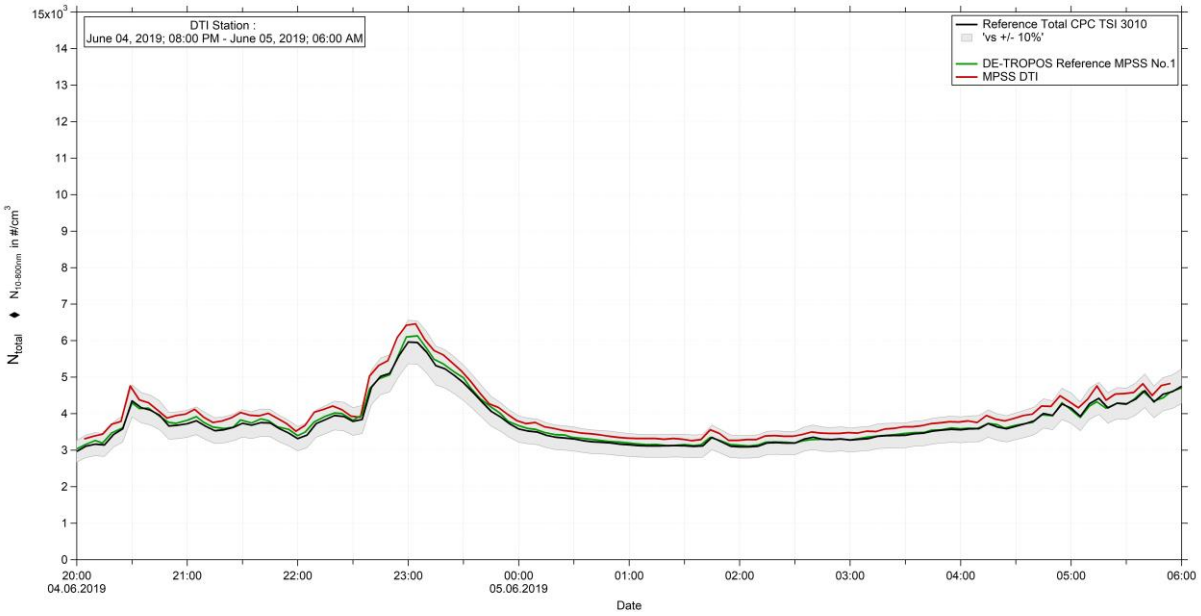


Figure 10: Time series (June 04, 2019 8 PM – June 05, 2019 6 AM) of the integrated particle number concentration ($N_{10\text{-}800nm}$) of the MPSS and total number concentration (N_{total}) of the Reference TSI-CPC Model 3010. Multiple charge correction, internal diffusion losses and CPC flow corrections are included.

Leibniz-Institut für Troposphärenforschung e.V.
Telefon: +49 341 2717-7060
Telefax: +49 341 2717-99-7060
info@tropos.de
http://www.tropos.de

Commerzbank Leipzig
KTO 102 14 50
BLZ 860 400 00
IBAN: DE77 8604 0000 0102 1450 00
SWIFT CODE: COBADEFF 860

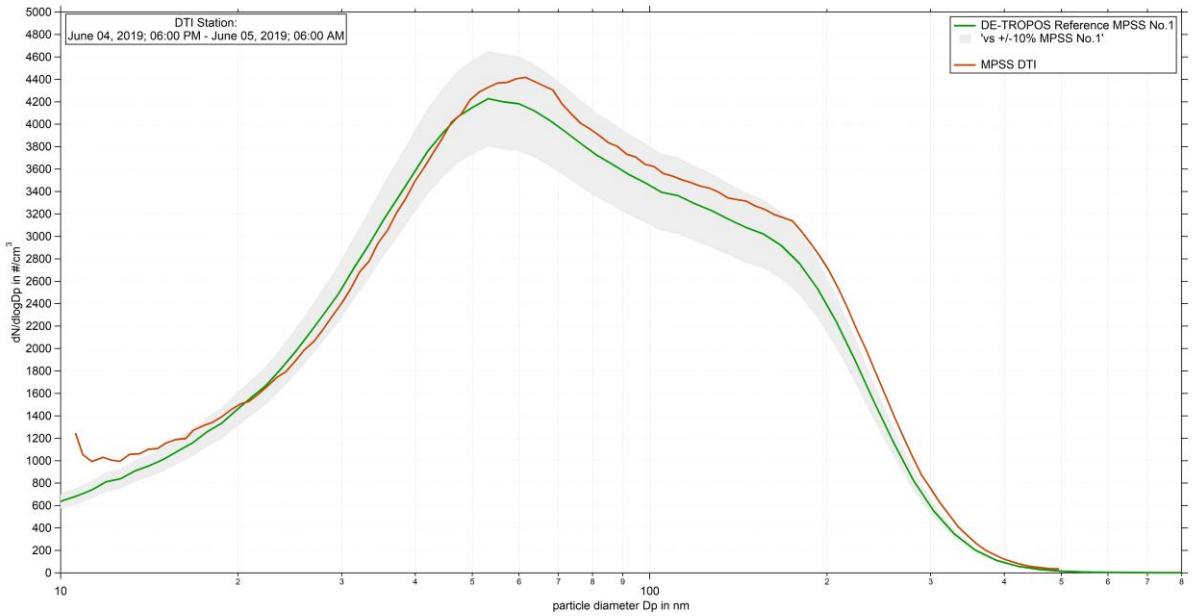


Figure 11: Comparison of median particle number size distribution of TROPOS Reference MPSS No.1 against MPSS-DTI With TROPOS Box4 CPC SN3772154301 from June 04, 2019 8 PM – June 05, 2019 6 AM. Multiple charge correction, internal diffusion losses.

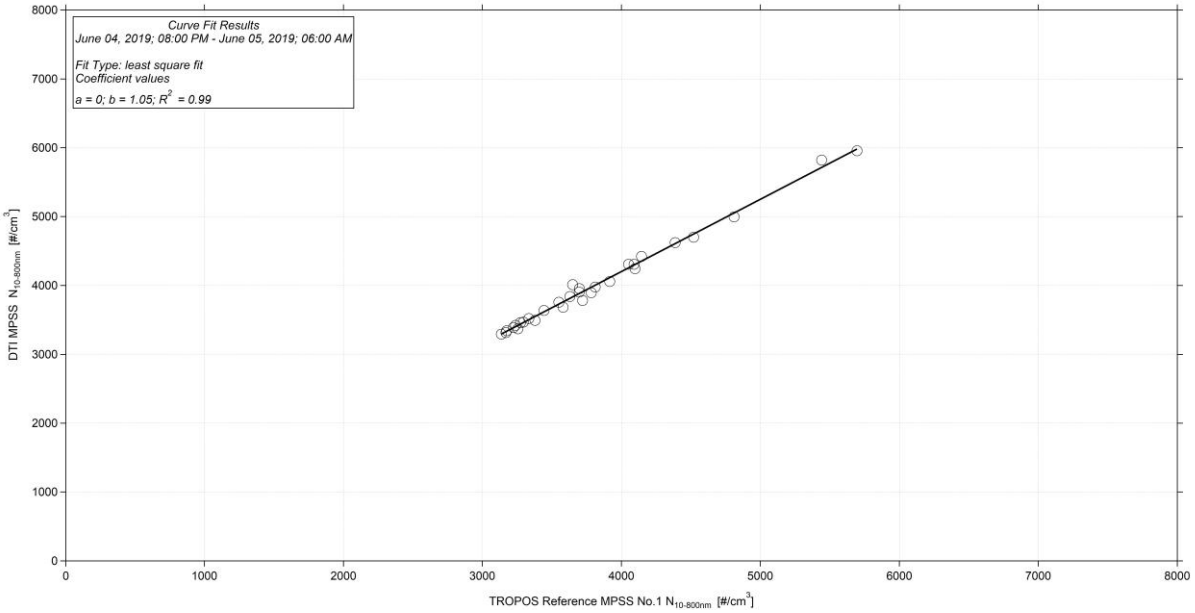


Figure 12: Linear regression between the number concentrations of the TROPOS Reference MPSS No.1 and DTI-MPSS. Multiple charge correction, internal diffusion losses and CPC efficiency are included.

Leibniz-Institut für Troposphärenforschung e.V.
Telefon: +49 341 2717-7060
Telefax: +49 341 2717-99-7060
info@tropos.de
http://www.tropos.de

Commerzbank Leipzig
KTO 102 14 50
BLZ 860 400 00
IBAN: DE77 8604 0000 0102 1450 00
SWIFT CODE: COBADEFF 860

Final-Status June 05 – 06, 2019

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

Table No. 2:

Institute: ***Danish Technological Institute***							
Station: Denmark							
Date of checking list: ***05.06.2019***							
Instrument/ Components	*info*	*SN*	*Date/Code*	*CPC-Status*		*HV-Status*	
MPSS/Classifier:	**TSI 308200**	**3082001382001**		*ST*		*OFF*	
Firmware Classifier:				*CT*		*5 V*	
Firmware Software:				*OT*		*10 V*	
DMA type:	**TSI DMA**	**3080**		*CabT*		*1000 V*	
CPC model:	**TSI CPC 3776**	**70701030**		*AP*		*250 V*	
Firmware CPC:				*OP*		*5 V*	
radioactive source:	**Kr.85**	**77A-0074**		*NP*		*400 V*	
Flow CPC (l/min):				*LC*		*600 V*	
Flow Inlet (l/min):	**0.30**					*800 V*	
Flow Display (l/min):						*700 V*	
Zero (#/cm^3):						*650 V*	
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:	**UCPC Installed instead of the Box4: Flow adjustment made on UCPC**						
Impactor:	**Dummy Impactor**						
Setup settings over night:							

Institute: **TROPOS**							
Station: **Reference Instrument No.1**							
Date of checking list: **June 05, 2019**							
Instrument/ Components	*info*	*Serial Number*	*Date/Code*	*CPC-Status*		*HV-Status*	
MPSS/Classifier:	**TROPOS**	**No.1**		*ST*		*0 V*	
Firmware Classifier:				*CT*		*5 mV*	
Firmware Software:	**TROPOS 6.68**			*OT*		*800 mV*	
DMA type:	**Hauke medium**		**142**	*CabT*		*200 mV*	
CPC model:	**TSI 3772**	**3772141701**		*AP*		*0 V*	
Firmware CPC:	**2.15**			*OP*			
Radioactive source:	**Kr.85**	**NER 8275**	**002/13**	*NP*			
Flow Inlet (l/min):	**1.02**			*LC*			
Zero (#/cm^3):	**0**						

Leibniz-Institut für Troposphärenforschung e.V.
Telefon: +49 341 2717-7060
Telefax: +49 341 2717-99-7060
info@tropos.de
http://www.tropos.de

Commerzbank Leipzig
KTO 102 14 50
BLZ 860 400 00
IBAN: DE77 8604 0000 0102 1450 00
SWIFT CODE: COBADEFF 860

Institute: **TROPOS**					
Station: **Reference Total CPC**					
Date of checking list: **June 05, 2019**					
Instrument/ Components	*info*	*Serial Number*	*Cut off*	*CPC-Status*	
CPC model:	**TSI 3010**	**2410**	**D_{p50} 10 nm**	*ST*	
Firmware CPC:	**2.15**			*CT*	
Flow Inlet (l/min):	**1.01**			*OT*	
Zero (#/cm³):	**0**			*CabT*	
				AP	
				OP	
				NP	
				LC	

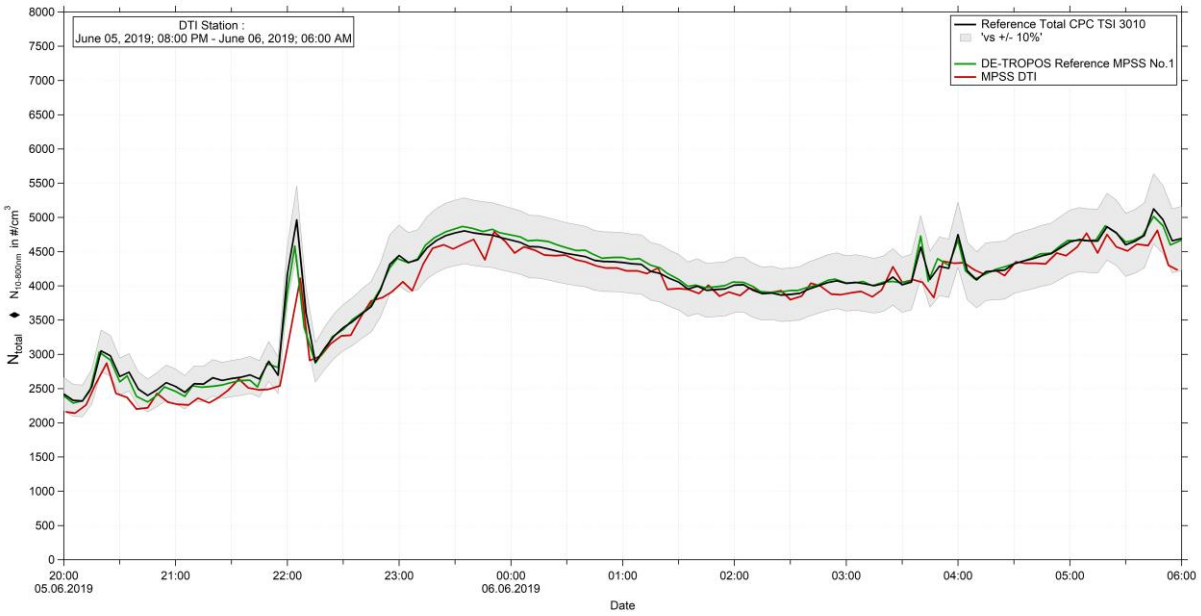


Figure 13: Time series (June 05, 2019 8 PM – June 06, 2019 6 AM) of the integrated particle number concentration ($N_{10\text{-}800nm}$ or $N_{10.6\text{-}500nm}$) of the MPSS and total number concentration (N_{total}) of the Reference TSI-CPC Model 3010. Multiple charge correction, internal diffusion losses and CPC flow corrections are included.

Leibniz-Institut für Troposphärenforschung e.V.
Telefon: +49 341 2717-7060
Telefax: +49 341 2717-99-7060
info@tropos.de
http://www.tropos.de

Commerzbank Leipzig
KTO 102 14 50
BLZ 860 400 00
IBAN: DE77 8604 0000 0102 1450 00
SWIFT CODE: COBADEFF 860

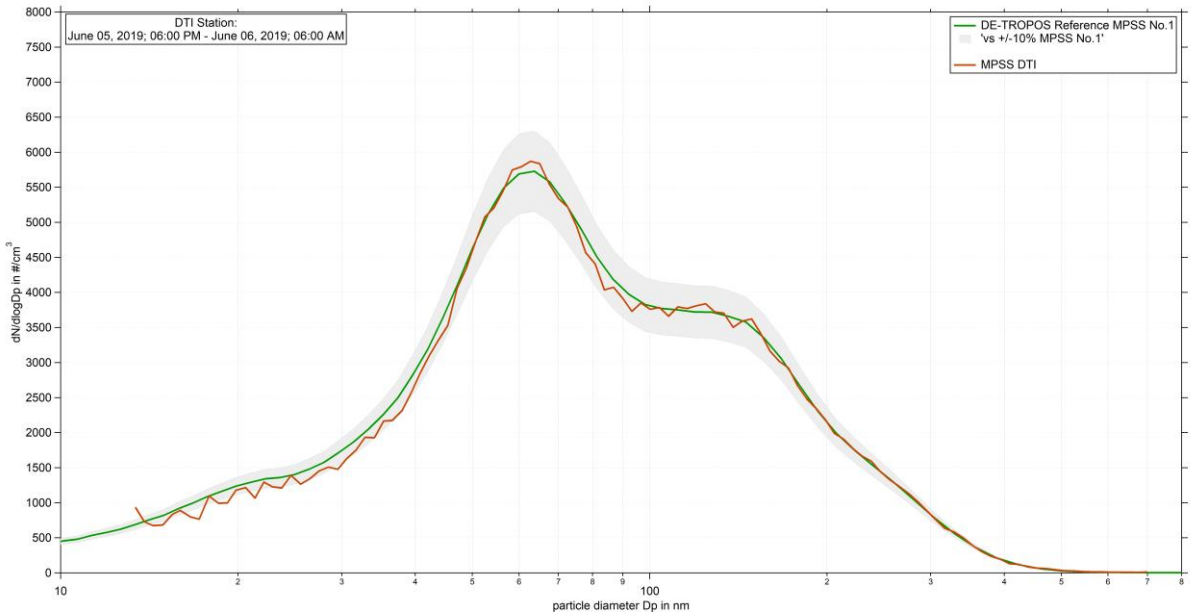


Figure 14: Comparison of median particle number size distribution of TROPOS Reference MPSS No.1 against DTI-MPSS from June 05, 2019 8 PM – June 06, 2019 6 AM. Multiple charge correction, internal diffusion losses and CPC efficiency are included in different steps.

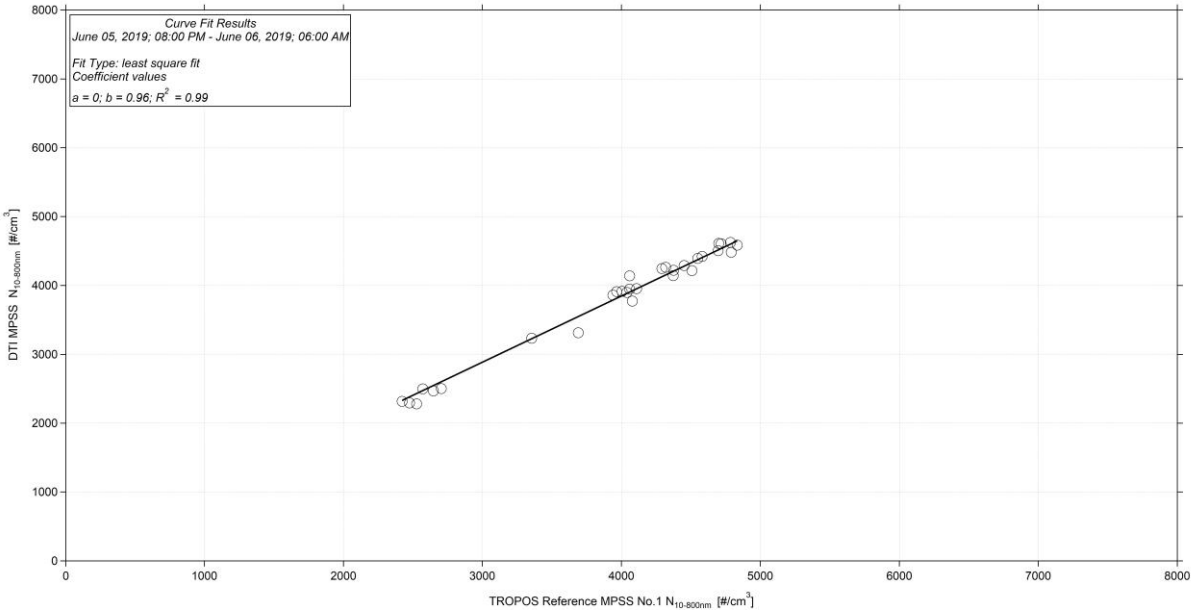


Figure 15: Linear regression between the number concentrations of the TROPOS Reference MPSS No.1 and DTI-MPSS. Multiple charge correction, internal diffusion losses and CPC efficiency are included.

Leibniz-Institut für Troposphärenforschung e.V.
Telefon: +49 341 2717-7060
Telefax: +49 341 2717-99-7060
info@tropos.de
http://www.tropos.de

Commerzbank Leipzig
KTO 102 14 50
BLZ 860 400 00
IBAN: DE77 8604 0000 0102 1450 00
SWIFT CODE: COBADEFF 860

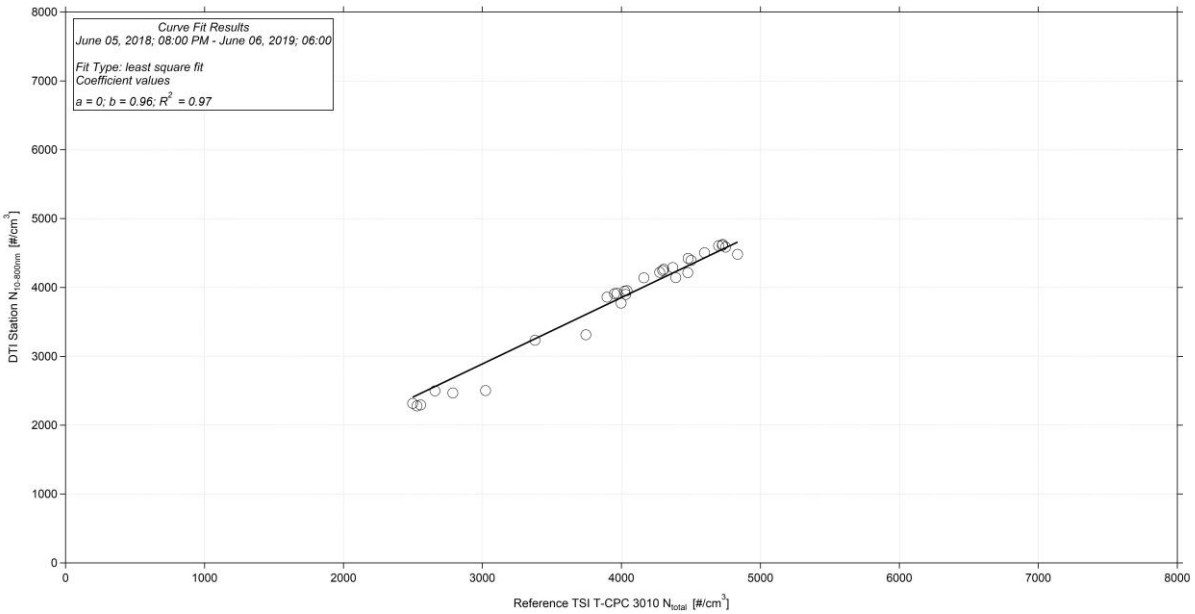


Figure 16: Linear regression between the number concentrations of the TROPOS Reference CPC 3010 and DTI-MPSS. Multiple charge correction, internal diffusion losses and CPC efficiency are included.

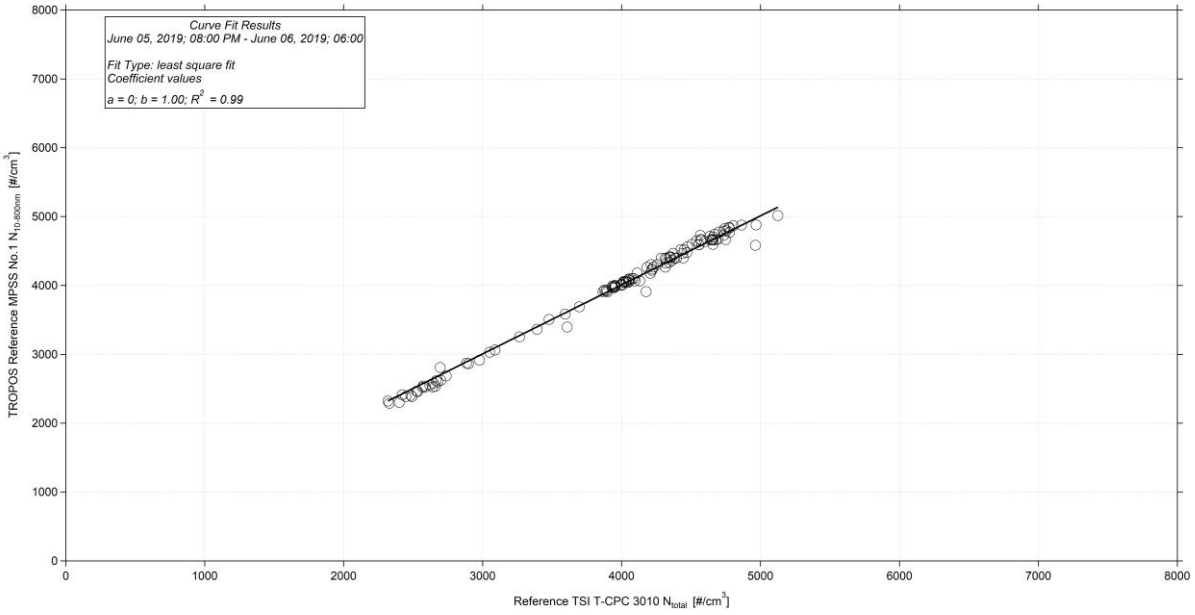


Figure 17: Linear regression between the number concentrations of the TROPOS Reference CPC 3010 and TROPOS Reference MPSS No.1. Multiple charge correction, internal diffusion losses and CPC efficiency are included.

Leibniz-Institut für Troposphärenforschung e.V.
Telefon: +49 341 2717-7060
Telefax: +49 341 2717-99-7060
info@tropos.de
http://www.tropos.de

Commerzbank Leipzig
KTO 102 14 50
BLZ 860 400 00
IBAN: DE77 8604 0000 0102 1450 00
SWIFT CODE: COBADEFF 860

Status June 06 – 07, 2019

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

Table No. 3:

Institute: ***Danish Technological Institute***							
Station: Denmark							
Date of checking list: ***06/06/2019***							
Instrument/ Components	*info*	*SN*	*Date/Code*	*CPC-Status*		*HV-Status*	
MPSS/Classifier:	**TSI 308200**	**3082001382001**		*ST*		*OFF*	
Firmware Classifier:				*CT*		*5 V*	
Firmware Software:				*OT*		*10 V*	
DMA type:	**TSI NanoDMA**			*CabT*		*1000 V*	
CPC model:	**TSI CPC 3776**	**70701030**		*AP*		*250 V*	
Firmware CPC:				*OP*		*5 V*	
radioactive source:	**Kr.85**	**77A-0074**		*NP*		*400 V*	
Flow CPC (l/min):				*LC*		*600 V*	
Flow Inlet (l/min):	**0.30**					*800 V*	
Flow Display (l/min):						*700 V*	
Zero (#/cm^3):						*650 V*	
Maintenance							
Aerosol inlet:							
Aerosol Nafion dryer:							
Sheath Nafion dryer:							
Source:							
HV power supply:							
DMA:	**DMA changed to nanoDMA**						
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: **June 06, 2019**							
Instrument/ Components	*info*	*Serial Number*	*Date/Code*	*CPC-Status*		*HV-Status*	
MPSS/Classifier:	**TROPOS**	**No.1**		*ST*		*0 V*	
Firmware Classifier:				*CT*		*5 mV*	
Firmware Software:	**TROPOS 6.68**			*OT*		*800 mV*	
DMA type:	**Hauke medium**		**142**	*CabT*		*200 mV*	
CPC model:	**TSI 3772**	**3772141701**		*AP*		*0 V*	
Firmware CPC:	**2.15**			*OP*			
Radioactive source:	**Kr.85**	**NER 8275**	**002/13**	*NP*			
Flow Inlet (l/min):	**1.02**			*LC*			
Zero (#/cm^3):	**0**						

Leibniz-Institut für Troposphärenforschung e.V.
Telefon: +49 341 2717-7060
Telefax: +49 341 2717-99-7060
info@tropos.de
http://www.tropos.de

Commerzbank Leipzig
KTO 102 14 50
BLZ 860 400 00
IBAN: DE77 8604 0000 0102 1450 00
SWIFT CODE: COBADEFF 860

Institute: **TROPOS**						
Station: **Reference Total CPC**						
Date of checking list: **June 18, 2019**						
Instrument/ Components	*info*	*Serial Number*	*Cut off*	*CPC-Status*		
CPC model:	**TSI 3010**	**2410**	**D_{p50} 10 nm**	*ST*		
Firmware CPC:	**2.15**			*CT*		
Flow Inlet (l/min):	**1.01**			*OT*		
Zero (#/cm³):	**0**			*CabT*		
				AP		
				OP		
				NP		
				LC		

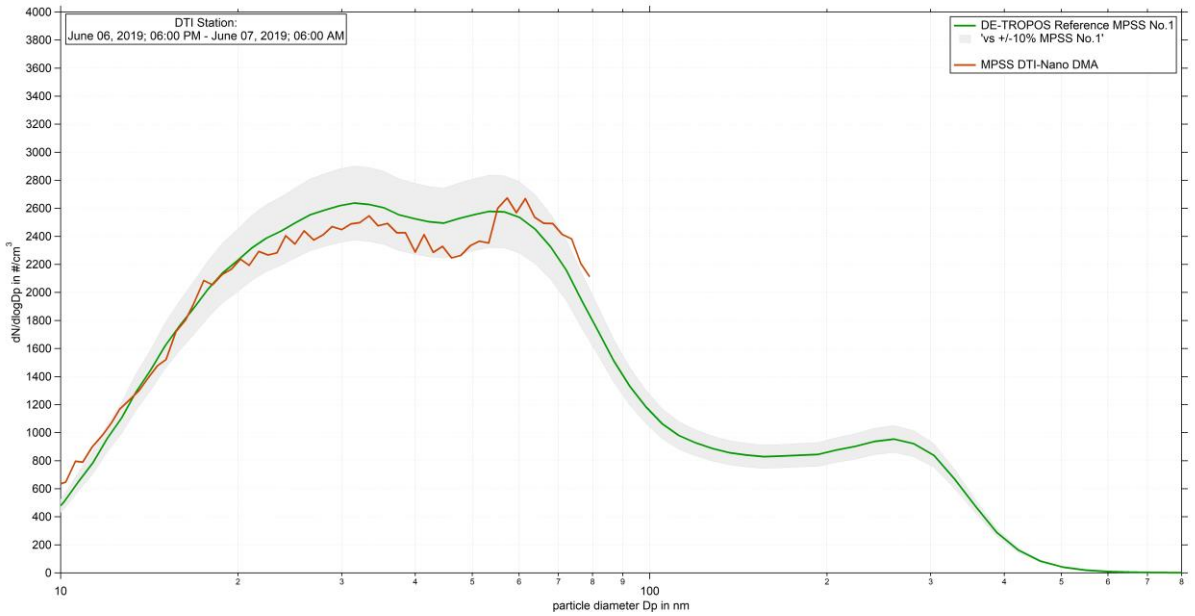


Figure 18: Comparison of mean particle number size distribution of TROPOS Reference MPSS No.1 against DTI-MPSS with nanoDMA from June 06, 2019 8 PM – June 07, 2019 6 AM. Multiple charge correction, internal diffusion losses and CPC efficiency are included in different steps.

Leibniz-Institut für Troposphärenforschung e.V.
Telefon: +49 341 2717-7060
Telefax: +49 341 2717-99-7060
info@tropos.de
http://www.tropos.de

Commerzbank Leipzig
KTO 102 14 50
BLZ 860 400 00
IBAN: DE77 8604 0000 0102 1450 00
SWIFT CODE: COBADEFF 860