

Intercomparison of Mobility Particle Size Spectrometers

Project No.: *MPSS-2021-5 -1*

Principal Investigator: *Jakub Ondracek*

Home Institution: *Institute of Chemical Fundamentals – CAS
Rozvojová 1/135
16502 Prague
Czech Republic*

Participant:

Candidate: **CZ-XXX Prag1**
Made by: **TROPOS**
Counter (SN): TSI CPC Model 3750, SN: 3750200201
Software: LabView version 7.7

Location of the quality assurance: WCCAP, Leipzig, lab 0.4

Comparison period: Jul 30, 2021 – Aug 05, 2021

Last Intercomparison (with Project No.):

Summary of Intercomparison:

Final-Status:

During the final run, the performance of the system showed a concentration 4% higher in comparison to the TROPOS Reference Instrument No.1. The candidate used the TSI CPC model 3750 and a Kr.85 source from TROPOS. The candidate passed the quality standards of ACTRIS and GAW.

Status of the instruments:

	MPSS Reference 1	MPSS Prag 1			unit
<i>total CPC flow</i>	0.960	-			l/min
<i>aerosol flow (DMA)</i>	-	-			l/min
<i>aerosol flow (UDMA)</i>	-	-			l/min
<i>aerosol flow (total)</i>	0.968	0.960			l/min
<i>Zero MPSS</i>	0	0			#/cm ³
<i>Zero total CPC</i>	0	-			#/cm ³
<i>PSL 203 nm</i>	203.44	203.43			nm
<i>HV – 0 V</i>	0.0	0.0			V
<i>HV – 5 V</i>	5.0	5.0			V
<i>HV – 100 V</i>	100.0	100.1			V
<i>HV – 1000 V</i>	1000.0	1000.2			V

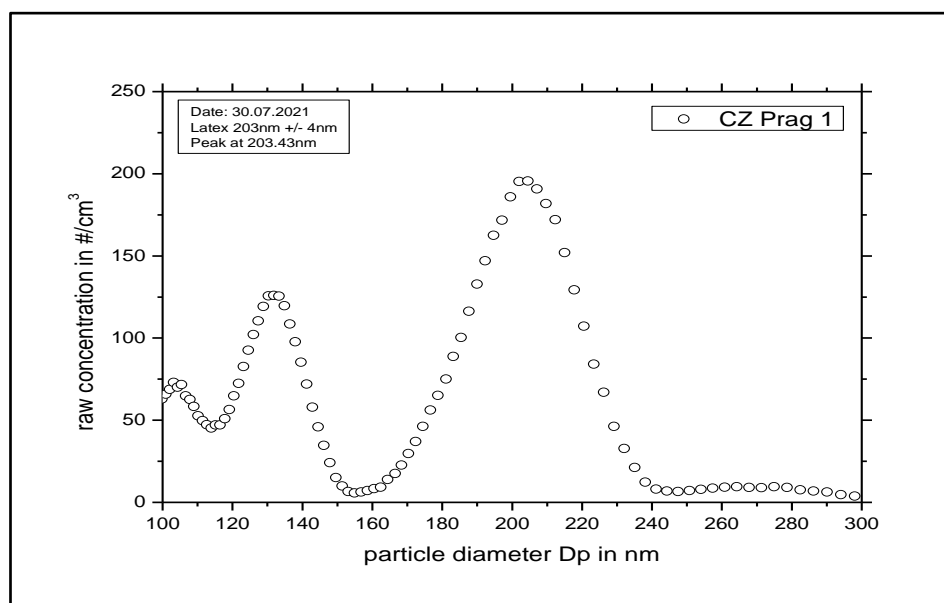
PSL Scan and calibration: Latex 203 nm +/- 4 nm

Figure 01: Measurement of latex 203 nm – MPSS Prag 1: Particle size distribution (raw concentration) for latex 203 nm on Jul 30th, 2021. The peak is at 203.43 nm.

Intercomparison between TROPOS Reference Instrument No. 1 and MPSS Prag 1

(04.08.2021 12:00 AM – 05.08.2021 08:00 AM)

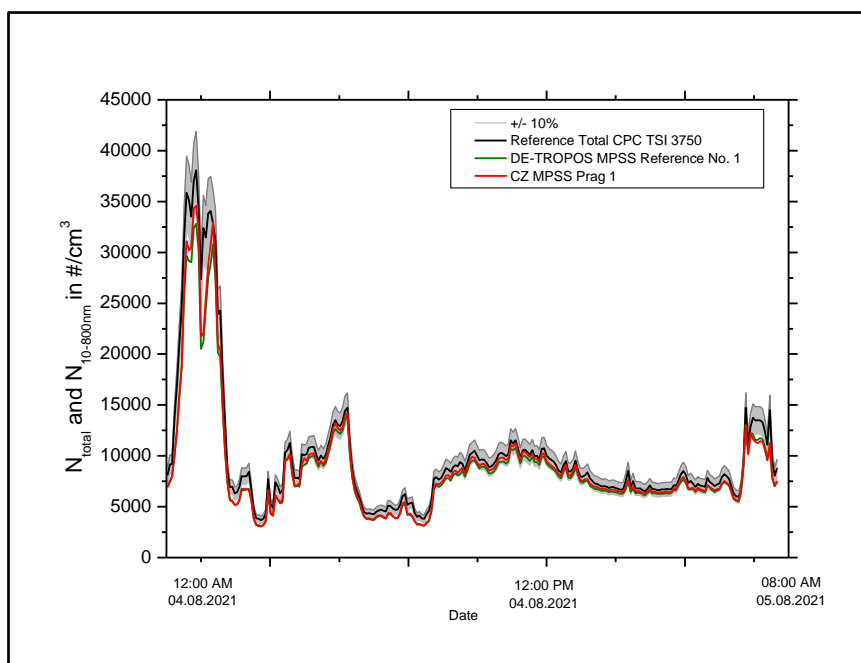


Figure 02: Time series (August 04, 2021 11:00 AM – August 05, 2021 08:00 AM) of the integrated particle number concentration ($N_{10-800nm}$) of the MPSS and total number concentration (N_{total}) of the Reference TSI-CPC Model 3750. The inversion for the candidate was performed using TROPOS software. Multiple charge correction, internal diffusion losses and CPC flow corrections are included. The candidate is running with a Kr85 source from TROPOS.

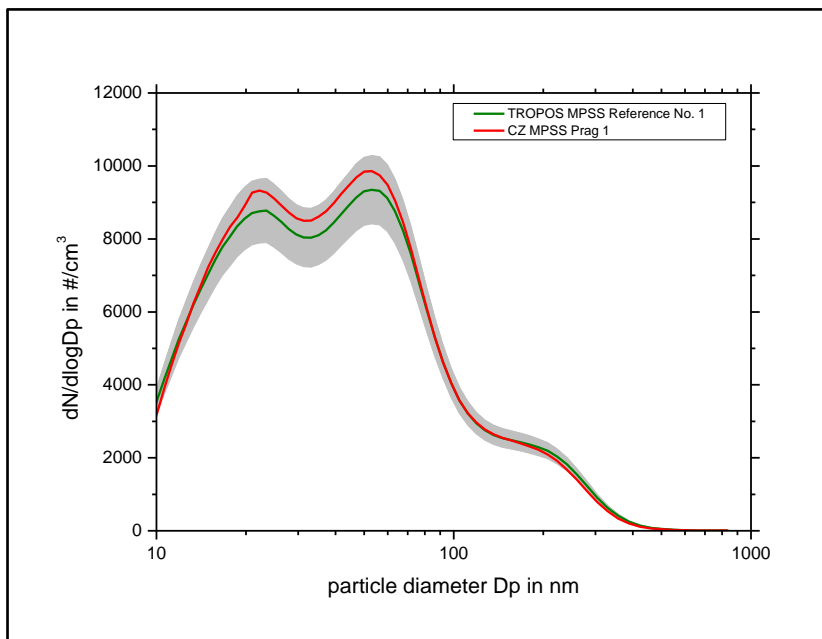


Figure 03: Particle number size distribution for TROPOS Reference MPSS No.1 and MPSS Prag 1, flow corrections, multiple charge correction and internal diffusion losses are included.

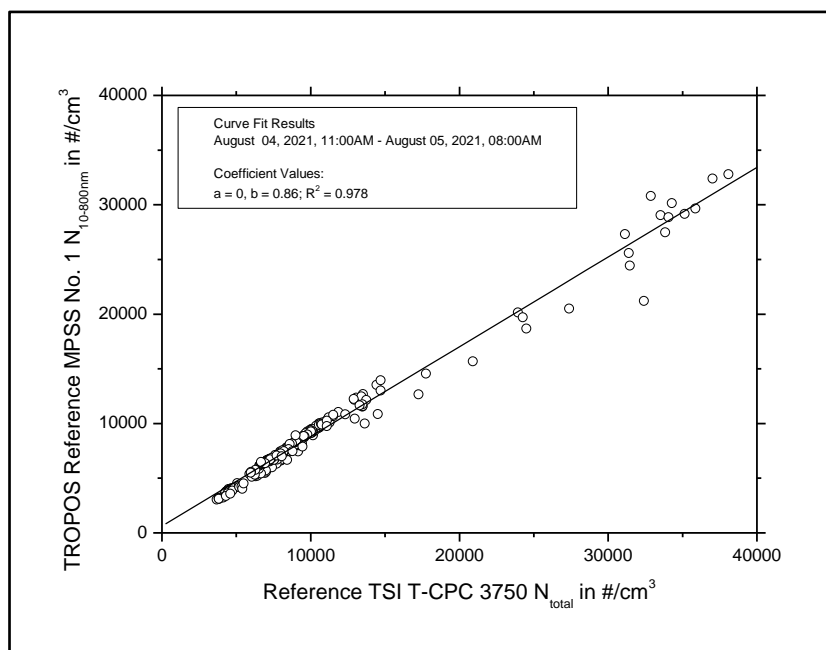


Figure 04: Linear regression between DE- TROPOS Reference TSI CPC Model 3750 and DE-TROPOS Reference MPSS No.1.

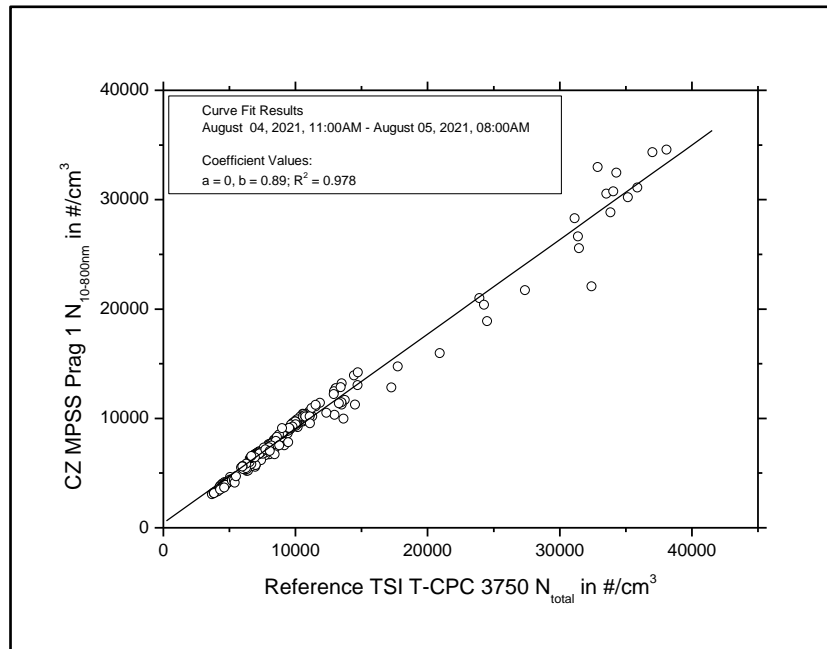


Figure 05: Linear regression between DE- TROPOS Reference TSI CPC Model 3750 and CZ MPSS Prag 1.

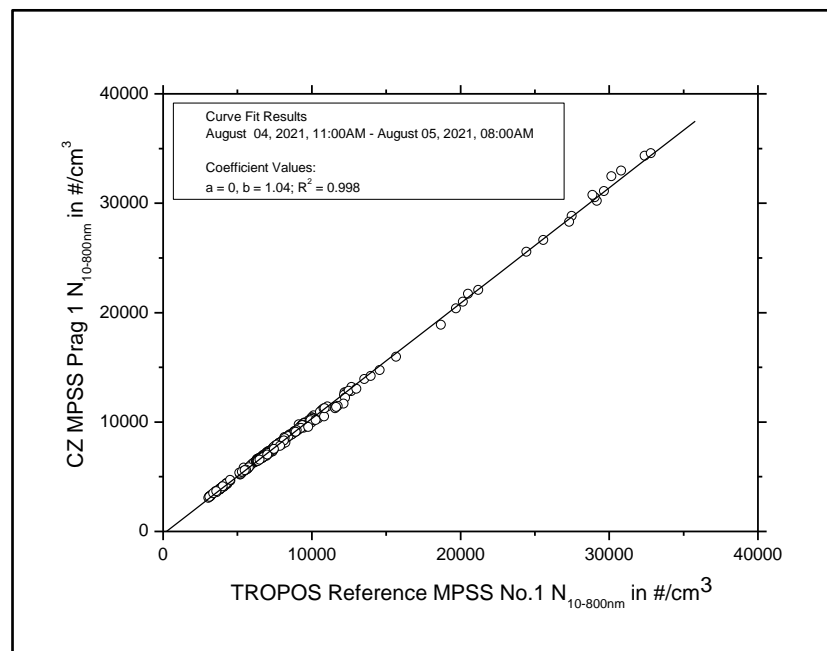


Figure 06: Linear regression between DE-TROPOS Reference MPSS No.1 and CZ MPSS Prag 1.