

Intercomparison of Mobility Particle Size Spectrometers

Project No.: MPSS-2016-4-8

Basic information:

Principal Investigator:	Alfred Wiedensohler
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Participant:	-
Instrument No.1:	TROPOS Reference MPSS No.1 TSI CPC Model 3772, SN: 3772141701
Location of the quality assurance:	TROPOS Leipzig, lab 118
Comparison period:	June 30, 2016 – July 04, 2016
Last Intercomparison (with Project No.):	

Summary of Intercomparison:

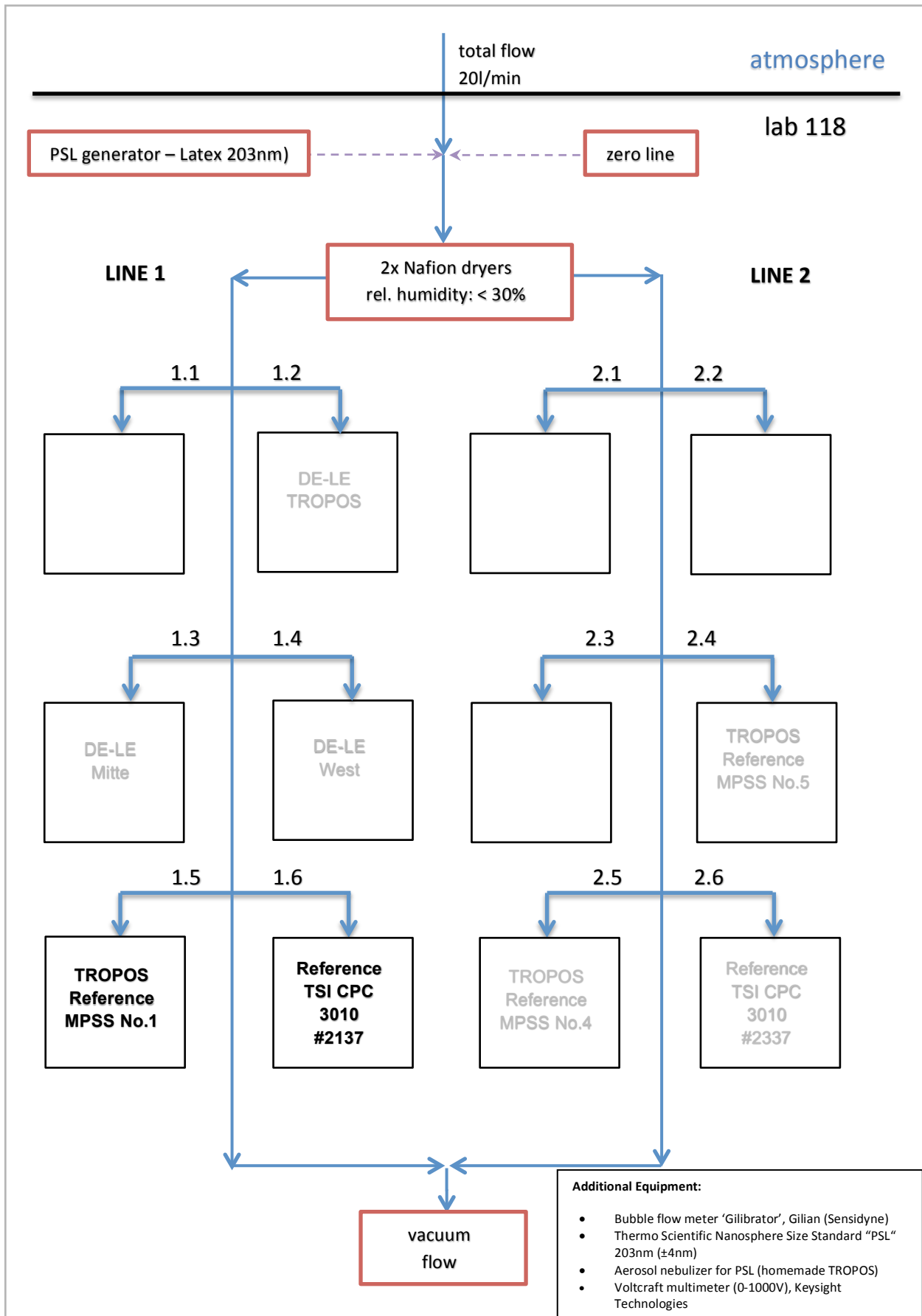
Pre-Status:
The TROPOS Reference MPSS was in good condition.

Final Status:
The TROPOS Reference MPSS passed the quality standards of ACTRIS and GAW.

List of Components:

	Specification	Reference MPSS No.1
Position (Line)		1.5
Company		TROPOS
Software		TROPOS 6.1
CPC		TSI CPC, Model 3772
Flow ratio		1.0 : 5.0
Source		Kr85
HV cassette		positive
DMA		Hauke medium
Flow meas.	aerosol	✓
Dryer		✓
RH sensor		✓
T sensor		✓
RH sensor	Sheath air	✓
T sensor		✓
Dryer		✓
p sensor		✓

Laboratory setup:



TROPOS Total CPC Status

Instrument	Variable	Status
TROPOS Total CPC 3010, #2137	Power	good
	Laser	good
	Flow	good
	Liquid level	full

TROPOS Reference Instrument Status

Instrument	Variable	Status
TROPOS Reference Instrument No.1, TSI CPC 3772 #3772141701	Saturator Temp	39.0°C
	Condenser Temp	22.0°C
	Optics Temp	40.0°C
	Cabinet Temp	32.8°C
	Ambient Pressure	98.7 kPa
	Orifice Pressure	69.8 kPa
	Nozzle Pressure	2.8 kPa
	Laser Current	50 mA

TROPOS Reference Systems during the pre-status June 30st - July 01st

Components and zero check

Instrument	Line	Flow		Zero	
TROPOS Reference MPSS No.1	1.5	1.015	l/min	0	# cm ⁻³
TROPOS Total CPC 3010, #2137	1.6	1.016	l/min	0	# cm ⁻³

High voltage calibration

Instrument	[V]	0 V	4 mV	80 mV	800 mV
TROPOS Reference MPSS No.1	final	0.0	4.9	99.8	1000

Latex 203nm ±4nm (pressure 988 hPa, 23.0°C)

Instrument	Latex 203 [nm]	slope
TROPOS Reference MPSS No.1	205.5	5.27

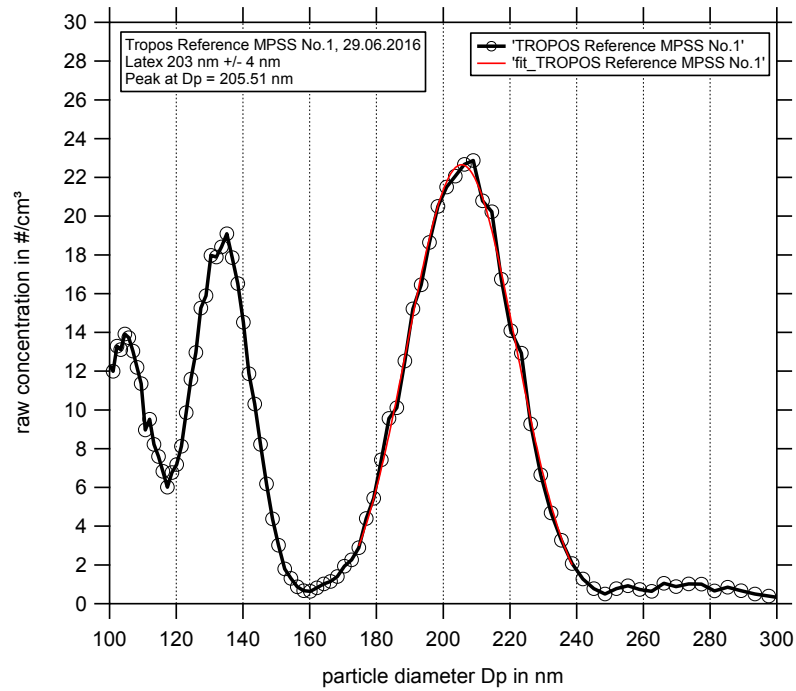


Figure 01: Measurement of latex 203 nm: Particle size distribution (raw concentration) for latex 203 nm on June 30th, 2016.

Time Series

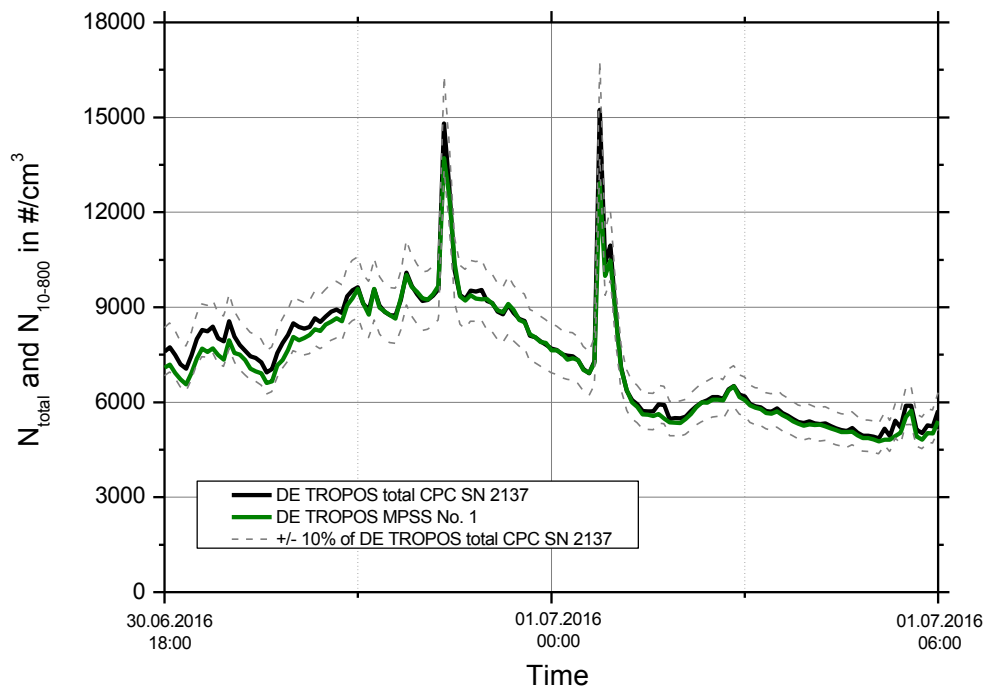


Figure 03: Time series (June 30, 2016 06:00 pm – July 01, 2016 06:00 am) of the integrated particle number concentration ($N_{10-800nm}$) of the TROPOS Reference MPSS and total number concentration (N_{total}) of the Reference TSI CPC 3010. The inversion was performed using TROPOS software. Multiple charge correction, internal diffusion losses and CPC flow corrections are included.

Correlation

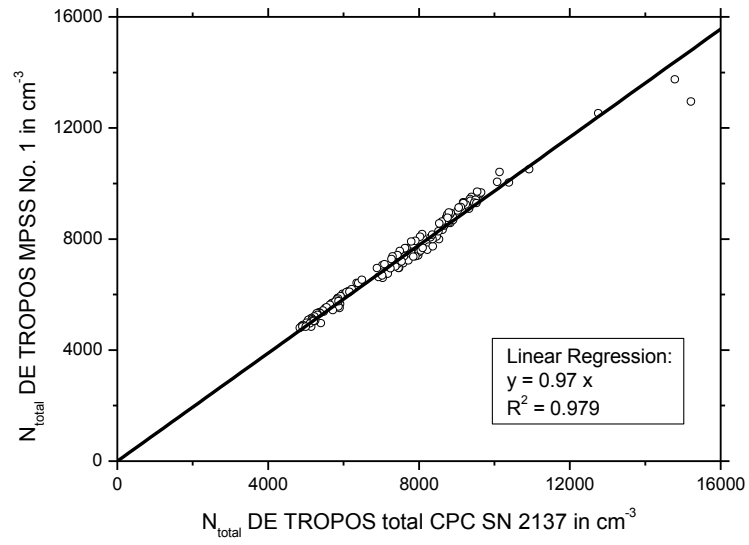


Figure 05: Linear regression between the number concentrations of the TROPOS Reference TSI CPC Model 3010 SN: 2137 and TROPOS Reference MPSS No.1. Multiple charge correction, internal diffusion losses and CPC flow corrections are included.