Leibniz-Institut für Troposphärenforschung Permoserstraße 15 04318 Leipzig

Intercomparison of Condensation Particle Counter

Project No.:	*CPC-2019-3-5*
Principal Investigator:	*Patrick Sheridan*
Home Institution:	*NOAA*
Participant:	-
Candidate:	**NOAA DMPS**
Counter (SN):	*TSI CPC Model 3010 SN2438*
Location of the quality assurance:	TROPOS Leipzig, lab 130
Comparison period:	July 10, 2019
Last Intercomparison (with Project No.):	
TROPOS Reference Instrument:	Electrometer: TSI model 3068B #70838596, Last calibration in September 2018
Additional Equipment:	Bubble flow meter 'Gilibrator', Gilian (Sensidyne) #1711008-S, Last calibration in January 2018

Summary of Intercomparison

Status:
The candidate passed the quality standards of ACTRIS and GAW. The candidate reached 100% efficiency at 40 nm. The Dp50 is at 11.45 nm. The CPC efficiency curve corresponds to the standard of ACTRIS and GAW.

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

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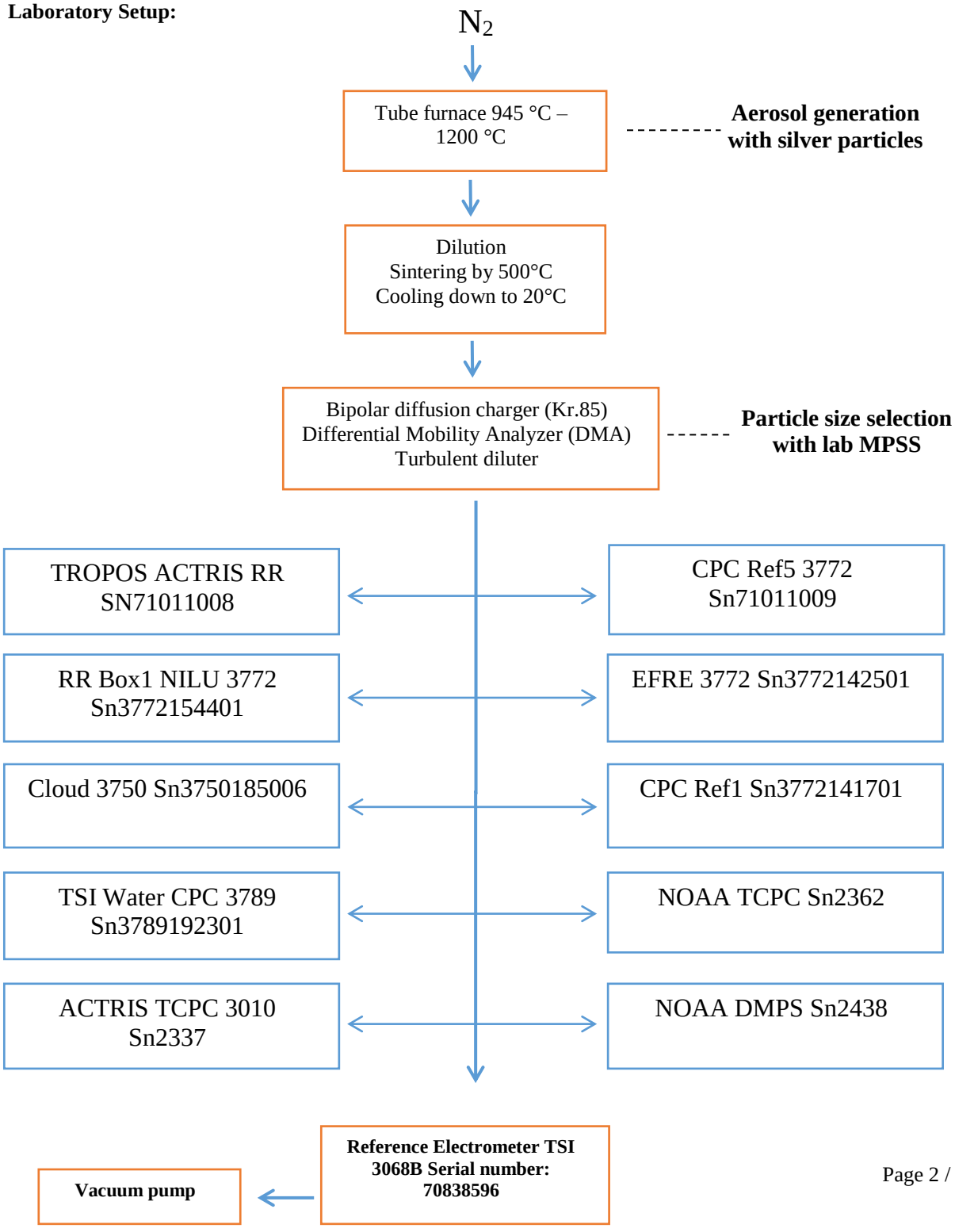
Laboratory Setup:



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Date of arrival of instrument in calibration lab:	*July 10, 2019*
Instrument:	*Condensation Particle Counter*
Model and serial number of instrument:	*CPC 3010 S/N* 2438
Result of physical inspection:	*no damages*
Result of functional test:	*functional test successful*
Internal parameters of instrument	*nominal flow rate 1.0 l/min*
Model and identification number of aerosol electrometer:	*TSI Electrometer Model 3068, S/N 70838596*
Electrometer calibration certificate:	*September 05, 2018, calibrated at PTB Braunschweig*
Corrections of electrometer, for instance, differing flow rate:	*Within tolerance range (+/-2%); reference: 4.0 l/min, measured: 3.970 l/min*
Software for recording:	*LabView 2010; National Instruments; Program „LabCount.vi“*
Date of calibration:	*July 10, 2019*
Lab temperature and pressure:	*23°C, 983.82mbar*
Measured aerosol flow rate of CPC:	*0.992 l/min*
Uncertainty in measured flow rate:	*3%*
Flowmeter used:	*Gilian Gilibrator V; S/N 1711008-S, January, 2018*
Particles and gases used for calibration:	*silver particles and nitrogen*
Method of particle generation:	*tube furnace generator*
Zero measurement of instrument:	*0 particles/cm³ in 5 minutes*

Results (using pulse output):

Particle size (nm)	***40***	***30***	***20***	***15***	***12***
Number concentration (cm-3)	1238	1339	1334	1321	746
Counting efficiency η	*1.02*	*1.02*	*0.97*	*0.81*	*0.58*
Particle size (nm)	***10***	***09***	***08***	***07***	***06***
Number concentration (cm-3)	358	172	57	5	0
Counting efficiency η	*0.27*	*0.12*	*0.03*	*0.00*	*0.0*
Particle size (nm)	***40***				
Number concentration (cm-3)	1198				
Counting efficiency η	*1.01*				

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Special Information regarding to the Candidate:

Was it necessary to:	yes/no	information
do a second run	no	-
clean the optics	no	-
clean the nozzle	no	-
clean the saturator	no	-
change the wick	no	-
change the laser	no	-
change internal settings	no	-

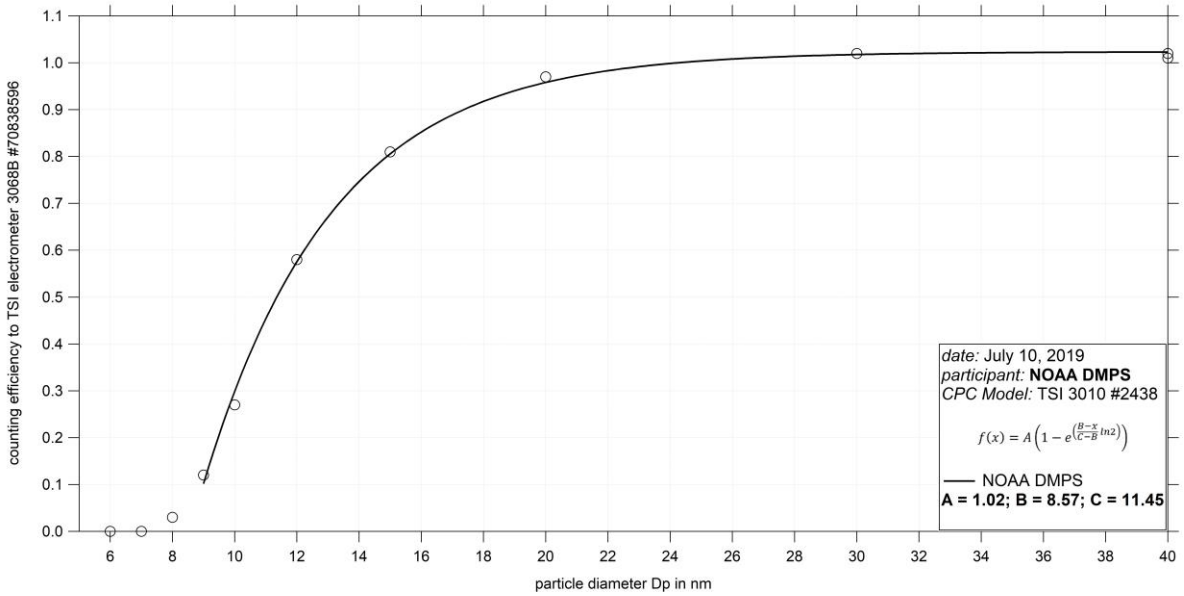

Fig. 1: Counting efficiency for NOAA DMPS TSI CPC 3010 SN2438 against aerosol electrometer 3068 SN 70838596; silver particles between 6 and 40 nm were used for calibration; the calculated Dp50 is 11.45 nm.

Status information:

Status	*T SAT*	*T CON*	*T OPT*	*T CAB*	*P AMB*
from display	-	-	-	--	
Status	***P OR***	***P NO***	***Laser***	***LV***	***flow***
from display	-	-	-	full	0.992

Date of issue: *July 10, 2019*
Reviewed: TROPOS / Kay Weinhold

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