Leibniz-Institut für Troposphärenforschung Permoserstraße 15 04318 Leipzig

Intercomparison of Condensation Particle Counter

Project No.:	*CPC-2019-3-27*
Principal Investigator:	Marcos Andrade
Home Institution:	Chacaltaya GAW Station Carrera de Fisica Universidad Mayor de San Andres Campus Universitario Cota-Cota La Paz, Bolivia
Participant:	–
Candidate:	CPC Bolivia
Counter (SN):	TSI CPC Model 3772 SN70826011
Location of the quality assurance:	TROPOS Leipzig, lab 130
Comparison period:	August 13, 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 7.89 nm. The CPC efficiency curve corresponds to the standard of ACTRIS and GAW. Information: It was necessary to clean the CPC, change the wick and laser. The CPC is calibrated.

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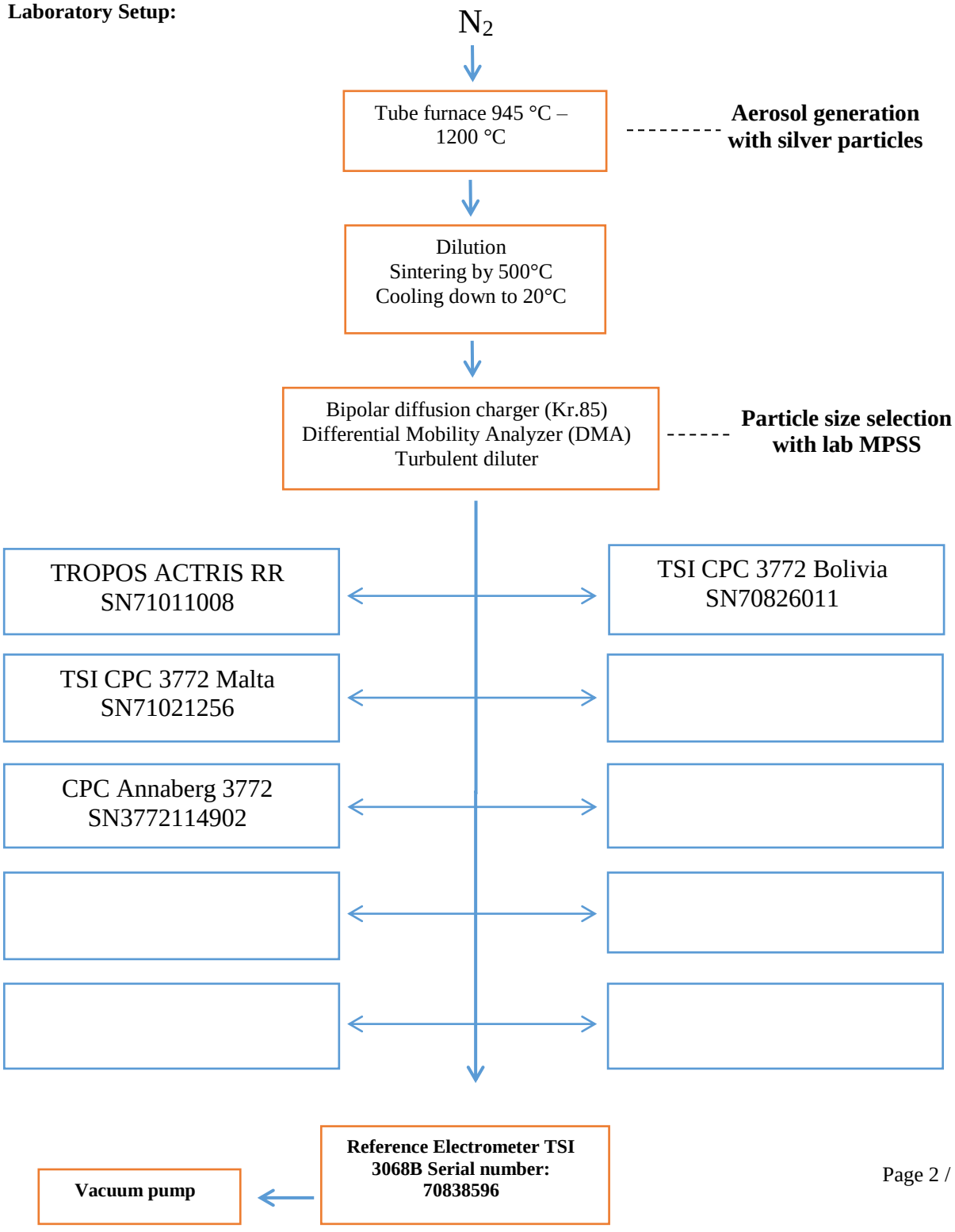
Laboratory Setup:



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Date of arrival of instrument in calibration lab:	*August 13, 2019*
Instrument:	*Condensation Particle Counter*
Model and serial number of instrument:	*CPC 3772 S/N* 70826011
Result of physical inspection:	*no damages*
Result of functional test:	*cleaning necessary, laser broken*
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: 4.00 l/min*
Software for recording:	*LabView 2010; National Instruments; Program „LabCount.vi“*
Date of calibration:	*August 13, 2019*
Lab temperature and pressure:	*23°C, 992.5mbar*
Measured aerosol flow rate of CPC:	*1.019 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)	2436	2347	2383	3024	2226
Counting efficiency η	*1.01*	*1.00*	*1.00*	*0.97*	*0.88*
Particle size (nm)	***10***	***09***	***08***	***07***	***06***
Number concentration (cm-3)	1353	987	908	423	46
Counting efficiency η	*0.77*	*0.68*	*0.52*	*0.31*	*0.04*
Particle size (nm)	***40***				
Number concentration (cm-3)	1536				
Counting efficiency η	*1.02*				

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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	yes	-
clean the nozzle	yes	-
clean the saturator	yes	-
change the wick	yes	new wick
change the laser	yes	laser old
change internal settings	no	-

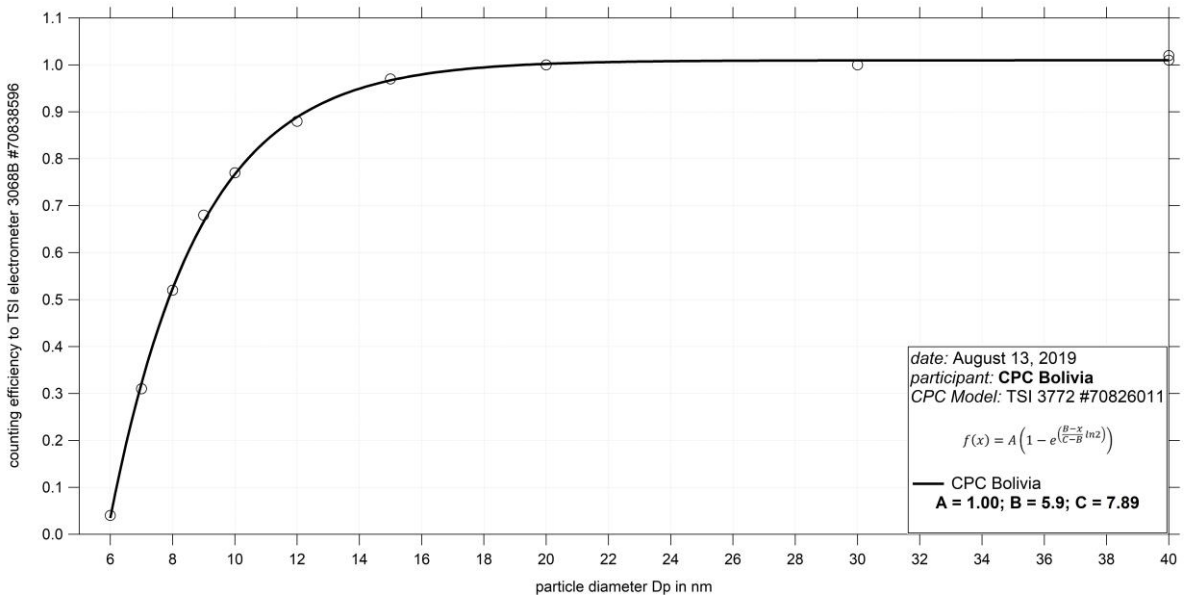

Fig. 1: Counting efficiency for CPC Bolivia 3772 SN70826011 against aerosol electrometer 3068 SN 70838596; silver particles between 6 and 40 nm were used for calibration; the calculated Dp50 is 7.89 nm.

Status information:

Status	*T SAT*	*T CON*	*T OPT*	*T CAB*	*P AMB*
from display	39	22	40	31.1	99.7
Status	***P OR***	***P NO***	***Laser***	***LV***	***flow***
from display	71.2	2.7	56	full	1.019

Date of issue: *August 13, 2019*
Reviewed: TROPOS / Kay Weinhold

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