Intercomparison of Mobility Particle Size Spectrometers

Project No.:	MPSS-2019-2-4
Principal Investigator:	Alfred Wiedensohler
Home Institution:	*TROPOS*
Participant:	-
Candidate:	*Reference MPSS No. 1 and No. 4*
Made by:	TROPOS Homemade
Counter (SN):	*3772141701/3772142501*

Location of the quality assurance:	TROPOS Leipzig, lab 118
Comparison period:	May 20, 2019 – May 29, 2019
Last Intercomparison (with Project No.):	

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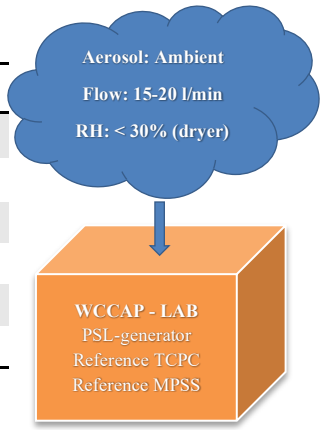
Mitglied der Leibniz-Gemeinschaft

Summary of Intercomparison:

Status:
The Reference MPSS instruments passed the standards of ACTRIS and GAW conditions.

Laboratory Setup and Legend

Candidates
Reference MPSS No.1
Reference MPSS No.4



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:

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TROPOS Reference Instruments No. 1 and No. 4

May 20 – May 21, 2019: Time Series, Particle Number Size Distribution and Correlation

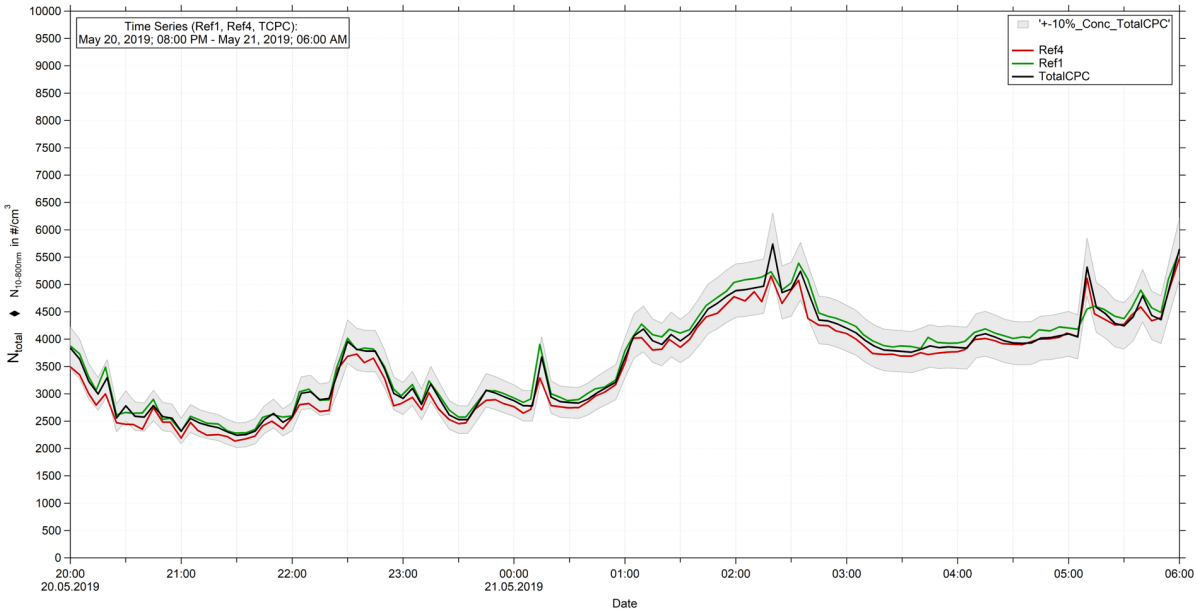

Figure 01: Time series (May 20, 2019 8 PM – May 21, 2019 6 AM) of the integrated particle number concentration ($N_{10\text{-}800nm}$) of the TROPOS Reference MPSS and total number concentration (N_{total}) of the Reference TSI-CPC Model 3010. Multiple charge correction, internal diffusion losses and CPC flow corrections are included.

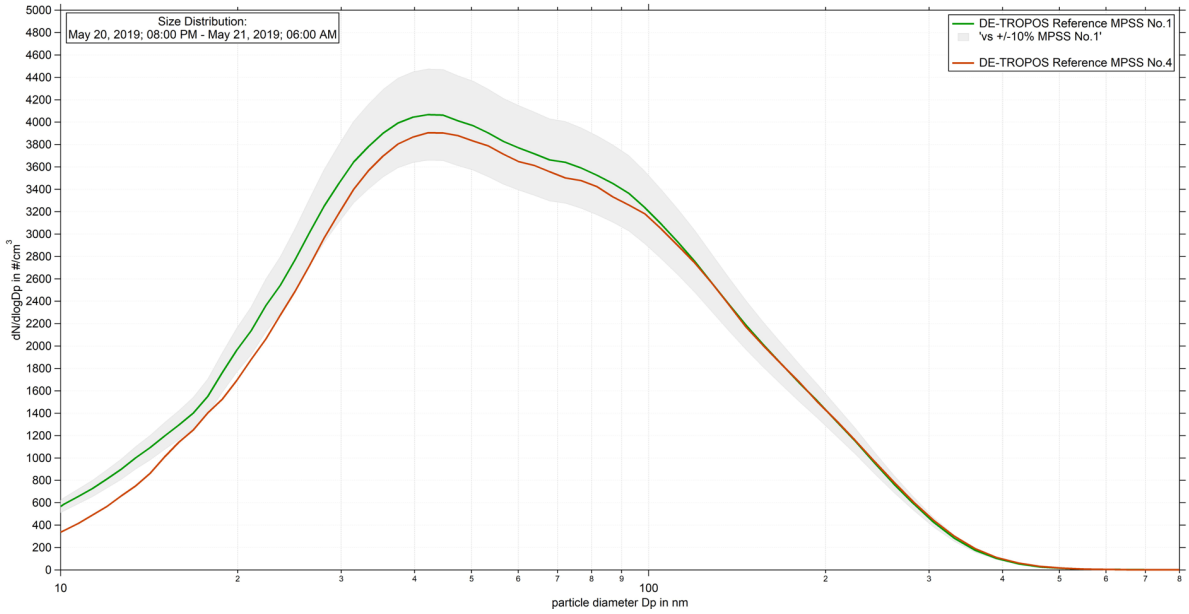

Figure 02: Comparison of mean particle number size distribution of TROPOS Reference MPSS No.1 against TROPOS Reference MPSS No.4 from May 20, 2019 8 PM – May 21, 2019 6 AM. Multiple charge correction, internal diffusion losses and CPC efficiency are included in different steps.

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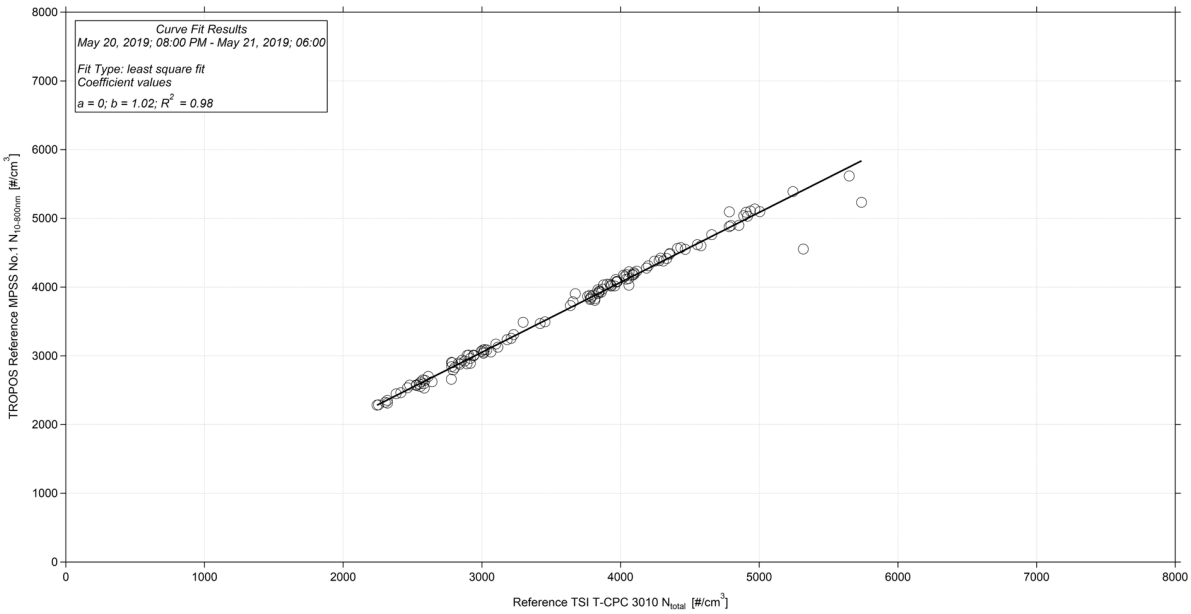

Figure 03: Linear regression between the number concentrations of the TROPOS Reference TSI T-CPC Model 3010 and TROPOS Reference MPSS No.1. Multiple charge correction, internal diffusion losses and CPC efficiency are included.

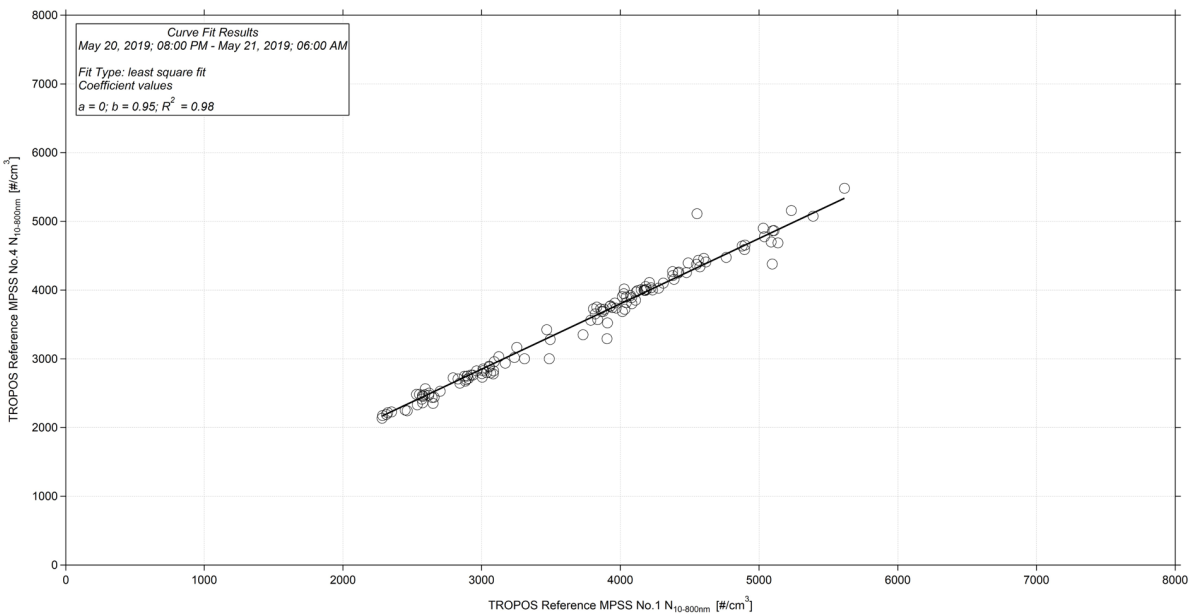

Figure 04: Linear regression between the number concentrations of the TROPOS Reference MPSS No.1 and TROPOS Reference MPSS No.4. Multiple charge correction, internal diffusion losses and CPC efficiency are included.

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