

Intercomparison of Mobility Particle Size Spectrometers

Project No.: MPSS-2020-2-2

Principal Investigator:

Home Institution: Deutscher Wetterdienst

Participant: Björn Briel

Candidate: MPSS DWD Hohenpeißenberg
Made by: **TROPOS**
Counter (SN): **TSI CPC 3772 SN: 70711210**

Location of the quality assurance: TROPOS Leipzig, lab 118

Comparison period: Feb. 28, 2020 – Mar. 5, 2020

Last Intercomparison (with Project No.): *Instrument upgrade

Summary:

The DWD-Hohenpeissenberg TROPO-made MPSS has been upgraded to the newest generation of TROPOS instruments. This instrument passed the standards of ACTRIS and GAW.

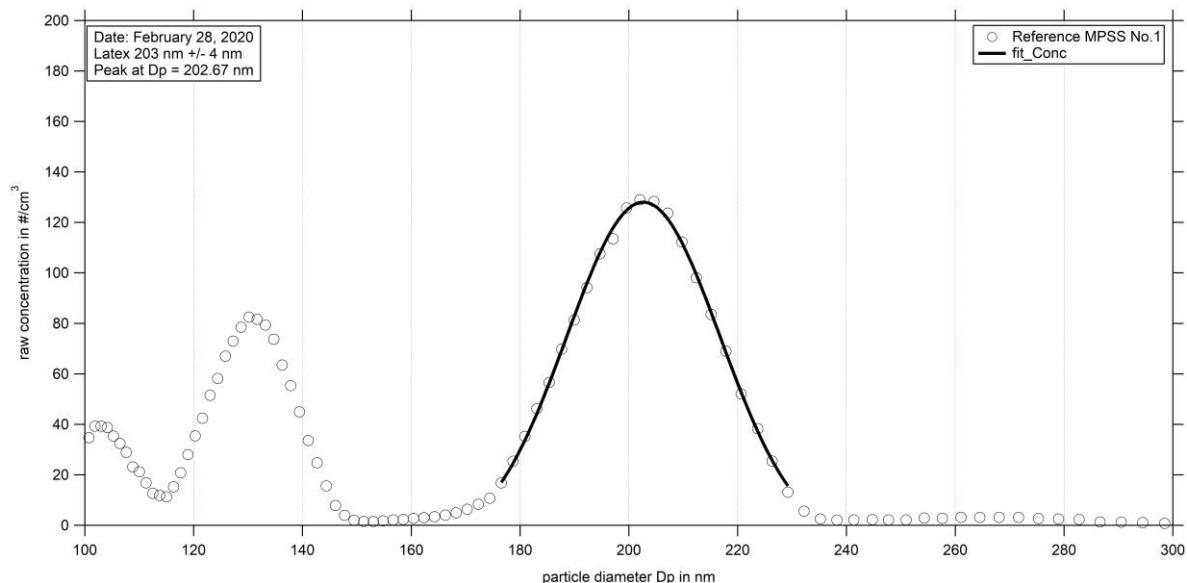
PSL Scan: Latex 203 nm +/- 4 nm

Figure 01: Measurement of latex 203 nm – TROPOS Reference Instrument No. 1: Particle size distribution of latex 203 nm on February 28th, 2020. The peak shows at 202.67nm

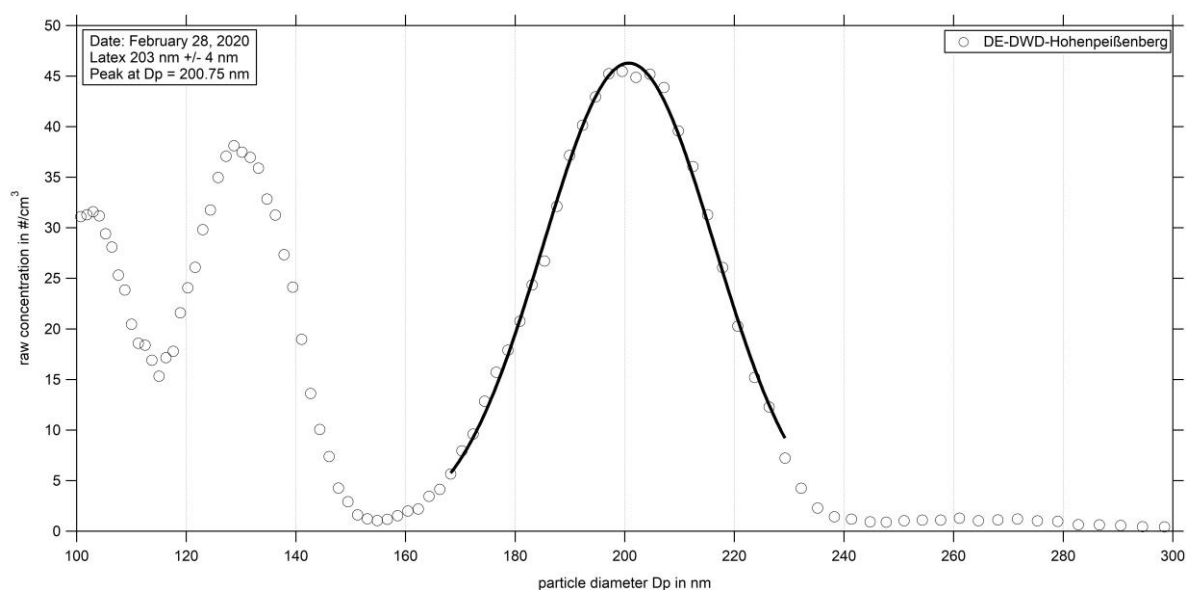


Figure 02: Measurement of latex 203 nm – TROPOS Reference Instrument No. 1: Particle size distribution of latex 203 nm on February 28th, 2020. The peak shows at 200.75nm.

Intercomparison between TROPOS Reference Instrument No. 1 and MPSS DWD Hohenpeißenberg

28.02.2020 18:00PM – 02.03.2020 06:00AM

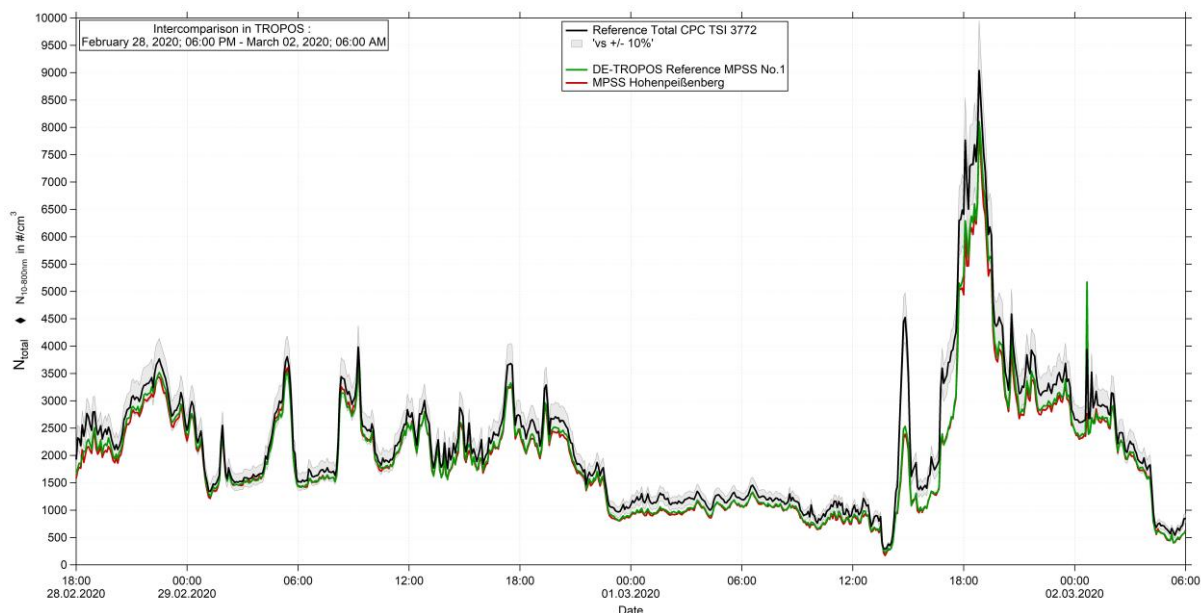


Figure 03: Time series (Feb. 28, 2020 6 PM – Mar. 02, 2020 6 AM) of the integrated particle number concentration ($N_{10-800nm}$) of the MPSS and total number concentration (N_{total}) of the Reference TSI-CPC Model 3772. Multiple charge correction, internal diffusion losses, CPC flow corrections. The candidate is running with the TSI Kr.85 source.

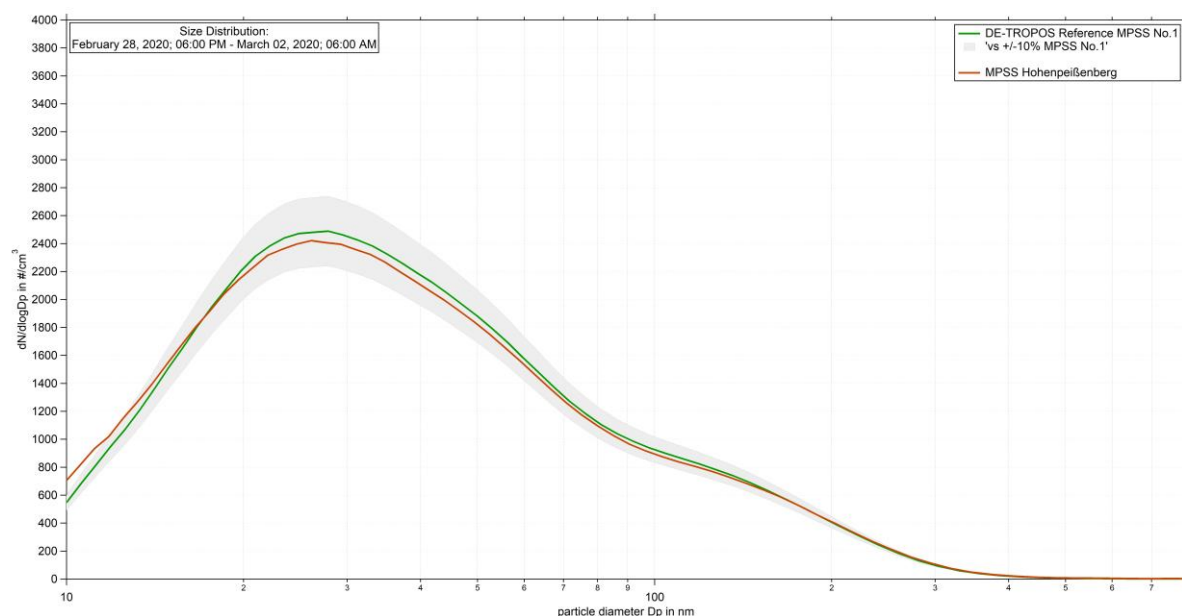


Figure 04: Particle size distribution for TROPOS Reference MPSS No.1 and DE-DWD-Hohenpeißenberg, flow corrections, multiple charge correction and diffusion loss corrections are included.

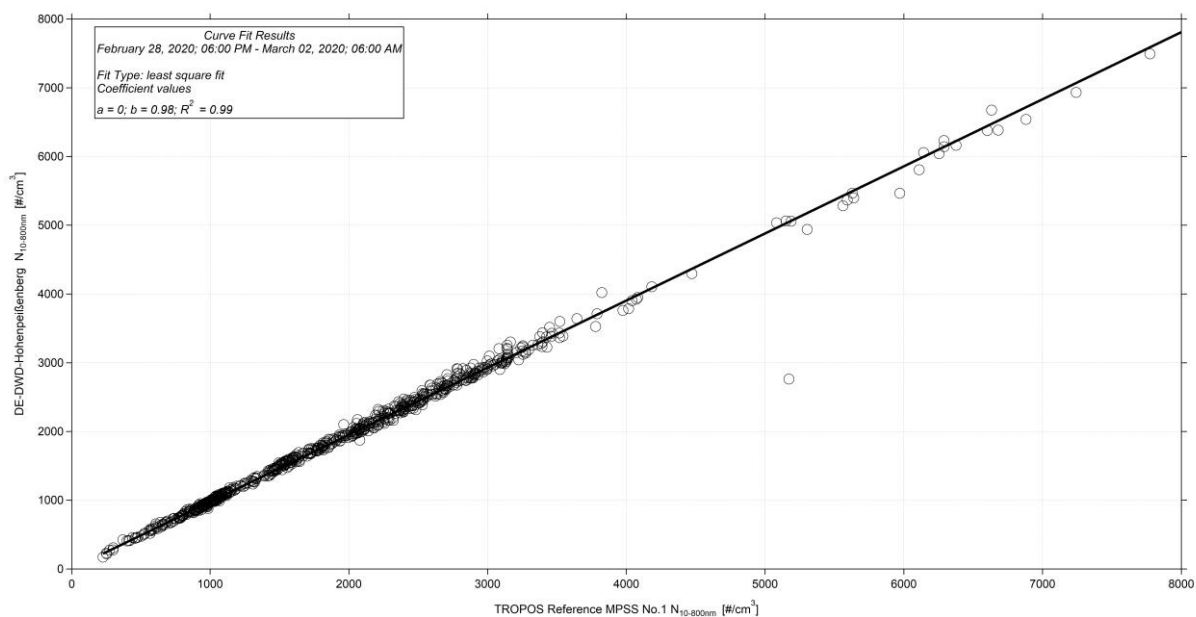


Figure 05: Linear regression between the number concentration of the TROPOS Reference MPSS No. 1 and DE-DWD-Hohenpeißenberg.

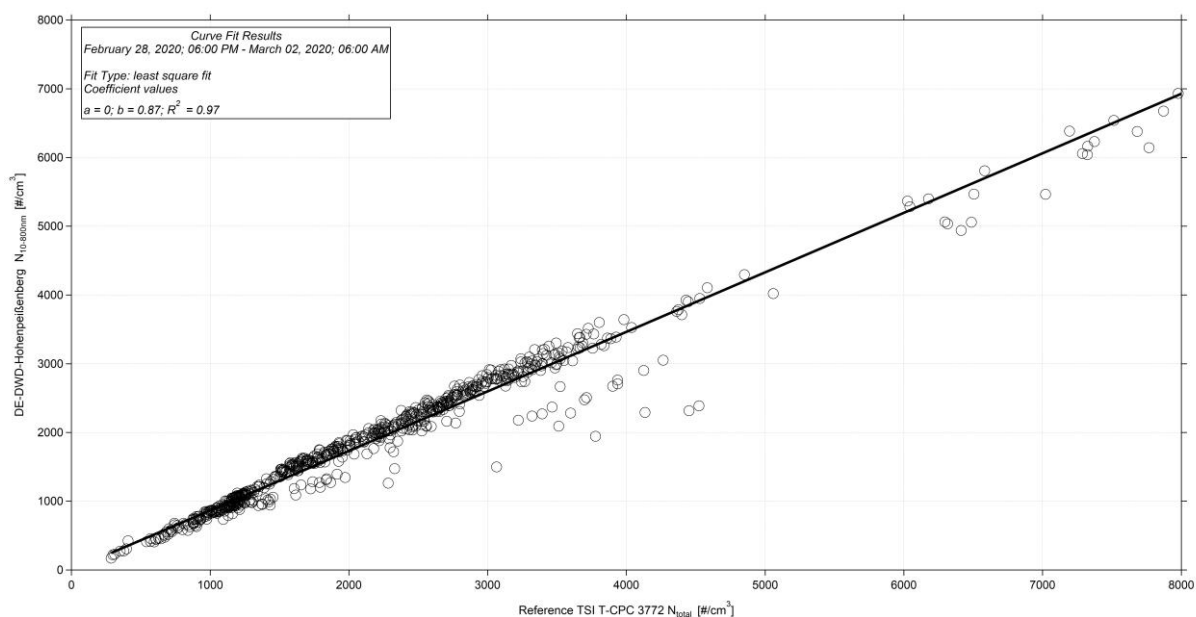


Figure 06: Linear regression between the number concentration of the TROPOS Reference Total-CPC Model 3772 and DE-DWD-Hohenpeißenberg.

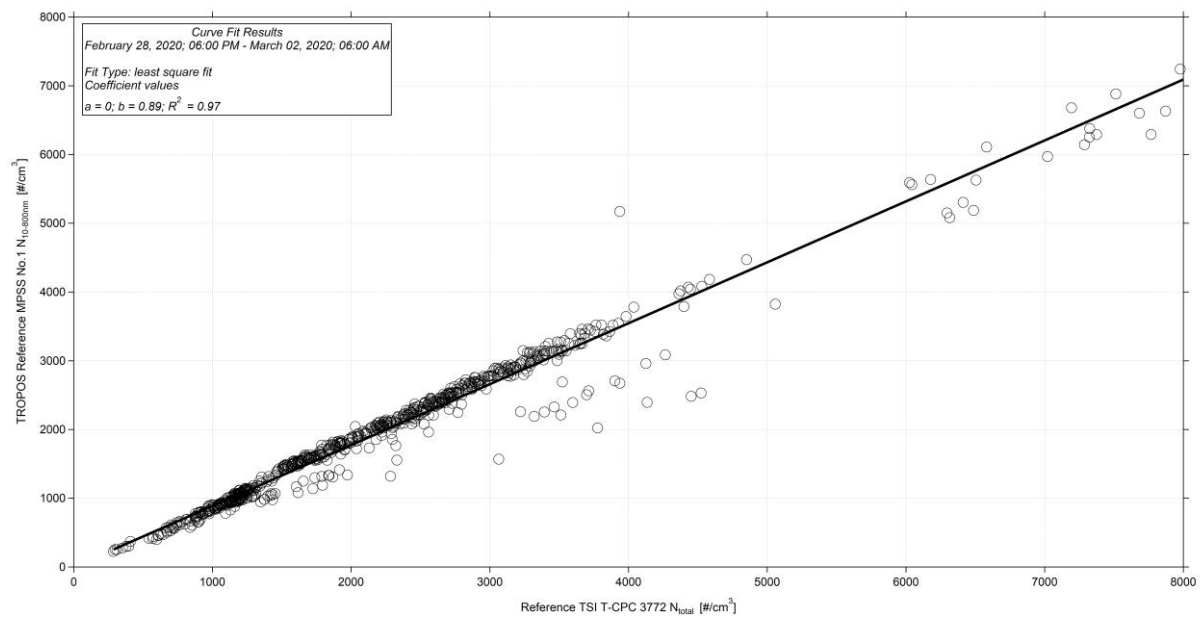


Figure 07: Linear regression between the number concentration of the TROPOS Reference Total-CPC Model 3772 and TROPOS Reference Instrument No. 1.

Intercomparison between TROPOS Reference Instrument No. 1 and MPSS DWD
Hohenpeißenberg with TD over ambient line
04.03.2020 18:00PM – 05.03.2020 06:00AM

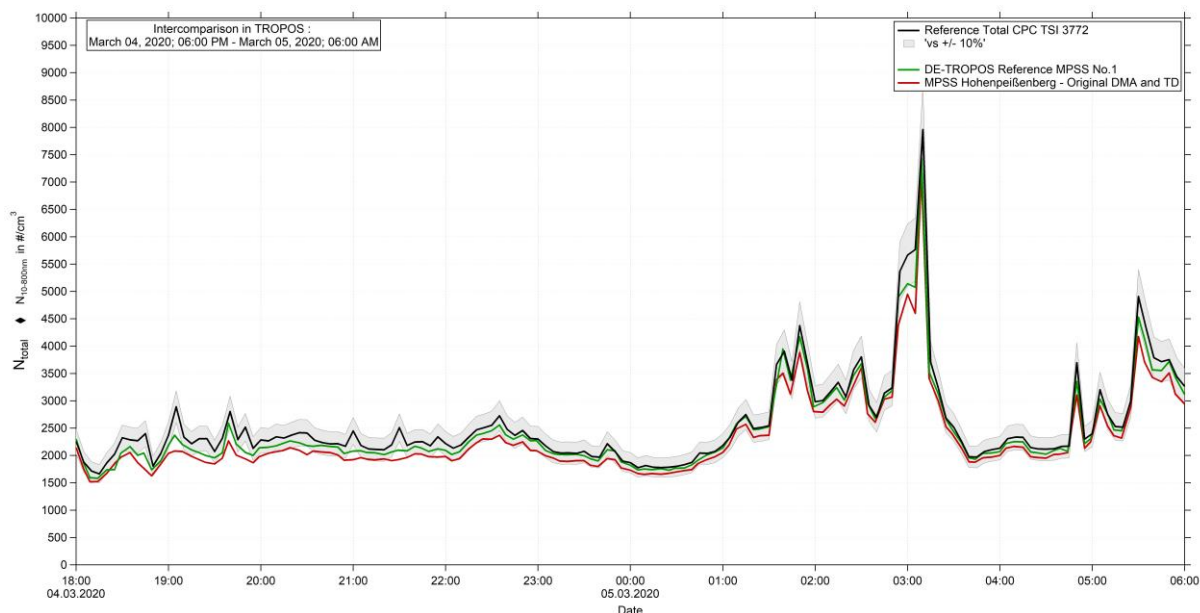


Figure 08: Time series (Mar. 04, 2020 6 PM – Mar. 05, 2020 6 AM) of the integrated particle number concentration ($N_{10-800nm}$) of the MPSS and total number concentration (N_{total}) of the Reference TSI-CPC Model 3772. Multiple charge correction, internal diffusion losses, CPC flow corrections. The candidate is running with the TSI Kr.85 source.

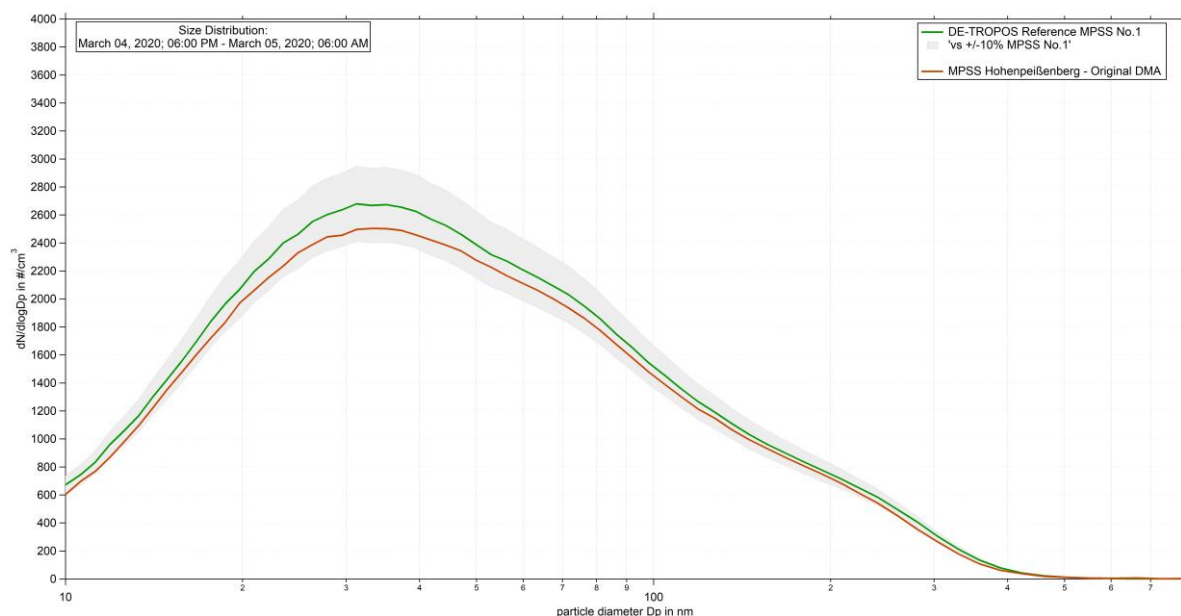


Figure 09: Particle size distribution for TROPOS Reference MPSS No.1 and DE-DWD-Hohenpeißenberg, flow corrections, multiple charge correction and diffusion loss corrections are included.

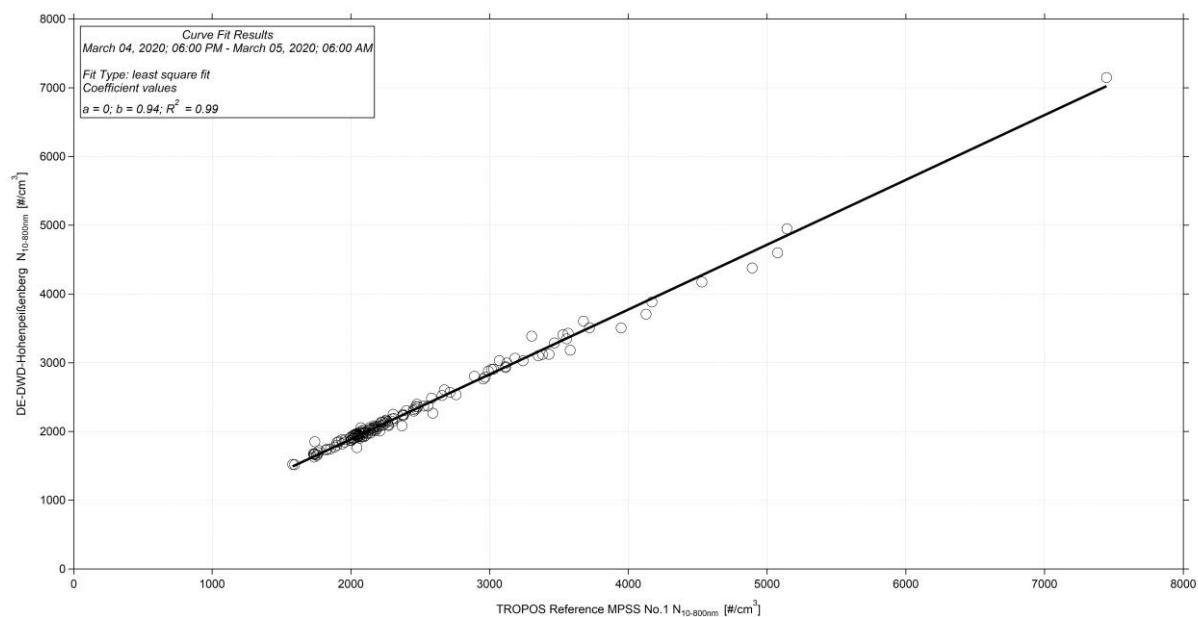


Figure 10: Linear regression between the number concentration of the TROPOS Reference MPSS No. 1 and DE-DWD-Hohenpeißenberg.

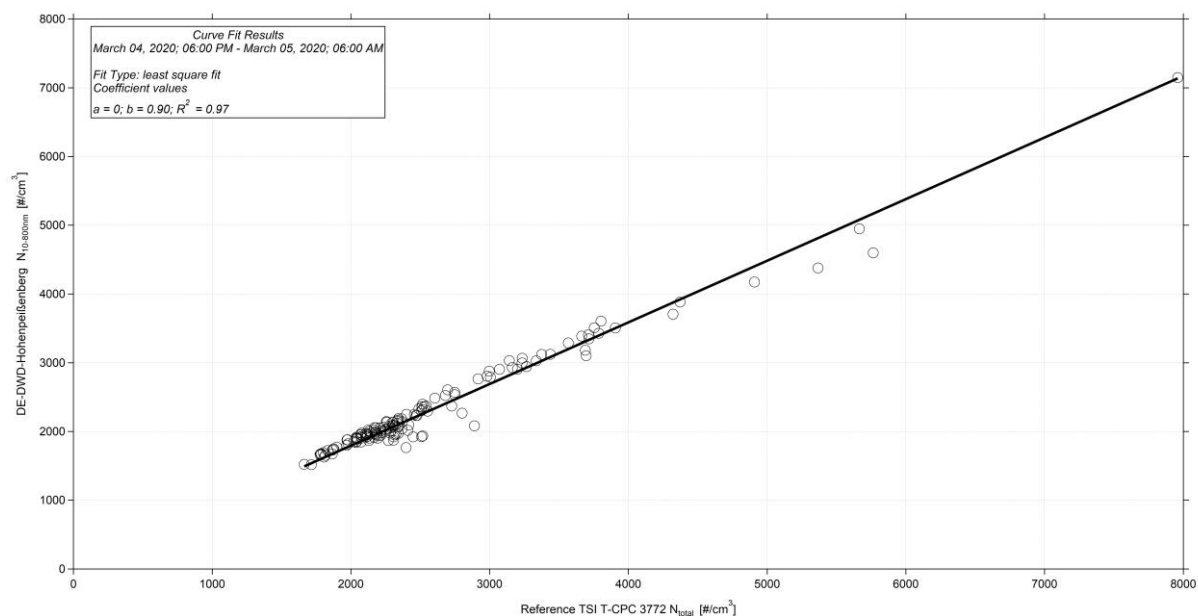


Figure 11: Linear regression between the number concentration of the TROPOS Reference Total-CPC Model 3772 and DE-DWD-Hohenpeißenberg.

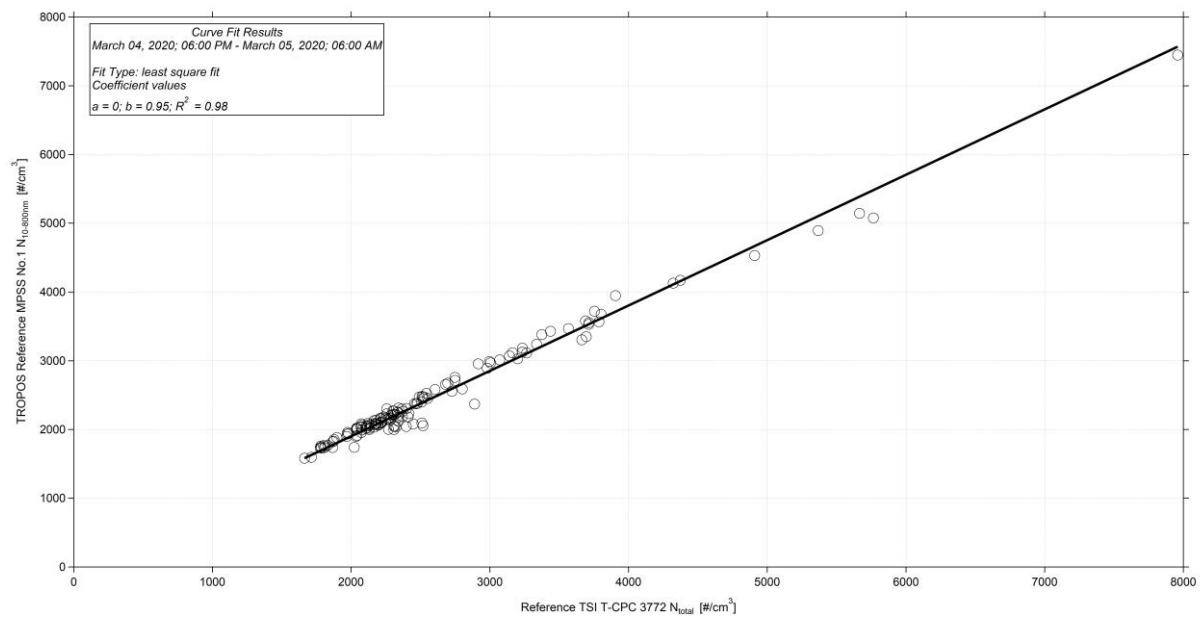


Figure 12: Linear regression between the number concentration of the TROPOS Reference Total-CPC Model 3772 and TROPOS Reference Instrument No. 1.