Supplementary Materials: Comparison of scanning aerosol LIDAR and *in-situ* measurement of aerosol physical proprieties and boundary layer heights

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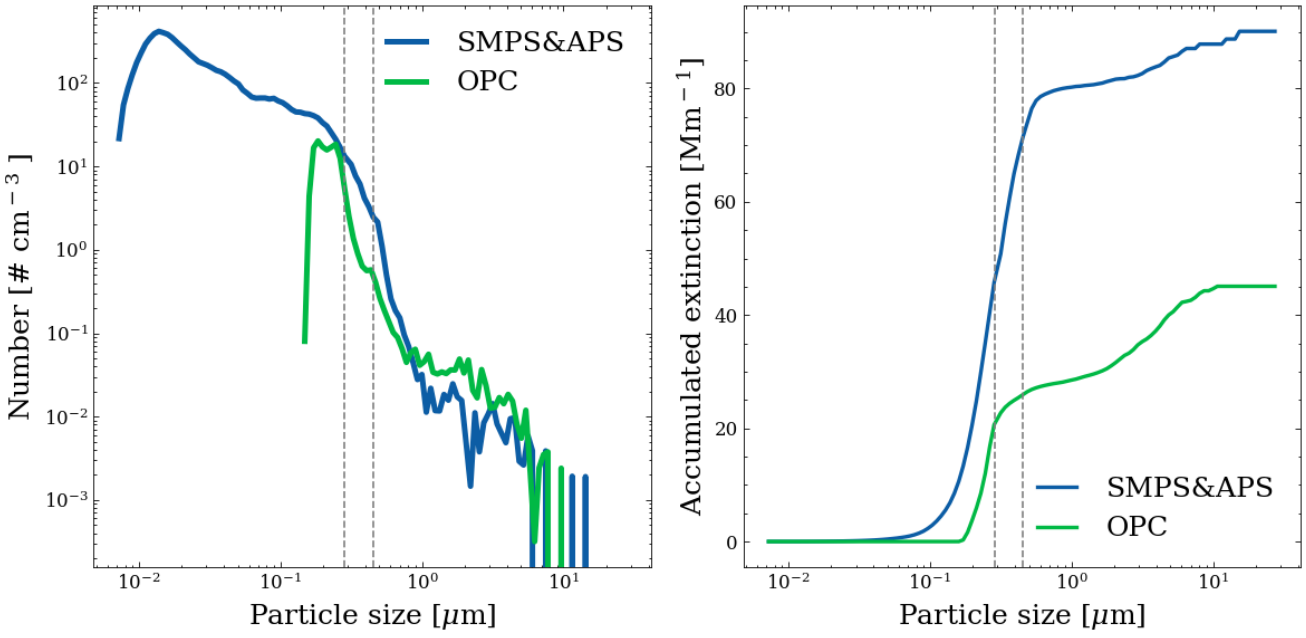

Figure S1. Particle size distribution measured by OPC and merged size distribution measured by SMPS and APS (left) as well as accumulated extinction coefficients calculated from the model calculation based on these two size distributions.

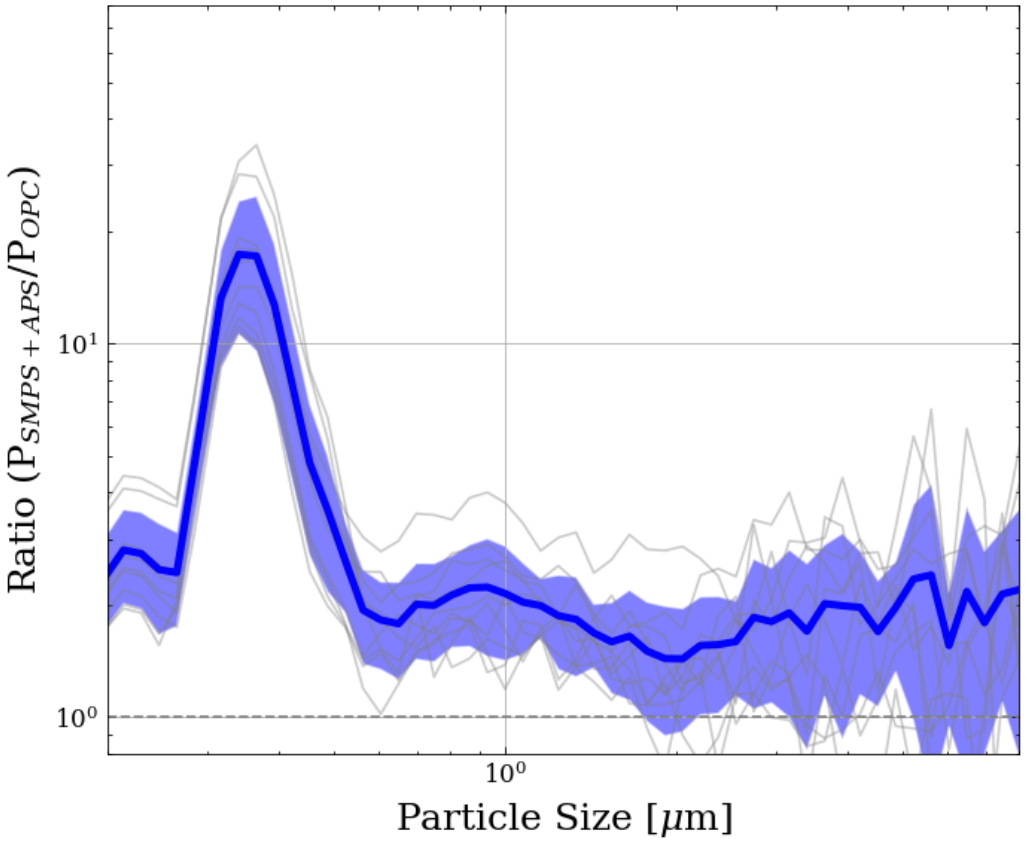

Figure S2. The particle counting effective curve calculated from merged aerosol number size distribution by SMPS and APS data and measured by OPC.

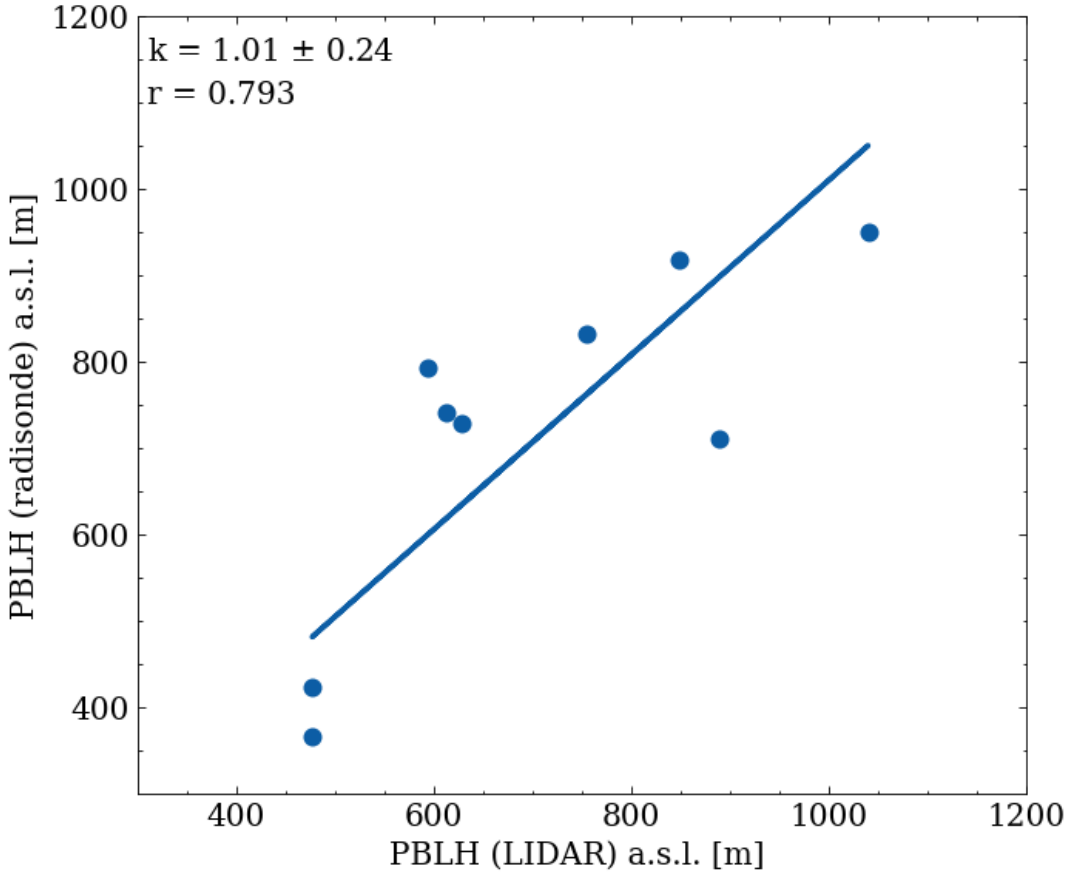

Figure S3. correlation of boundary layer height retrieved lidar and radiosonde measurement on 9^{th} and 12^{nd}, July, 2018 in Jülich.

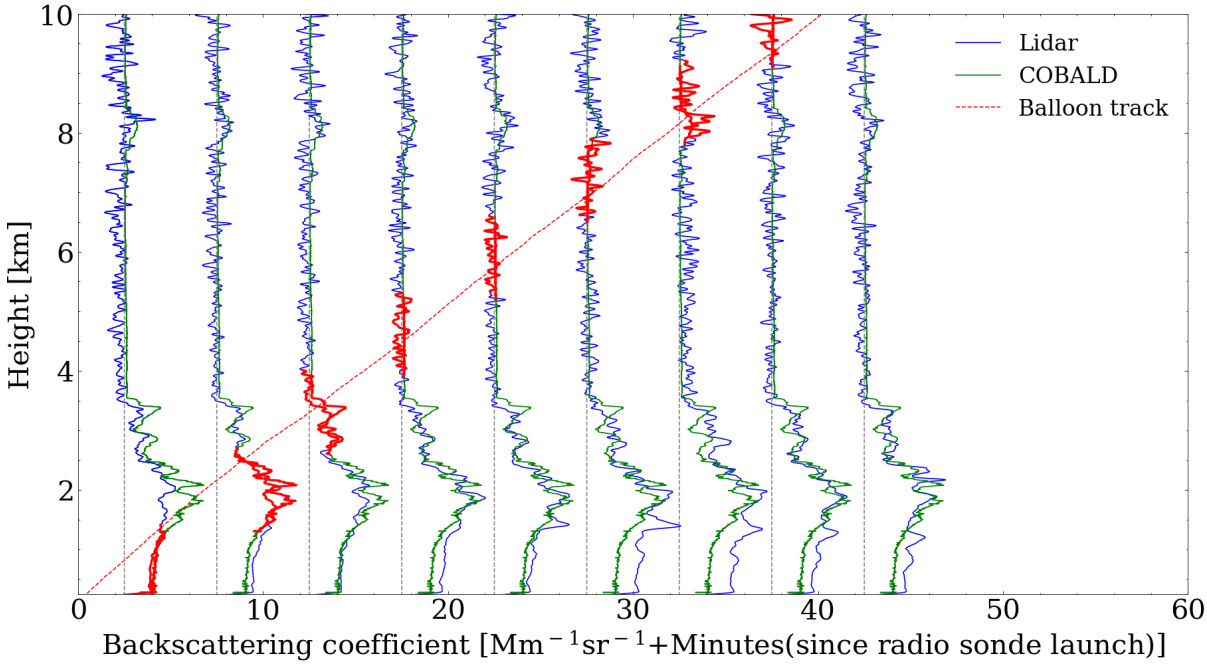

Figure S4. Profiles of backscatter coefficients from LIDAR for integration of 5 minutes and vertical profile of in-suit backscatter coefficient measured by balloon-borne COBALD on July 12^{th} of 2018. The black line segments indicate the altitude ranges selected to get the merged profile of the backscatter coefficient from LIDAR.