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Supplement of

Measurement report: Properties of aerosol and gases in the vertical profile during the LAPSE-RATE campaign

David Brus et al.

Correspondence to: David Brus (david.brus@fmi.fi)

Supplementary material

An inter-comparison of particle counters

A short inter-comparison (about 5 minutes) was done before each flight among the particle counters to check their performance, mostly visually from the laptop screen, if the number concentrations roughly correspond to each other. The rotorcraft (FMI-PRKL1) with particle module was not in the same location as surface module, neither the particle counters were using the same inlet. The rotorcraft was standing on the camping table approximately one third of the height of surface module which was placed on the car roof. Since the provided comparison is rather semi quantitative.

The comparison of rotorcraft particle module to surface module for CPC could be seen in attached Fig. S1, we must point out that each CPC was calibrated to different D50 cut-off, the most pronounced disagreement could be seen on Jul 16th when a weak NPF took place also at the surface (the red circles).

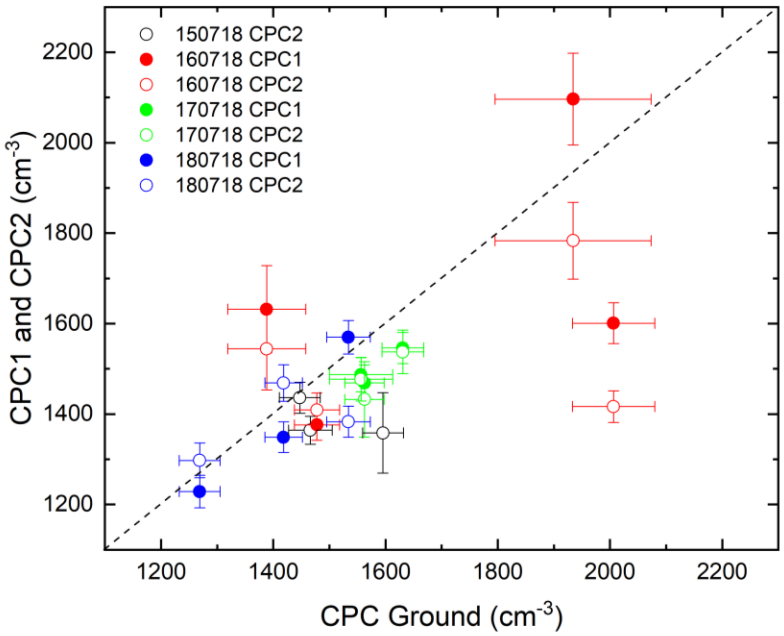

Figure S1. Inter-comparison of CPCs mounted on rotorcraft particle module (CPC1 and CPC2) and surface module (CPC Ground).

The comparison of OPCs in particle and surface module is shown in attached Fig. S2. In some cases, the OPC on particle module shows higher concentrations than the OPC on surface module. This might due to rotorcraft proximity to dusty surface during comparison. Similarly, when we

compare normalized concentration per bin, the OPC on particle module slightly overcounts in all bins, see Fig. S3.

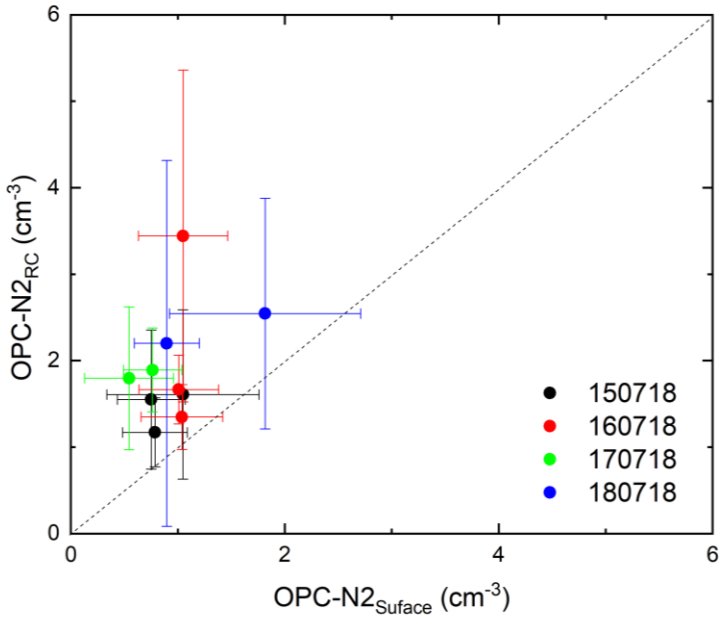

Figure S2. Daily comparison of total number concentration of OPCs mounted on rotorcraft particle module (OPC-N2_RC) and surface module (OPC-N2_Surface).

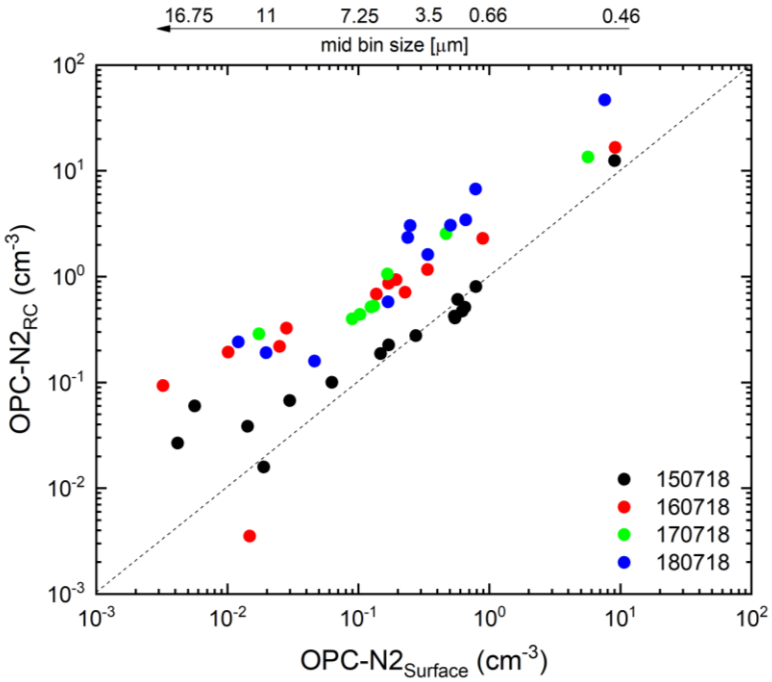

Figure S3. Daily comparison of normalized concentration per bin of the OPCs mounted on rotorcraft particle module (OPC-N2_RC) and surface module (OPC-N2_Surface).

There was no intentional comparison made for the pair of POPS counters, however we made a comparison of total particle number concentration using the air unit data just before the flight, when the KSU rotorcraft was ready for take-off, e.g. height was zero or close to zero, see Fig S4. The particle concertation data are slightly biased toward higher counts of air unit, on average about 10%.

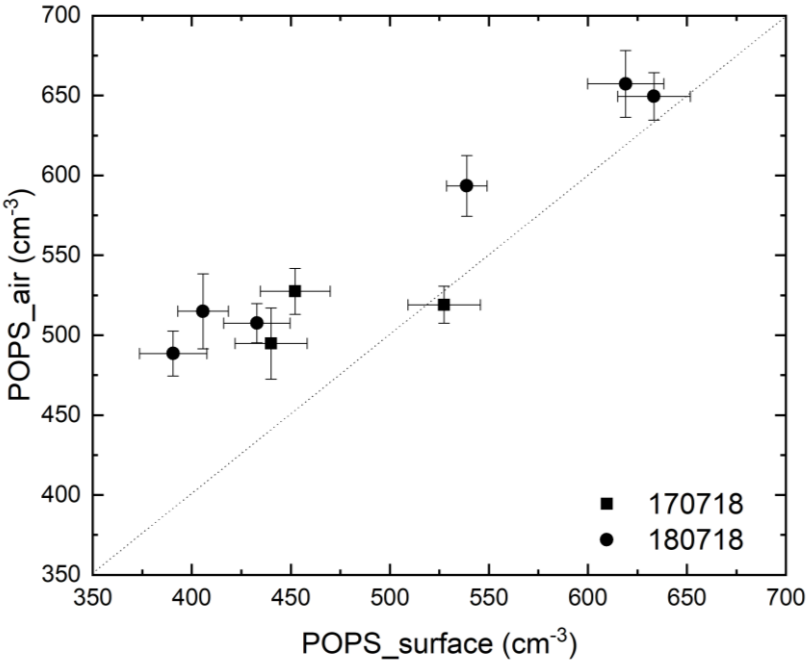

Figure S4. Comparison of POPS air and surface unit particle number concentration.