Supplement of

Aitken mode particles as CCN in aerosol- and updraft-sensitive regimes of cloud droplet formation

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Figure S1. Vertical profiles of (a,b) droplet number concentration ($N_d$), (c, d) dry size of smallest particles that contribute to $N_d$ ($D_{min}$), overlaid by the ASD (grey lines), and (e, f) sensitivity of $N_d$ to $\kappa$ ($\xi(\kappa)$) for an updraft velocity $w = 1.0$ m s$^{-1}$. Left and right columns show results for ASD I.b and III.b, respectively. The black lines denote the height of $S_{max}$. 
Figure S2. Vertical profiles of (a,b) droplet number concentration ($N_d$), (c, d) dry size of smallest particles that contribute to $N_d$ ($D_{\text{min}}$), overlaid by the ASD (grey lines), and (e, f) sensitivity of $N_d$ to $\kappa$ ($\xi(\kappa)$) for an updraft velocity $w = 0.2$ m s$^{-1}$. Left and right columns show results for ASD I.b and III.b, respectively. The black lines denote the height of $S_{\text{max}}$. 
Figure S3. Left column: Supersaturation [%] for ASD I.b as a function of $\kappa$ for a) $w = 2.9$ m s$^{-1}$, c) 1.0 m s$^{-1}$, e) 0.2 m s$^{-1}$; Right column: Supersaturation [%] for ASD III.b as a function of $\kappa$ for b) $w = 2.9$ m s$^{-1}$, d) 1.0 m s$^{-1}$, f) 0.2 m s$^{-1}$
Figure S4. Size distributions of haze particles and cloud droplets as predicted for ASD I.b (black) and III.b (blue) at four heights above the level of RH = 100% (0.5 m, 5 m, 20 m, 40 m), three updraft velocities (columns) and three κ values (set of twelve panels each). The red lines mark the size threshold for cloud droplets ($D_{\text{wet}} \geq 3 \mu m$). The orange box indicates the conditions under which Aitken mode particles start contributing to $N_d$ (cf. ‘turnover’ of $\xi(\kappa)$ in Figure 2 f).
Figure S5. Same as Figure 3 but for ASD III.a ($N_a = 200 \text{ cm}^{-3}$)

Figure S6. Same as Figure 3 but for ASD III.c ($N_a = 5000 \text{ cm}^{-3}$)
Figure S7. Supersaturation (s-1 [%]) as a function of $w$ and $\kappa$ for ASDs I.a - V.c (Figure 1). The figures are based on 810 model simulations assuming 30 different values of $w$ and 27 different values of $\kappa$ for each ASD. Note that the color scales show $S_{max} \leq 1.3\%$ for ASD I-IV and $S_{max} \leq 3\%$ for ASD V.
Figure S8. Activated fractions of Aitken and accumulation modes ($F_{\text{act,Ait}}$ (dotted lines), $F_{\text{act,acc}}$ (solid lines)) as a function of $w$ and $\kappa$ for ASDs I.a - V.c (Figure 1). The figures are based on 810 model simulations assuming 30 different values of $w$ and 27 different values of $\kappa$ for each ASD.
Figure S9. Activated fractions for accumulation mode ($F_{act,acc}$, dashed lines, ≤ 1) and Aitken mode ($F_{act,Ait}$, solid lines) for a) $\kappa_{acc} = 0.1$ and b) $\kappa_{acc} = 0.5$, corresponding to the results in Figure 6 c and d.