Vertical redistribution of moisture and aerosol in orographic mixed-phase clouds - Supplementary Information

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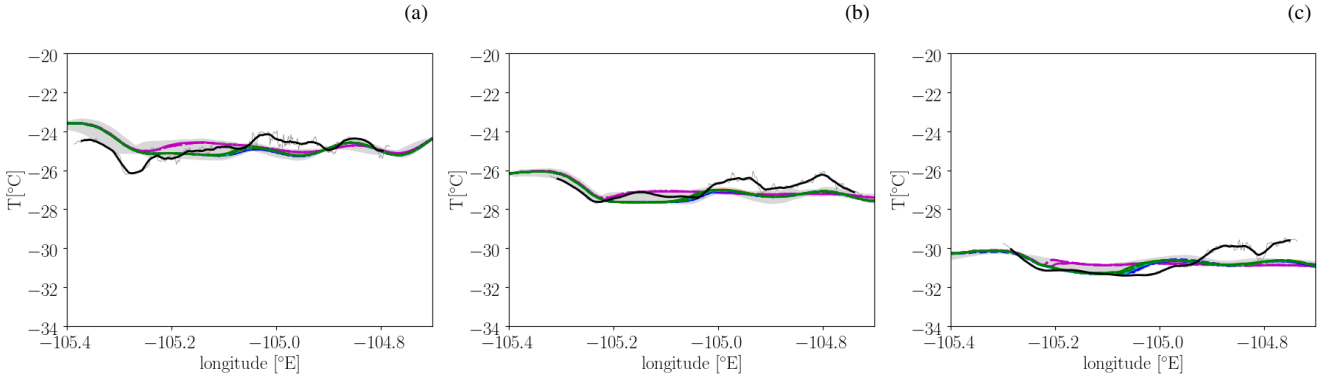

Figure 1. Comparison of air temperature for the three different flight legs. The lowest flight leg is shown in (a) and the highest one in (c). The thick black lines shows the smoothed aircraft data (thin black line shows 1 Hz data). Model data are interpolated to the same tangents of the mean streamlines as used in Fig. 3 of the main paper. The variability of the variables along all these hypothetical flight paths are shown by the grey shading, while the thick coloured lines show the median values for simulations. The different coloured lines represent with different ice nucleation schemes and different line styles indicate different assumptions on the amount of soluble material in the dust particles.

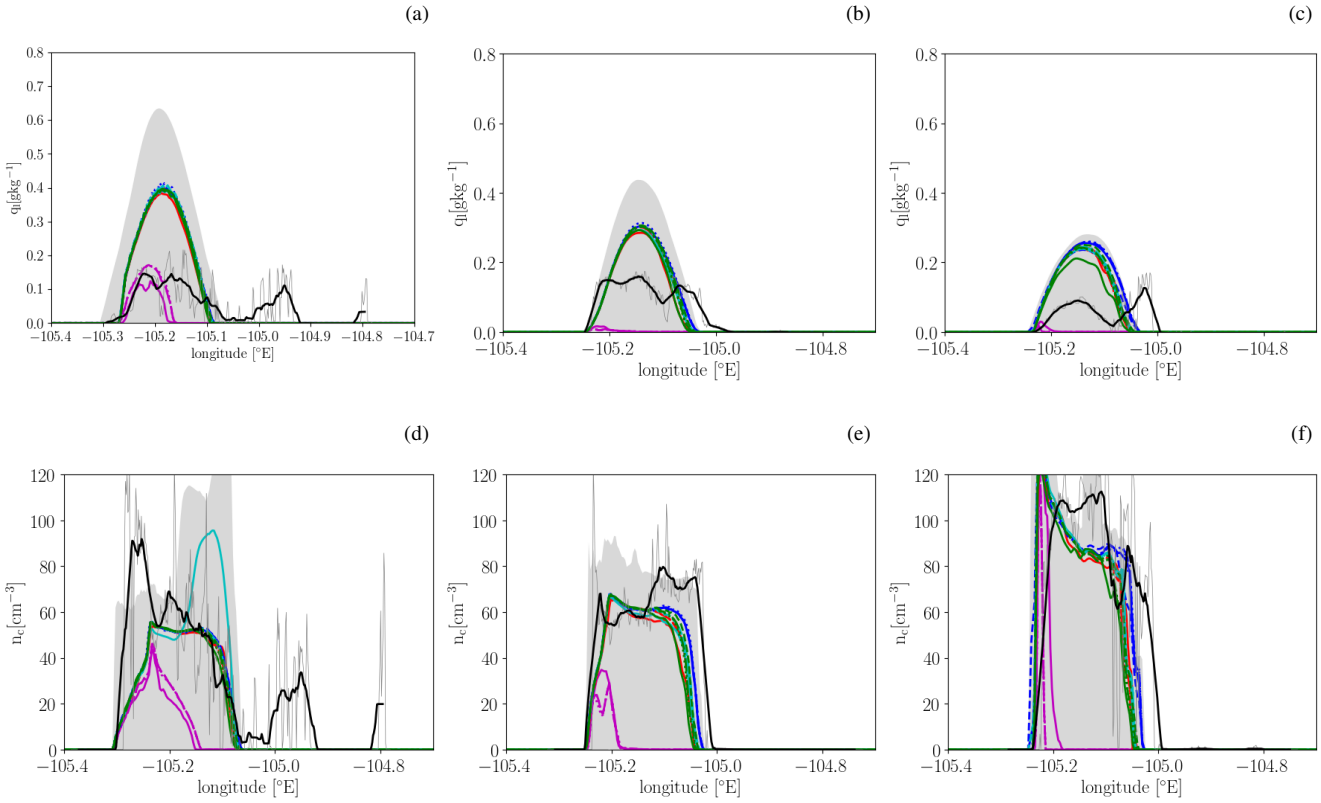

Figure 2. Comparison of (a-c) liquid water content and (d-f) cloud droplet number concentration for the three different flight legs. The lowest flight leg is shown in (a, d) and the highest one in (c, f). The thick black lines shows the smoothed aircraft data (thin black line shows 1 Hz data). Model data are interpolated to the same tangents of the mean streamlines as used in Fig. 3 of the main paper. The variability of the variables along all these hypothetical flight paths are shown by the grey shading, while the thick coloured lines show the median values for simulations. The different coloured lines represent with different ice nucleation schemes and different line styles indicate different assumptions on the amount of soluble material in the dust particles.

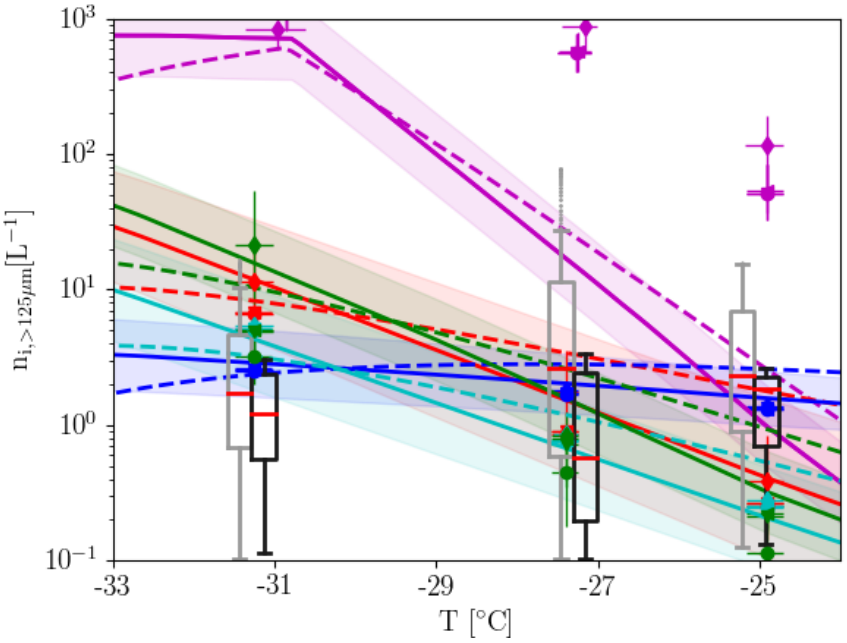

Figure 3. Same as Fig. 6 in the main paper, but assuming feldspar to cover 1 % of the dust surface instead of 1 % in the A13 parameterisation (magenta lines and shading).

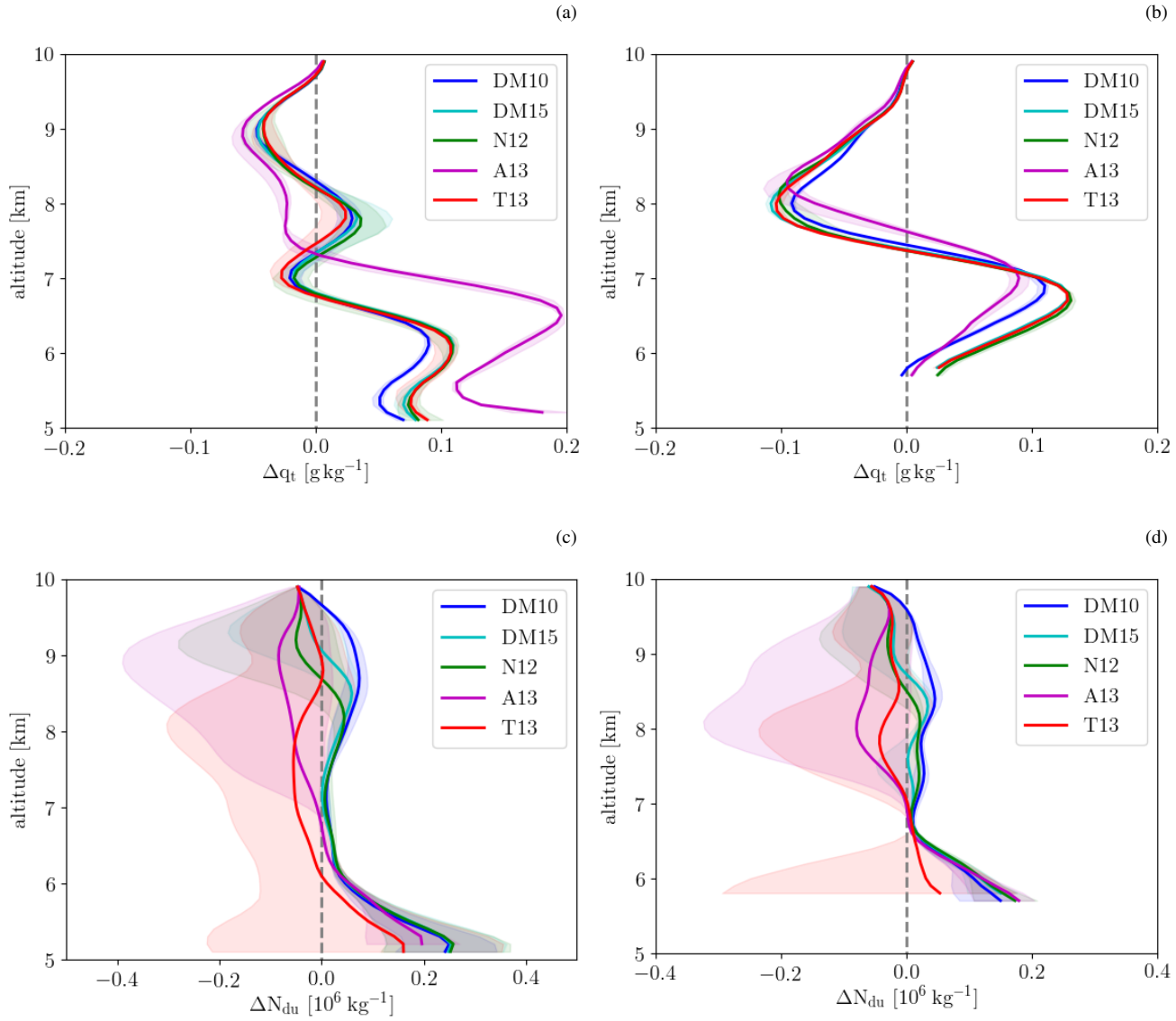

Figure 4. Mean profiles of Δq_t (a, b) and ΔN_{du} (c, d) for all simulations averaged between 2110 – 2130 UTC (a, c) and 2140 – 2200 UTC (b, d). The different colours correspond to simulations with different ice nucleation parameterisations, while the shading represents the variability due different assumptions on the CCN activation of dust.

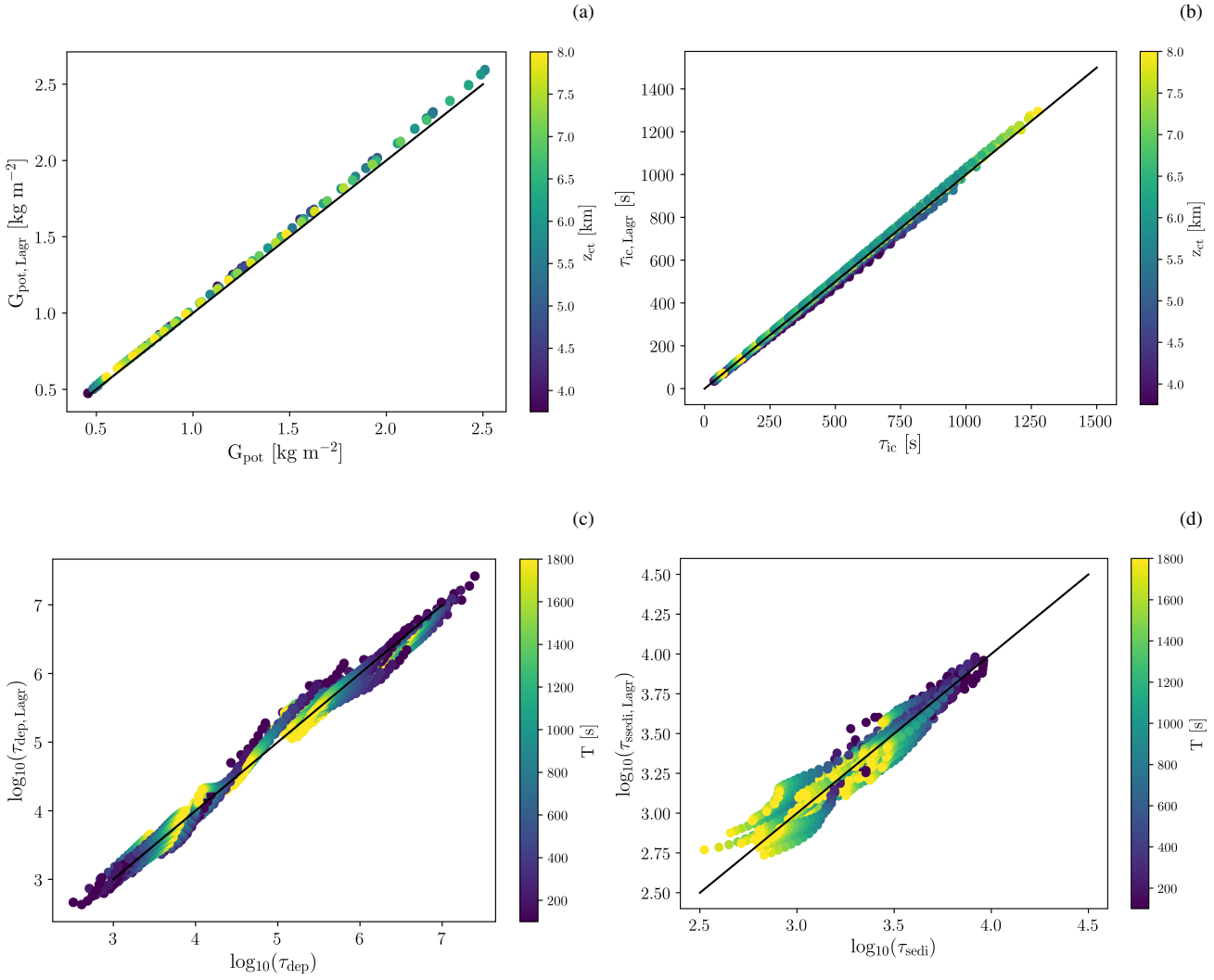

Figure 5. Comparison of Lagrangian estimates (ordinate) and analytical approximations (abscissa) for (a) G_{pot}, (b) τ_{ic}, (c) τ_{dep}, and (d) τ_{sedi}.