1 **Supplementary Information**

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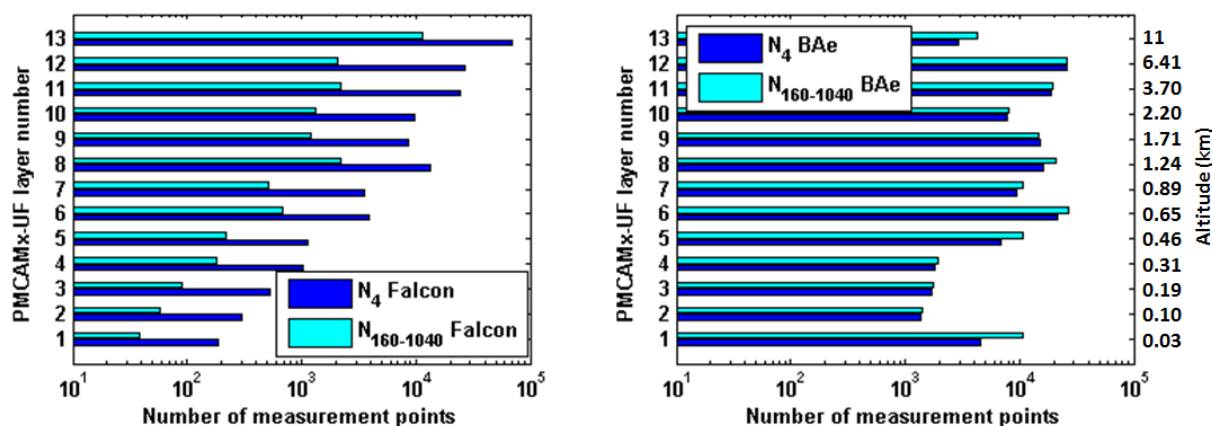
4   Figure S1. The availability of particle number concentration measurements as data point counts (x-axis)

5   in the different model layers for particles larger than 4 nm (N_4) and particles with sizes between 160 and

6   1040 nm ($N_{160-1040}$) measured by the German DLR Falcon 20 (left panel) and the British FAAM BAe

7   146 (right panel) aircrafts. The corresponding altitude of the layer midpoint is shown on the right-hand

8   side of the y-axis of the right panel. Note that similarly to N_4, the N_{10} has been measured by the same

9   instrument onboard the Falcon 20 which results in the same data availability as N_4.

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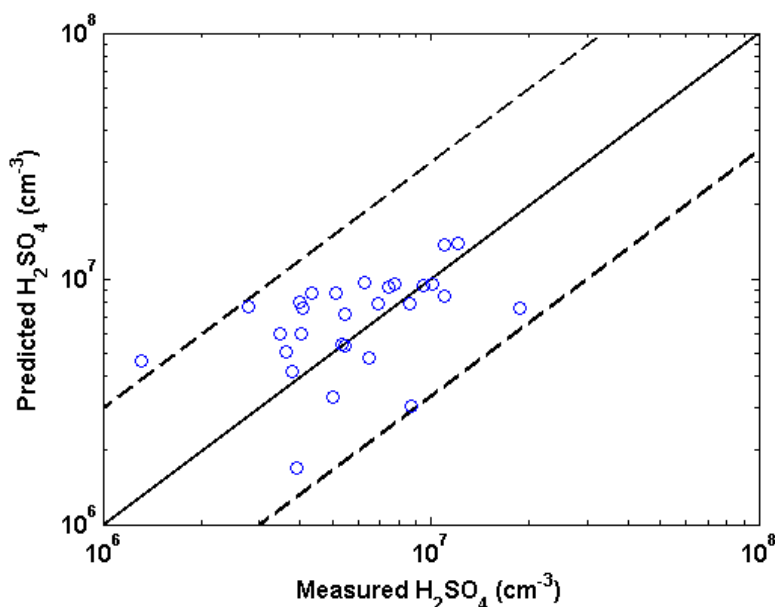
12   Figure S2. Comparison of PMCAMx-UF predictions vs. measurements of daily-averaged gas

13   phase concentration (cm^{-3}) of sulfuric acid (H_2SO_4) during May 2008 for the site Melpitz, Germany.

14   Lines corresponding to 1:1 (solid line), and 1:3 and 3:1 (dashed lines) are shown.

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