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*Supplement of*

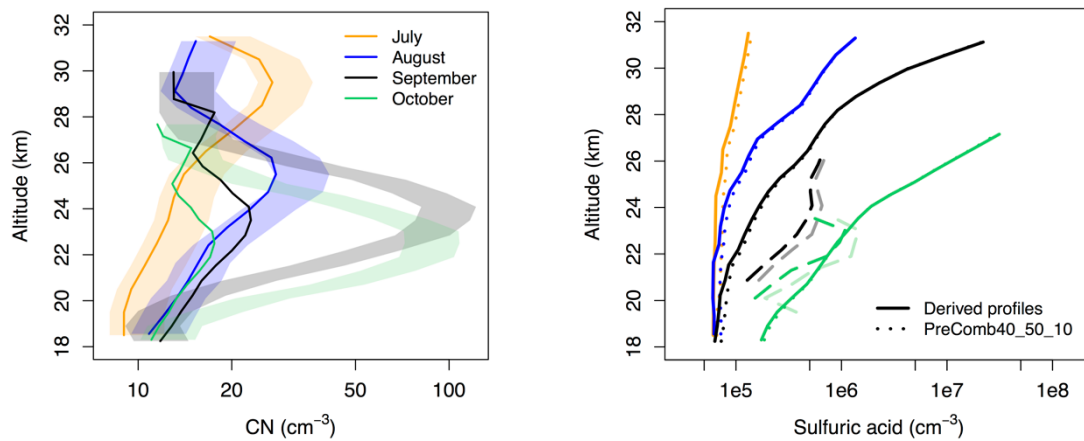
## **Nucleation modeling of the Antarctic stratospheric CN layer and derivation of sulfuric acid profiles**

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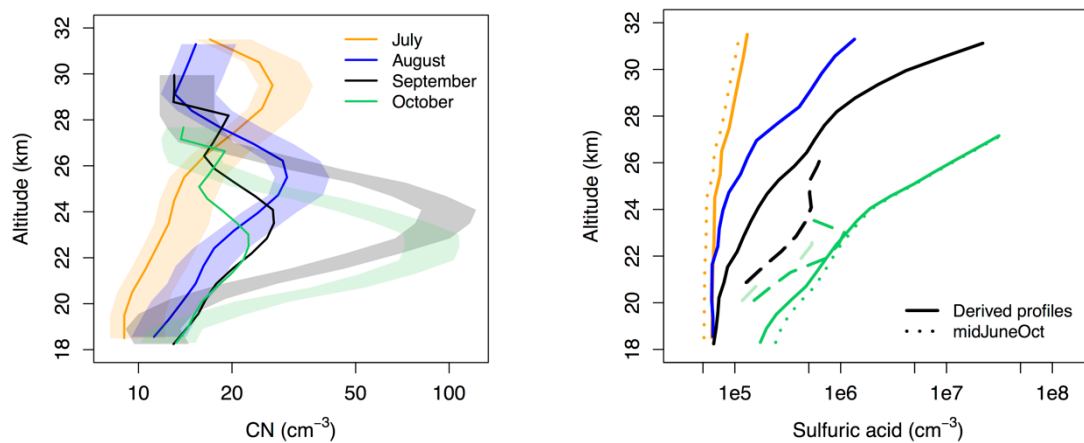
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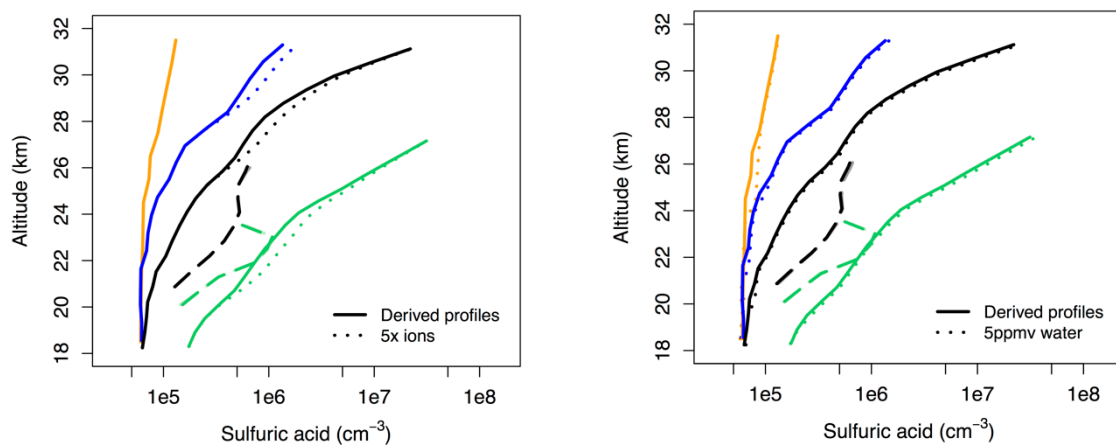
## S1 Additional sensitivity studies



**Figure S1: Preexisting particles: 10% are 300 nm, 50% are 100 nm, and 40% are 50 nm in size (as Fig. 2b and Fig. 4)**



**Figure S2: Run simulation from mid June until mid October. August and September profiles do not change (as Fig. 2b and Fig. 4)**



**Figure S3: 5x ion production rates everywhere (left) and 5 ppm water vapor everywhere (right) (as Fig. 4)**

## S2 Estimation of the trajectories

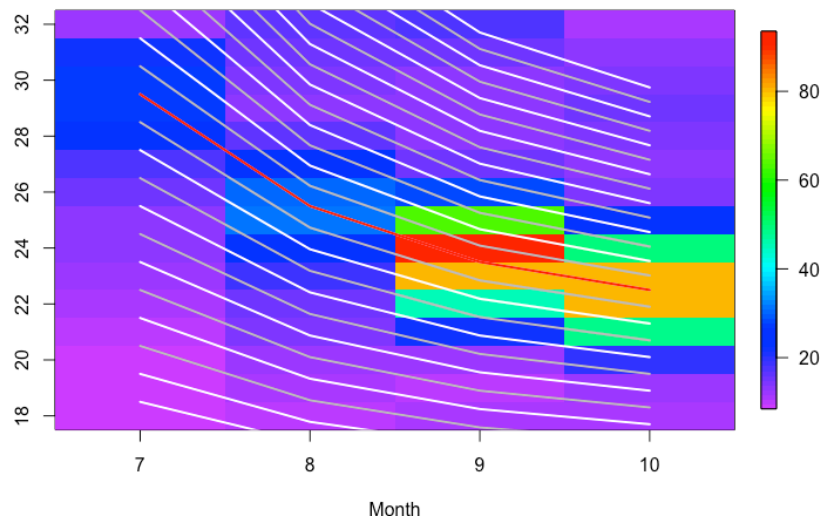
For the July altitudes we start at 18.5 km and then go up in steps of 1 km. For the following months the values are determined by using the following estimates:

$$August = July - 4.0 \cdot \frac{July - X}{29.0 - X}$$

$$September = August - 2.0 \cdot \frac{August - X}{25.5 - X}$$

$$October = September - 1.0 \cdot \frac{September - X}{23.5 - X}$$

with  $X = 15$  above the CN maximum trajectory and  $X = 12$  below it.



**Figure S4: Trajectories plotted over the measured CN concentrations from Campbell and Deshler (2014) (in color, cm-3)**