

## Modification of aerosol properties in the Antarctic troposphere by the Antarctic ozone hole

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Occurrence of new particle formation (NPF) is an important process to supply atmospheric aerosol particles (Kerminen et al., 2018). Photochemical gaseous products, coupled with UV radiation, play an important role in NPF, even in the Antarctic troposphere. With the appearance of the ozone hole in the Antarctic stratosphere, more UV radiation can enhance atmospheric chemistry, even near the surface in the Antarctic<sup>2</sup>. However, linkage among tropospheric aerosols in the Antarctic, ozone hole, and UV enhancement is unknown. We found that NPF started in the Antarctic free troposphere already in the end-August –early September by UV enhancement resulting from the ozone hole. Then, aerosol particles supplied from NPF during spring grow gradually by vapor condensation, suggesting modification of aerosol properties such as number concentrations and size distributions in the Antarctic troposphere during summer. Here, we assess the hypothesis that UV enhancement in the upper troposphere by the Antarctic ozone hole modifies the aerosol population, aerosol size distribution, cloud condensation nuclei capabilities, and cloud properties in Antarctic regions during summer.

### Reference:

Kerminen, V.-M. et al. Atmospheric new particle formation and growth: review of field observations. *Environmental Research Letters* **13**, 103003 (2018).

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