

# Antarctic ozone and precipitation variability in the Southern Hemisphere

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Although Antarctic ozone depletion occurs mostly in spring, the consequent reduction in shortwave heating lasts long into the summer, accelerating the stratospheric zonal winds and causing negative geopotential height anomalies at high latitudes. Such changes propagate from the stratosphere to the troposphere, affecting winds, precipitation, pressure, and temperature and result in a modulation of the trend of the Southern Annular Mode (SAM), especially during the austral summer. Nevertheless, Antarctic ozone can also potentially affect the climate at an interannual timescale due to its significant interannual springtime variability. On the other hand, ozone anomalies can be considered a proxy for variability in polar vortex strength. In this study, we investigated the interannual connection among ozone, SAM, and precipitation, exploring the possibility of using springtime Antarctic ozone as a predictor of summertime precipitation. Observations were compared with simulations of the present and future climate from a coupled climate model with interactive atmospheric chemistry. Then, in an attempt to identify the regions where ozone variations could improve seasonal predictions, we focused on areas where previous studies found a connection between surface climate and the ozone hole. Overall, we suggest that including ozone variations in models could enhance seasonal predictions.

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