

**PLANETARY WAVE AND GRAVITY WAVE INFLUENCE ON THE OCCURRENCE OF  
POLAR STRATOSPHERIC CLOUDS SEEN FROM AN EAST ANTARCTIC STATION**

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Four years of Rayleigh lidar and supporting radiosonde balloon data are used to study the influence of wave activity on Polar Stratospheric Clouds (PSC) from an Eastern Antarctic coastal site. PSC appear as enhanced backscatter in the lidar signal in the winter months from 15 to 25 km altitude. The radiosonde data provide temperature profiles and estimates of gravity wave activity. The occurrence of PSC is closely tied to average stratospheric temperatures (which in turn are closely related to the location of the observing site with respect to the Antarctic

vortex), with PSC being seen when the temperature falls to near or below the calculated formation temperature of nitric acid trihydrate (NAT). There is clear evidence in the sonde data for gravity wave (GW) and planetary wave (PW) modulation of the stratospheric temperature. We see small-scale wave-like structure in the PSC profiles, which likely arise from gravity waves, but find little direct correlation between a given

(vertical) lidar PSC profile and near-contemporaneous sonde profile, probably because the sonde flight is not an instantaneous sounding at the exact spatial location of the lidar. The planetary wave induced temperature variations are of order 10 times the size of the gravity wave variations, and have a greater and more direct influence in PSC occurrence at this site.