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## MIPAS detects Antarctic stratospheric belt of NAT PSCs caused by mountain waves

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**Abstract.** Space borne infrared limb emission measurements by the  
Michelson Interferometer for Passive Atmospheric Sounding (MIPAS) reveal  
the formation of a belt of polar stratospheric clouds (PSCs) of nitric acid  
trihydrate (NAT) particles over Antarctica in mid-June 2003. By mesoscale  
microphysical simulations we show that this sudden onset of NAT PSCs  
was caused by heterogeneous nucleation on ice in the cooling phases of  
large-amplitude stratospheric mountain waves over the Antarctic Peninsula  
and the Ellsworth Mountains. MIPAS observations of PSCs before this  
event show no indication for the presence of NAT clouds with volume  
densities larger than about  $0.3 \mu\text{m}^3/\text{cm}^3$  and radii smaller than  $3 \mu\text{m}$ , but  
are consistent with supercooled droplets of ternary  $\text{H}_2\text{SO}_4/\text{HNO}_3/\text{H}_2\text{O}$   
solution (STS). Simulations indicate that homogeneous surface nucleation  
rates have to be reduced by three orders of magnitude to comply with the  
observations.

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