

# Fast Preview

*Note: This is not exactly what the published abstract will look like*

## A Cold Jovian Arctic Polar Vortex: Evidence from Infrared Imaging

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A prominent cold arctic airmass in Jupiter is revealed by thermal images taken at NASA's Infrared Telescope Facility (IRTF) during Jupiter's northern summer in 1999. This cold airmass is well defined by a sharp 4-degree thermal gradient in both the stratosphere and the upper troposphere and tropopause regions. The latitude boundary of the cold airmass oscillates in longitude with principal wavenumber 5--6. This longitudinal oscillation is coincident with the oscillation of the boundary of the thick polar hood that is detectable in reflected sunlight that is sensitive to particles around Jupiter's tropopause ( $\sim 100$  mbar pressure), using IRTF 2.3- $\mu\text{m}$  and HST WFPC2 890-nm images. The sinusoidal boundaries slowly rotate prograde with respect to the interior. The proximity and similarity of the thermal and particle boundaries suggests that the phenomenon is a classical polar vortex of the same type as seen in the Earth's antarctic. Testing of possible gaseous entrainment within the vortex' area would verify or refute similarities with polar vortices in the Earth, Venus, Mars and possibly Titan. This phenomenon is relevant to studies of terrestrial meteorology by measuring the extent to which stratospheric phenomena can drive tropospheric properties. Detailed studies of Jupiter's polar regions might be most easily accomplished from appropriate remote sensing instrumentation on a polar orbiter mission as a result of optimized spatial resolution. The work reported here was supported by funds from NASA to the Jet Propulsion Laboratory, California Institute of Technology. Ori Fox was supported by the Undergraduate Student Researcher Program (USRP).

### Meeting:

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### Student rate:

Not Applicable

### Willing to chair a session:

Glenn S. Orton -  
P00

### Meeting Section:

P - Planetary Sciences

### Special Session:

P00 - General Planetary Sciences  
Contributions

### Index Terms:

342,343,5700,5707,5757

### Theme:

### Material presented:

60% DPS

### Contributed

### Poster presentation requested:

### Scheduling request: