Geophysical Research Abstracts,
Vol. 10, EGU2008-A-04851, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-04851
EGU General Assembly 2008

Mid-infrared imaging of Uranus from the VLT and spectroscopy from the Spitzer IRS

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We report the first mid-infrared images of Uranus obtained at the ESO Very Large Telescope (VLT) obtained using the VISIR instrument on 2-3 September 2006, a little over a year before its equinox. Taken through a filter centered at 18.7 microns, these images and their zonally averaged composite indicate hemispherical asymmetry about the equator, with the pole emerging from darkness being distinctly colder, implying a long-term seaonal response of tropopause (˜50-100 mbar) temperatures to decades of darkness. These results are analyzed in the context of Cycle-1 Spitzer observations of the disk-averaged spectrum of Uranus which indicate spectral changes from the ground-based observations made in 1986, possibly in upper tropospheric and stratospheric temperatures or in the abundances of stratospheric hydrocabons.