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Observations of Jupiter supporting the New Horizons encounter and at the onset of a period of "global upheaval"

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Observations of Jupiter were made between February and June of 2007 to provide both increased spectral support and an extended timeline for the New Horizons remote-sensing of Jupiter's atmosphere. Several ground-based facilities were used, using the NASA Infrared Telescope Facility (MIRSI and NSFCam2 mid- and near-infrared instruments, respectively), Gemini/South (T-Recs mid-infrared camera/spectrometer), and ESO's Very Large Telescope (VISIR mid-infrared camera/spectrometer). Mid-infrared observations from the large telescopes provide the maximum possible spatial resolution in the mid-infrared, as the point-response function is primarily defined by the limitations of diffraction rather than atmospheric turbulence. In mid-February, the north and south auroral-generated stratospheric hot spots were resolved spatially, possibly for the first time; the southern one being bright in methane, ethylene and ethane emission. In contrast, the northern one was recognizable in all of these emissions, but barely above the background level. Subsequent observations in March and thereafter did not detect any enhanced emission from the north. Observations of polar regions provided evidence of distinct boundaries to polar airmasses which coincided with the locations of high-altitude haze layers. These high-resolution images revealed that temperatures in the interior of the Great Red Spot were not elliptically symmetric but were warmer to the south and center of the vortex. Observations from March to June coincided with the initiation of several vertical jets in the southern portion of Jupiter's

North Temperate Belt (NTBs), which precede a major color change in the entire belt and often signal the beginning of an epoch of "global upheaval" in Jupiter’s cloud system with major disruptions to its typical appearance. Our observations determine the altitude of these outbursts and their influence on the temperature field.