Geophysical Research Abstracts
Vol. 19, EGU2017-3926, 2017
EGU General Assembly 2017

JunoCam's Imaging of Jupiter

Glenn Orton (1), Candice Hansen (2), Thomas Momary (1), Michael Caplinger (3), Michael Ravine (3), Sushil Atreya (4), Andrew Ingersoll (5), Scott Bolton (6), John Rogers (7), and Gerald Eichstaedt (8)

(1) Jet Propulsion Laboratory, MS 183-501, Pasadena, United States (glenn.orton@jpl.nasa.gov), (2) Planetary Science Institute, Tucson, Arizona, United States, (3) Malin Space Science Systems, San Diego, Calfornia, United States, (4) University of Michigan, Ann Arbor, Michigan, United States, (5) California Institute of Technology, Pasadena, California, United States, (6) Southwest Research Institute, San Antonio, Texas, United States, (7) British Astronomical Association, London, United Kingdom, (8) independent scholar, Stuttgart, Germany

Juno's visible imager, JunoCam, is a wide-angle camera (58° field of view) with 4 color filters: red, green and blue (RGB) and methane at 889 nm, designed for optimal imaging of Jupiter's poles. Juno's elliptical polar orbit offers unique views of Jupiter's polar regions with spatial scales as good as 50 km/pixel. At closest approach ("perijove") the images have spatial scale down to ∼3 km/pixel. As a push-frame imager on a rotating spacecraft, JunoCam uses time-delayed integration to take advantage of the spacecraft spin to extend integration time to increase signal. Images of Jupiter's poles reveal a largely uncharted region of Jupiter, as nearly all earlier spacecraft except Pioneer 11 have orbited or flown by close to the equatorial plane. Poleward of 64-68° planetocentric latitude, Jupiter's familiar east-west banded structure breaks down. Several types of discrete features appear on a darker, bluish-cast background. Clusters of circular cyclonic spirals are found immediately around the north and south poles. Oval-shaped features are also present, ranging in size down to JunoCam's resolution limits. The largest and brightest features usually have chaotic shapes; animations over ∼1 hour can reveal cyclonic motion in them. Narrow linear features traverse tens of degrees of longitude and are not confined in latitude. JunoCam also detected optically thin clouds or hazes that are illuminated beyond the nightside ∼1-bar terminator; one of these detected at Perijove lay some 3 scale heights above the main cloud deck. Tests have been made to detect the aurora and lightning. Most close-up images of Jupiter have been acquired at lower latitudes within 2 hours of closest approach. These images aid in understanding the data collected by other instruments on Juno that probe deeper in the atmosphere. When Jupiter was too close to the sun for ground-based observers to collect data between perijoves 1 and 2, JunoCam took a sequence of routine images to monitor large-scale features, which fortuitously yielded the earliest images of a very energetic outbreak on the rapid jet at 24°N. Images taken around perijove 3 (PJ3) allow a closer inspection of the outbreak features in a later state of evolution. Methane band images covering both polar regions within about four hours, around PJ3, show the shape and extent of the polar-haze features from favorable vantage points. Occasional, opportunistic images of the Galilean moons and the ring system were also acquired.