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Title:
Investigation of Jupiter's Equatorial Hotspots and Plumes using *Cassini* ISS Observations

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Abstract:
We present updated analysis of Jupiter's equatorial meteorology from Cassini observations. For two months preceding the spacecraft's closest approach, the ISS onboard regularly imaged the atmosphere. We created time-lapse movies from this period in order to analyze the dynamics of equatorial 5-micron hot spots and their interactions with adjacent latitudes. Hot spots are quasi-stable, rectangular dark areas on visible-wavelength images, with defined eastern edges that sharply contrast with surrounding clouds, but a diffuse western edge serving as a nebulous boundary with adjacent equatorial plumes. Hot spots exhibit significant variations in size and shape over timescales of days and weeks. Some of these changes correspond with passing vortex systems from adjacent latitudes interacting with hot spots. Strong anticyclonic gyres present to the south and southeast of the dark areas appear to circulate into hot spots. Impressive, bright white plumes occupy spaces in between hot spots. Compact cirrus-like 'scooter' clouds flow rapidly through the plumes before disappearing within the dark areas. This raises the possibility that the plumes and fast-moving clouds are at higher altitudes, because their speed does not match previously published zonal wind profiles. Most profiles represent the drift speed of the hot spots at their latitude from pattern matching of the entire longitudinal image strip. If a downward branch of an equatorially-trapped Rossby waves controls the overall appearance of hot spots, however, the westward phase velocity of the wave leads to underestimates of the true jet stream speed. Instead, our expanded data set demonstrating the rapid flow of these scooter clouds may be more illustrative of the actual jet stream speed at these latitudes. This research was supported by a NASA JDAP grant and the NASA Postdoctoral Program.

Category:
Jovian Planets: Atmosphere