**Longitudinal Variation and Waves in Jupiter's South Equatorial Wind Jet.** A. A. Simon-Miller[1], John H. Rogers[2], Peter J. Gierasch[3], David Choi[1,4], Michael D. Allison[5], Gianluigi Adamoli[2], and Hans-Joerg Mettig[2]. [1]NASA Goddard Space Flight Center, [2]JUPOS Team and British Astronomical Association, [3]Cornell University, [4]University of Arizona Lunar and Planetary Lab, [5]NASA Goddard Institute for Space Studies.

**Introduction:** We have conducted a detailed study of the cloud features in the strong southern equatorial wind jet near 7.5° S planetographic latitude. To understand the apparent variations in average zonal wind jet velocity at this latitude [*e.g.*, 1, 2, 3], we have searched for variations in both feature latitude and velocity with longitude and time. In particular, we focused on the repetitive chevron-shaped dark spots visible on most dates and the more transient large anticyclonic system known as the South Equatorial Disturbance (SED). These small dark spots are interpreted as cloud holes, and are often used as material tracers of the wind field.

**Data and Methods**: The main sources of data in this study are the Voyager Imaging Science Subsystem, Hubble Space Telescope Wide Field Planetary Camera 2, Cassini Imaging Science Subsystem, and ground-based data and measurements obtained by amateur observers. Cloud positions were manually measured on navigated images. Velocities were determined using a variety of manual tracking and correlation methods. Lomb-Scargle periodograms were used to search for periodocity in cloud features, and compared with manual counts of feature frequency. Time lapse movies were generated from Cassini data spanning ~2 months, revealing detailed cloud motion not apparent in still images. Each of these methods was used to compare the time variable motions of the chevron features, and also the SED on dates when it was present.

**Results:** The presence of the SED has a profound effect on the chevron velocity, causing slower velocities to its east and accelerations over distance from the disturbance. The chevrons move with velocities up to the maximum expected wind jet velocity of ~165 m/s, as deduced by the magnitude of the symmetric wind jet near 7° N latitude, which was also studied by the Galileo Probe [4]. The average chevron tip latitude is 7.5° S, but shows variation among the chevrons. Their repetitive nature is consistent with a gravity inertia wave, or second eigenmode Rossby wave, with 0 to 20 m/s phase speed relative to the local flow, but their exact nature is not well constrained.

In addition, time series movies from Cassini images also show that the chevrons oscillate in latitude over longitude and time. This oscillating motion has a wavelength of approximately 20° and a phase speed of ~100 m/s, following a pattern similar to that seen in the Rossby wave plumes of the North Equatorial Zone, and possibly reinforced by it. Feature latitude alone does not clearly delineate this wave, and it is unclear if this wave is present during other epochs, as suitable time series movies do not exist to investigate this.

Thus, the motions along the 7.5° S jet are highly complex. Multiple wave modes may be present, and chevron features trace not only the wind jet, when unperturbed, but also a large scale wave. With assumed symmetry in vertical wind structure, the difference in cloud appearance and wave modes between 7° N and 7.5° S is likely due to the presence of the Great Red Spot, as it alters stability or acts as a wave boundary.

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**References:**

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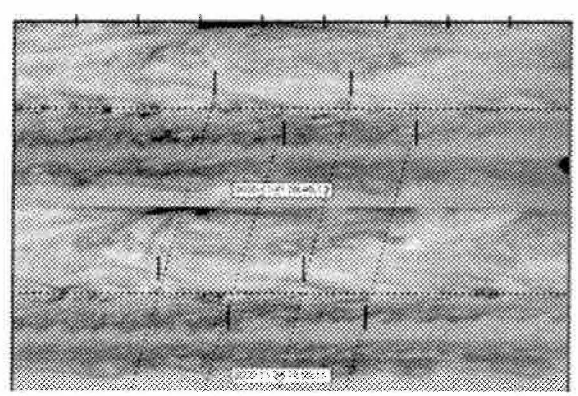

Caption: Wave crests and troughs identified in Cassini movie frames spaced ~3 days apart.