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Long-Baseline Observations with JunoCam

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Introduction

During almost all of Juno's past perijove flybys, JunoCam took images that allowed us to derive cloud velocity field data from cloud feature displacements.
During more recent Jupiter flybys, JunoCam observed distinct cloud top features with very different emission angles within less than ten minutes. These images also show relative cloud feature displacements. These newly observed displacements fields, however, appear to be parallel to vector fields that would be expected from parallaxes induced by long-baseline observations of the cloud top topography rather than primarily from cloud motion.
Based on this assumption, we show stereo images to make these observations intuitive. For this purpose, we project a pair of JunoCam images to the same trajectory position.
The pair of trajectory positions the JunoCam images have actually been taken from can be used to derive a quantitative displacement field in terms of pixels per km altitude offset. Stereo correspondence ís simplified to a one-dimensional search. Observed relative displacements can then be divided by the previously derived scaling in order to retrieve a digital elevation map of relative heights of the cloud tops.
Digital elevation maps can further be rendered in 3D.

Example image pair

This cross-eyed stereo pair is derived from JunoCam images JNCE_2022099_41C00024_V01 and JNCE_2022099_41C00026_V01. The time span between the two images is less than four minutes. For observers trained to cross-eyed vision, the three-dimensional effect of the distinct cloud-top features is well-visible. The image pair can also be transformed into a blink gif or into an anaglyph.