

JunoCam at PJ49: What the pictures show

John Rogers (BAA) (2023 March)

Juno's Perijove-49 was on 2023 March 1. Perijove was at latitude 41.0°N at 05:53 UT(SCET), then the spacecraft crossed the equator at 06:09 UT(SCET) at L3=181. (All times are from a previously released list of perijoves and have yet to be confirmed exactly.)

Io: While inbound, at 01:32 UT(SCET), Juno flew past Io at a distance of 51,568 km, its closest pass yet, and it took a series of images showing many surface features ([Figure 1](#)). There are only small changes denoting eruptions since pre-Juno views: in addition to the previously noted darkening of Dazhbog, Io expert Jason Perry notes a new dark spot east of Girru, and a red patch next to Chors. No plumes were observed; the bright points on the terminator are thought to be mountains.

For the third successive perijove, some images were lost, this time apparently corrupted by radiation, as Juno's evolving orbit now entails more exposure to Jupiter's radiation belts than before. The missing data were inbound images over a few hours before the Io flyby, and all the closeup images from the N4 domain to the SEBn. However, there was successful lo-res imaging earlier over a complete planetary rotation (Feb.28d, approx. 07h-18h); good northern-hemisphere views before and during north pole crossing (March 1d 02h-05h); and outbound imaging over a complete rotation (March 1d 07h-18h). Thus it was possible to compile a global map, albeit spanning three successive rotations, mostly at low resolution ([Figure 2](#)). A map was also compiled from methane-band images ([Figure 3](#)).

Polar regions: Excellent closeups of the north polar region were returned as usual, and maps are shown in [Figure 4](#) (down to 45°N) and [Figure 5](#) (down to 75°N, showing the circumpolar cyclones). South polar maps were also produced from RGB images ([Figure 6](#)) and methane images (not shown here), though nowadays the resolution is quite low. (All the maps in [Figures 2-6](#) were made by Gerald Eichstädt using an automated assembly procedure, with contrasts subsequently adjusted by JR.)

South Temperate domain: Juno now crosses the terminator onto the night side during its pass over the equatorial region, so although closeup views of southern temperate domains were returned, they showed only narrow slivers in sunlight. They did not reveal any cloud shadows near the terminator. Fortunately, the inbound and outbound images are still able to map wider areas. Of particular interest was STB spot 8: ground-based images had shown that this very dark cyclonic spot faded suddenly just after it passed the GRS at the end of January, but the resolution as the apparition ended was insufficient to show what happened to it. The PJ49 maps ([Figure 7](#)), although also lo-res, confirm what we suspected: that spot 8 has become a light, slightly reddish oval flanked by blue-grey patches, just like previous examples of fading spots such as the one that evolved into the STB Spectre in 2016. Spot 8 is still very methane-dark. There is also a smaller, similar spot 27° p. it, but its core is bright white, a cyclone that was observed passing the GRS several months ago.

Figures (small copies) are on the following pages:

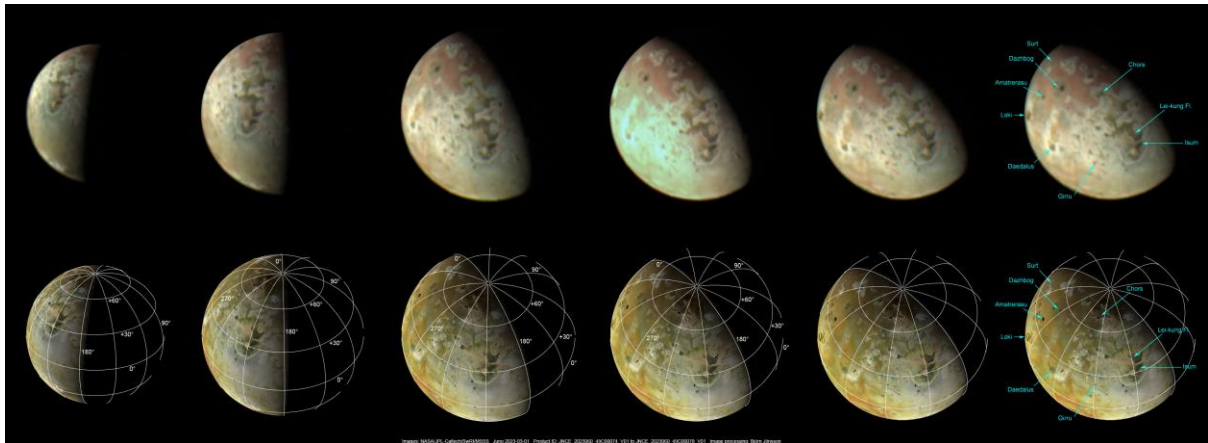


Figure 1. PJ49 images of Io, plus simulation views with coordinates, all generated by Björn Jónsson. At right, volcanic feature labels are added (omitting the suffix 'Patera').

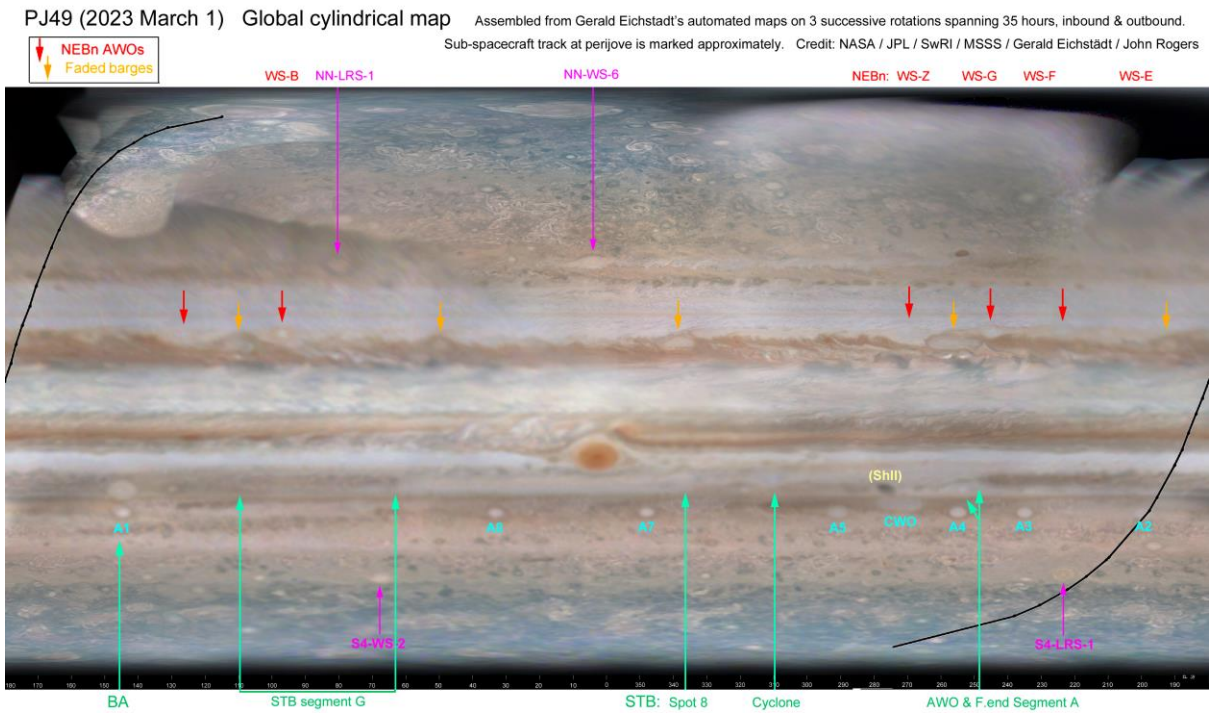


Figure 2. Global cylindrical map (RGB). (All the maps in Figures 2-6 were made by Gerald Eichstädt using an automated assembly procedure, & contrasts subsequently adjusted by JR.)

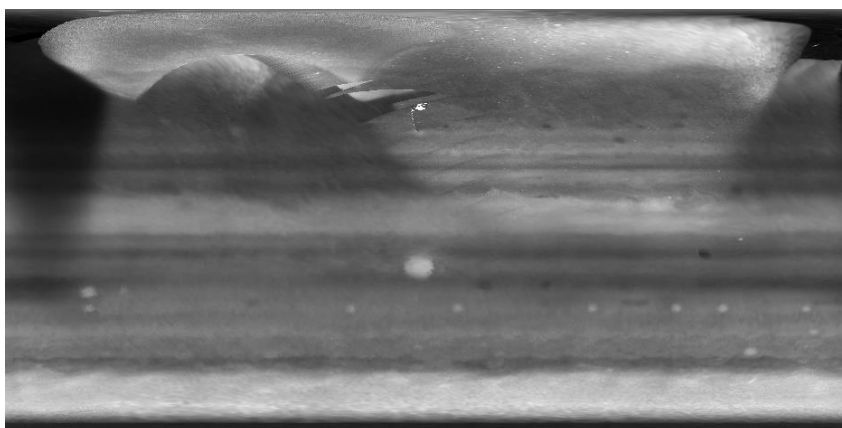


Figure 3. Global cylindrical map (CH4).

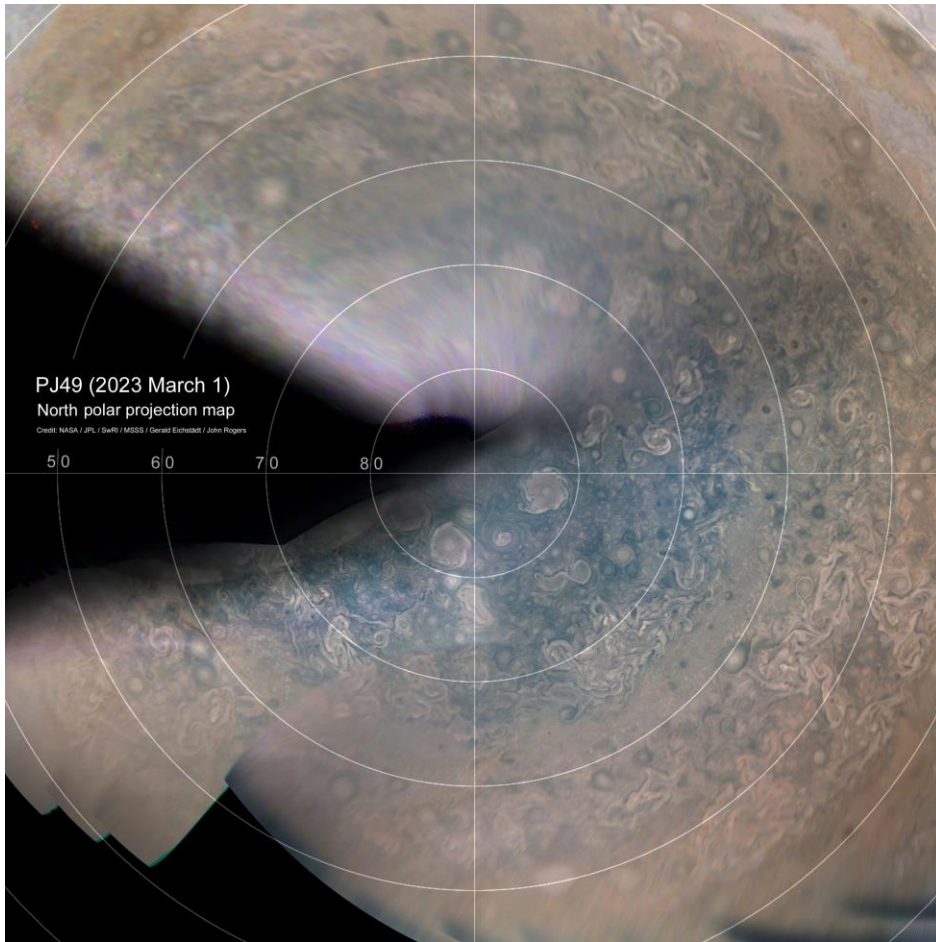


Figure 4

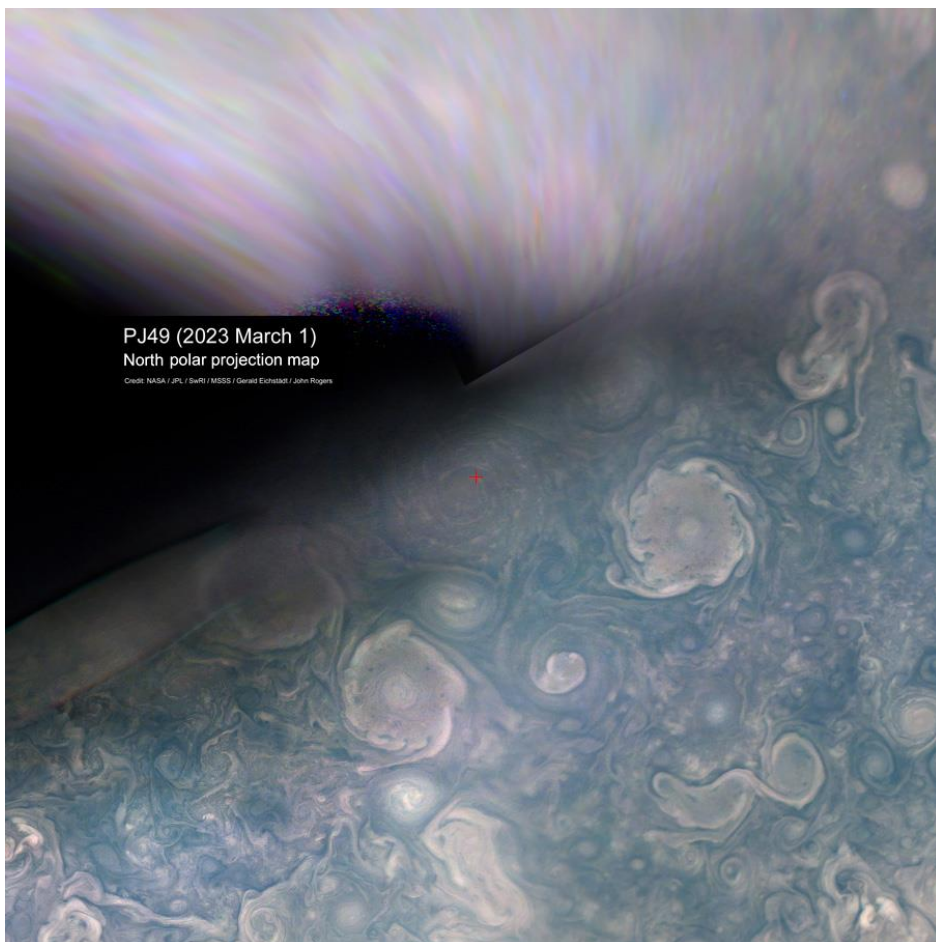


Figure 5

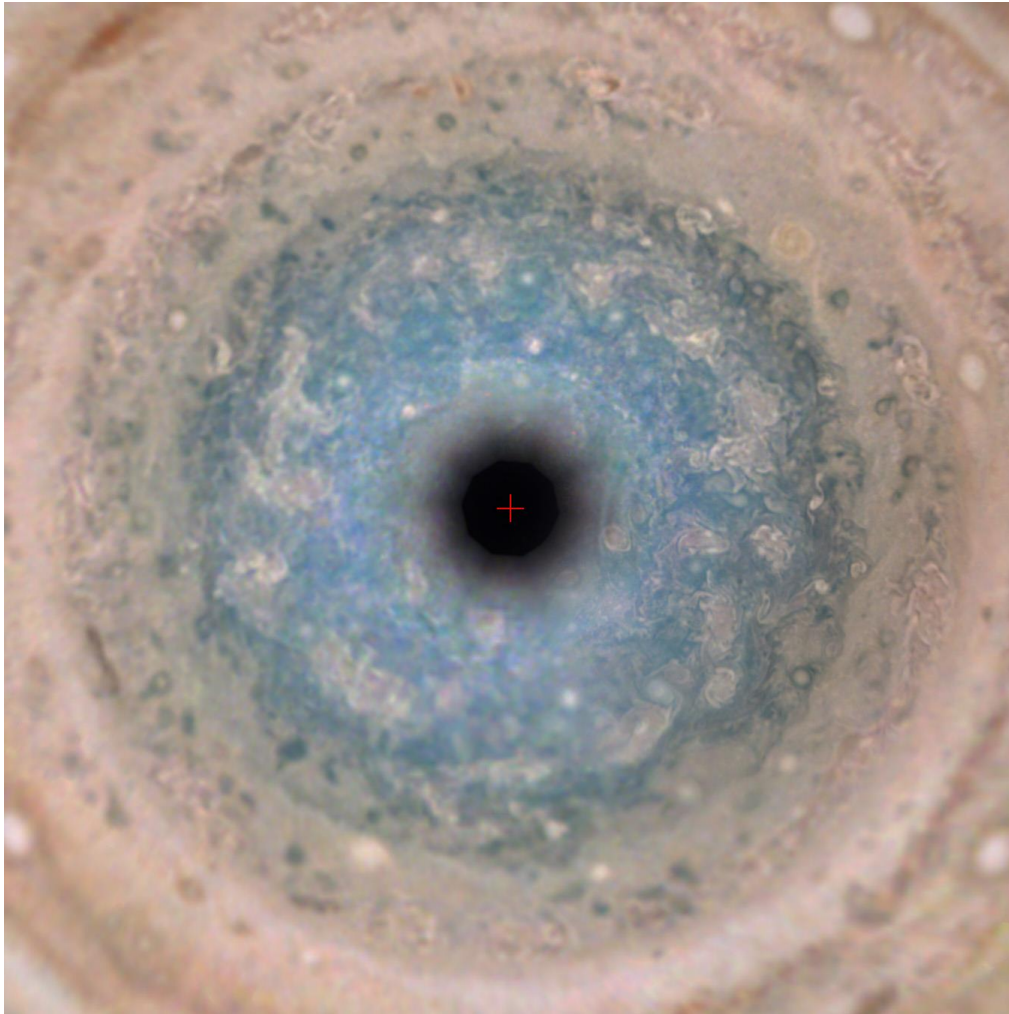


Figure 6. South polar projection map, down to 45°N at edges.
 (Credit: NASA / JPL / SwRI / MSSS / Gerald Eichstädt.)

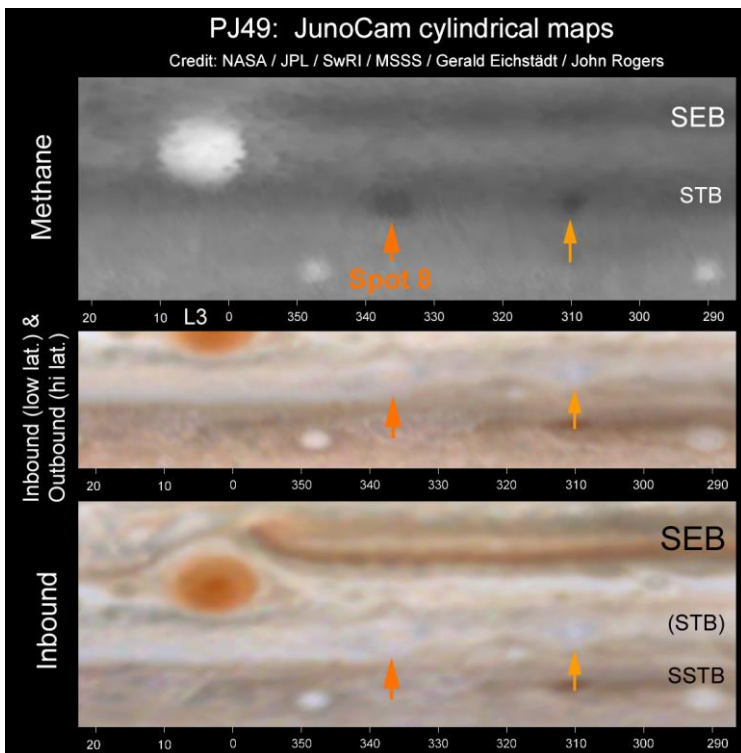


Figure 7.