JunoCam at PJ55: What the pictures show

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Juno's Perijove-55 was on 2023 Oct.15, crossing the equator (on the night side) at L3 = 125.

Flyby of Io

Juno has flown quite close to Io at every odd-numbered perijove since PJ41 (except for PJ45 when it flew past Europa), and at PJ55 it had its closest approach yet: 11627 km. The views were similar to those at PJ53, but with twice the resolution. Figure 1 is an approach view. Figure 2 shows two of the closest images, processed by Brian Swift, showing much detail. At bottom are brightened versions showing volcanic plumes on the limb: one is Prometheus (seen on the dark side in images 24-30, as at PJ53), the other is Zamama (seen in images 33-36). Both have apparently been erupting ever since Voyager 1 first observed them in 1979. Figure 3 is a map compiled from the images processed by Gerald Eichstädt. This is the best map of the relevant areas since the New Horizons flyby in 2007. It reveals (half of) the giant red ring around Pele, coming over the limb in the last few images, so this volcano also must have been erupting recently.

Global maps

Because of the Io flyby, good inbound imagery of Jupiter was only done thereafter, covering only part of the low latitudes and northern hemisphere.
Figure 4 is a map from amateur images around that date, with features labelled.
Figure 5 shows JunoCam's global map, combining inbound and outbound.
The same regions were also imaged in the methane band (not shown here).
The inbound images included very good coverage of an interesting sector of the NEB, spanning White Spot Z with NEBn waves following it, and the longest faded barge, and a bright plume outbreak just preceding it. This was the first such outbreak in mid-NEB this apparition, and it is illustrated thoroughly in our 2023/24 Report no.1, posted herewith.
Figure 6 shows PJ55 images of it, including an anticyclonic dark spot (ADS) that it had generated in the N. Tropical Zone (interacting with the barge).

North polar region

Figure 7 is the PJ55 map of the NPR down to 45°N at the edges, and Figure 8 is the map down to 75°N, with the northern octagon indicated. Now that Jupiter is approaching northern summer solstsice, the latter map (Figure 8) shows all but one of the circumpolar cyclones (CPCs). Their arrangement is unchanged, with no special disturbances, and the central NPC is centred only 0.35° from the pole, the smallest distance that we have recorded. Three anticyclonic ovals (red arrows) are not moving much: in comparison with PJ52, PJ53 and PJ54, the little one north of CPC-7 is still there, but the opposite one has drifted back to its earlier position north of CPC-3&4; and the large one just outside the octagon remains nearly fixed in longitude, but has moved further north.

South polar region

Figure 9 is the PJ55 map of the SPR down to 45ºN at the edges. Once again, although the FFRs in the southernmost belt cannot be matched up since earlier perijoves with certainty, rotation of the map by 30º puts FFRs (and AWOs) into similar positions as at the previous perijove, suggesting that the previously established retrograde drift still applies.

Figures (small copies):

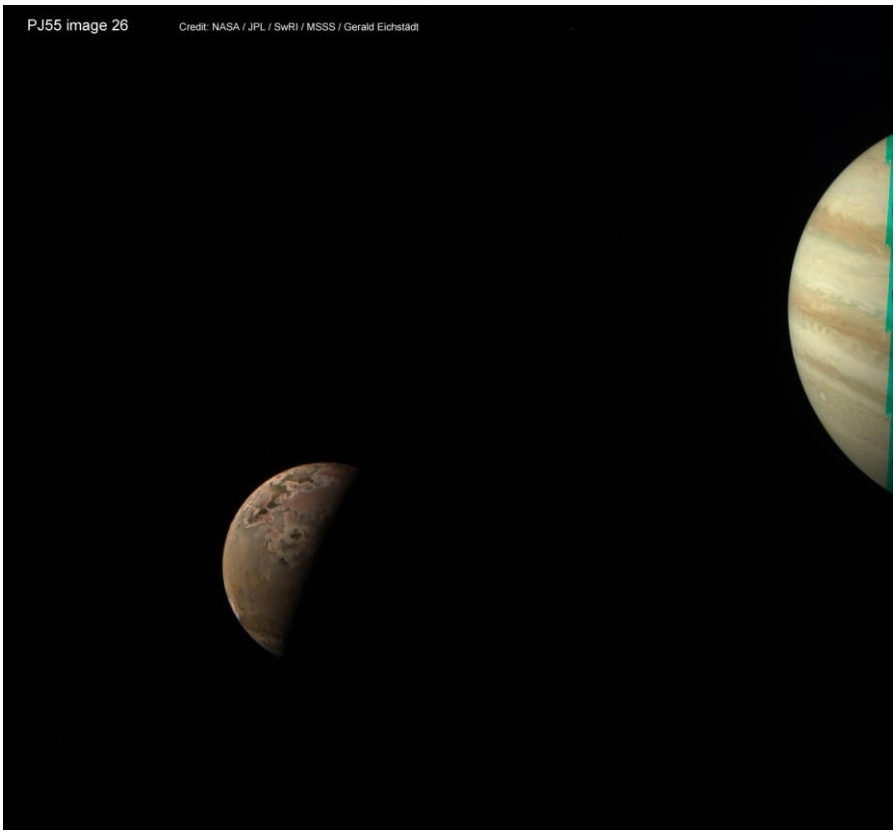

Figure 1.

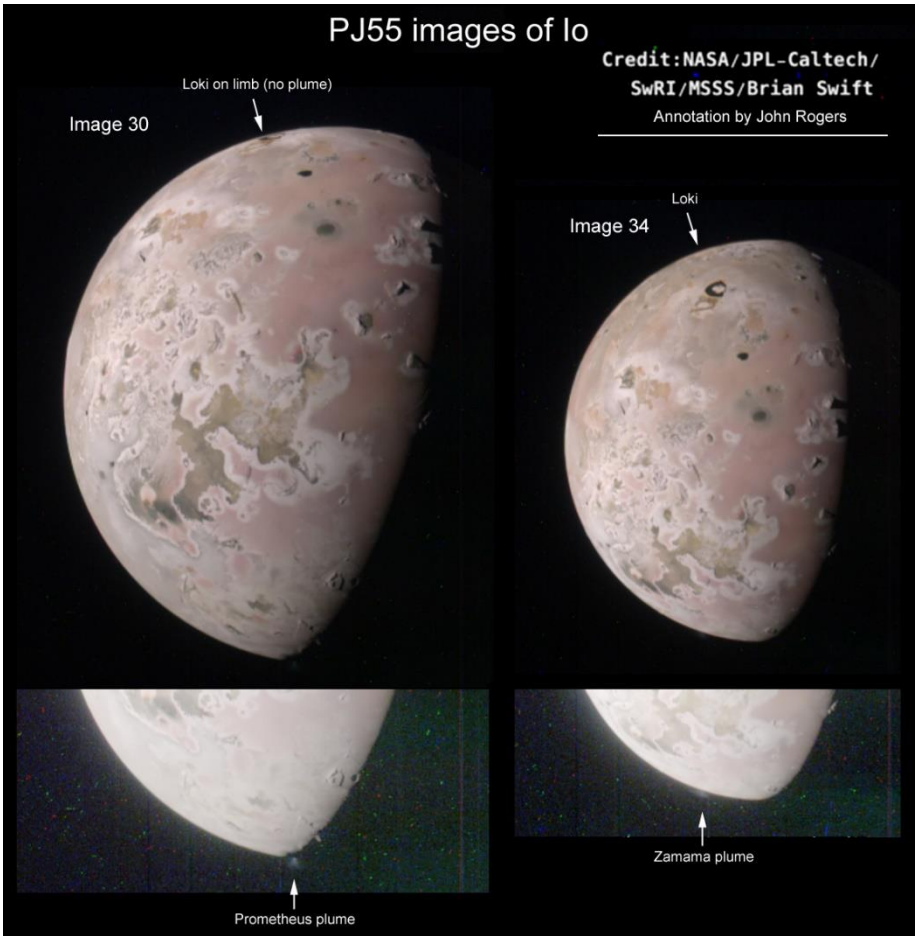

Figure 2.

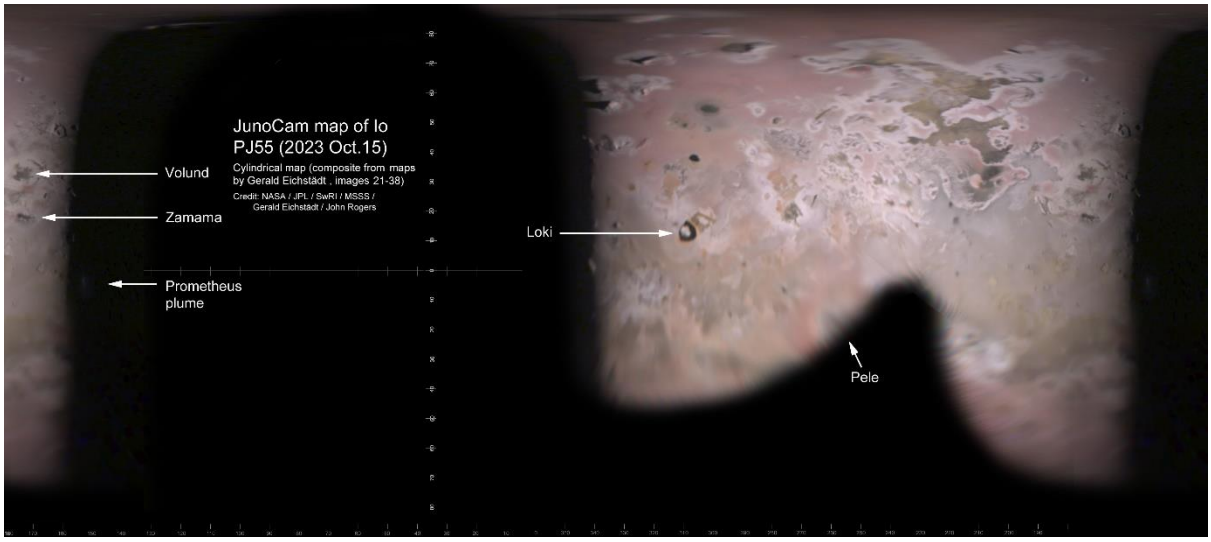

Figure 3

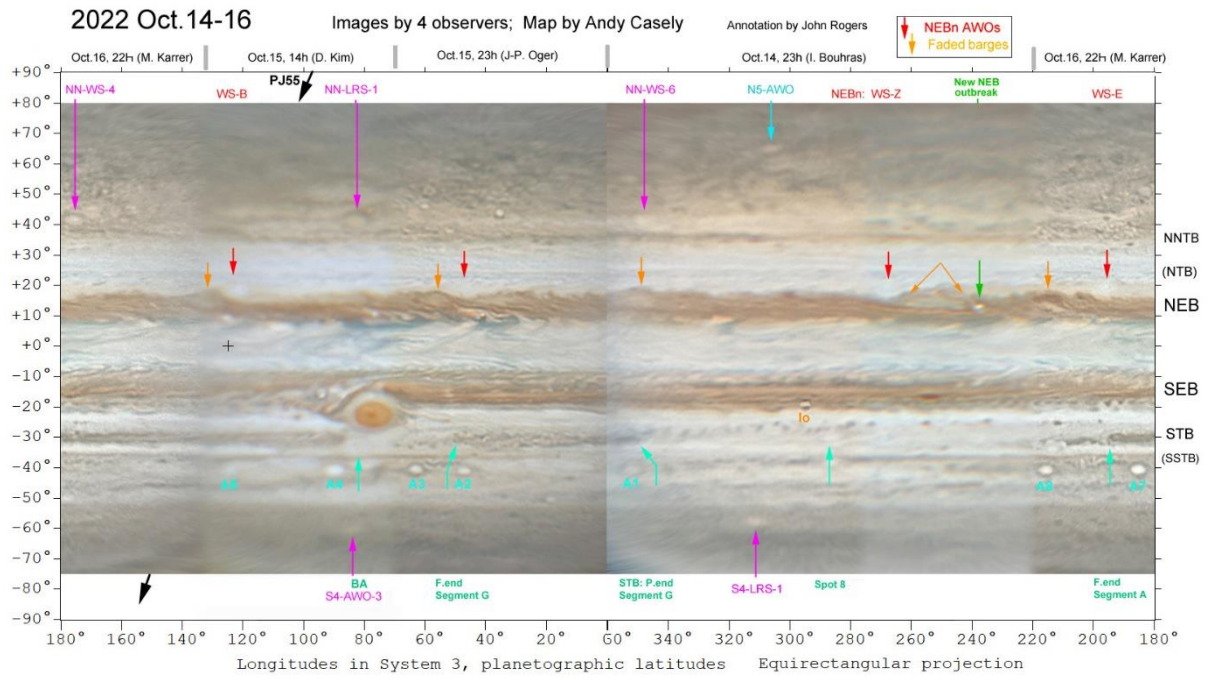

Figure 4. Ground-based map of Jupiter around PJ55.

Figure 5. JunoCam map of Jupiter at PJ55.

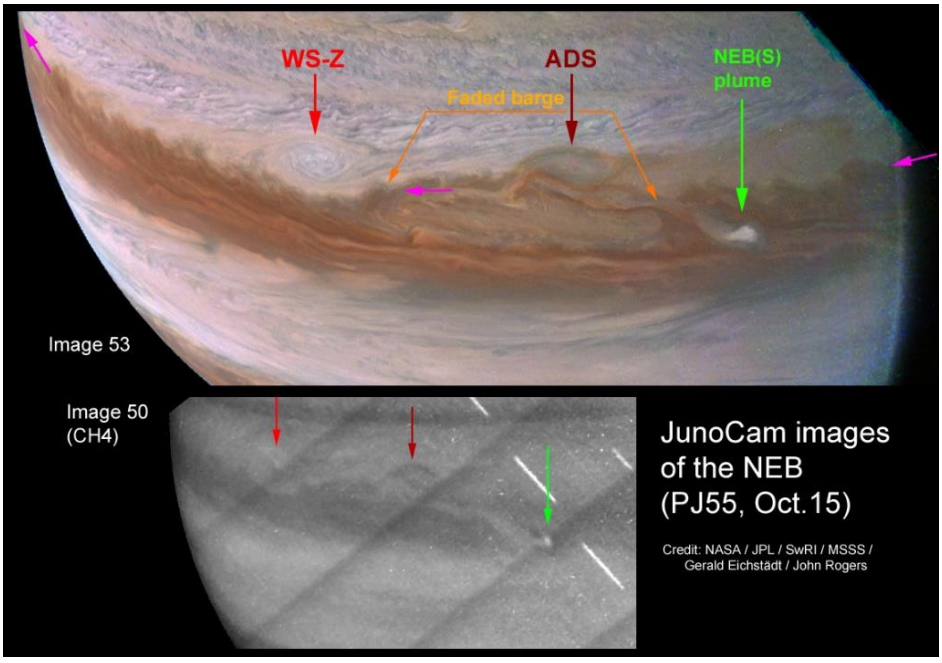

Figure 6.

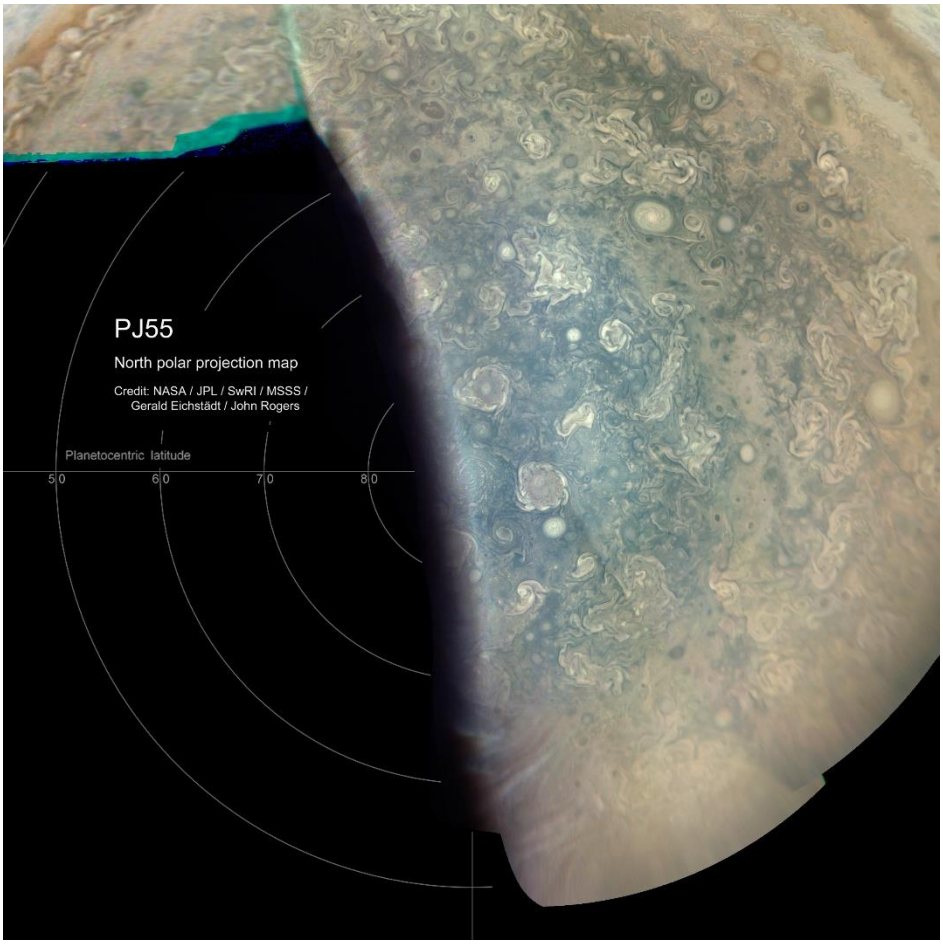

Figure 7.

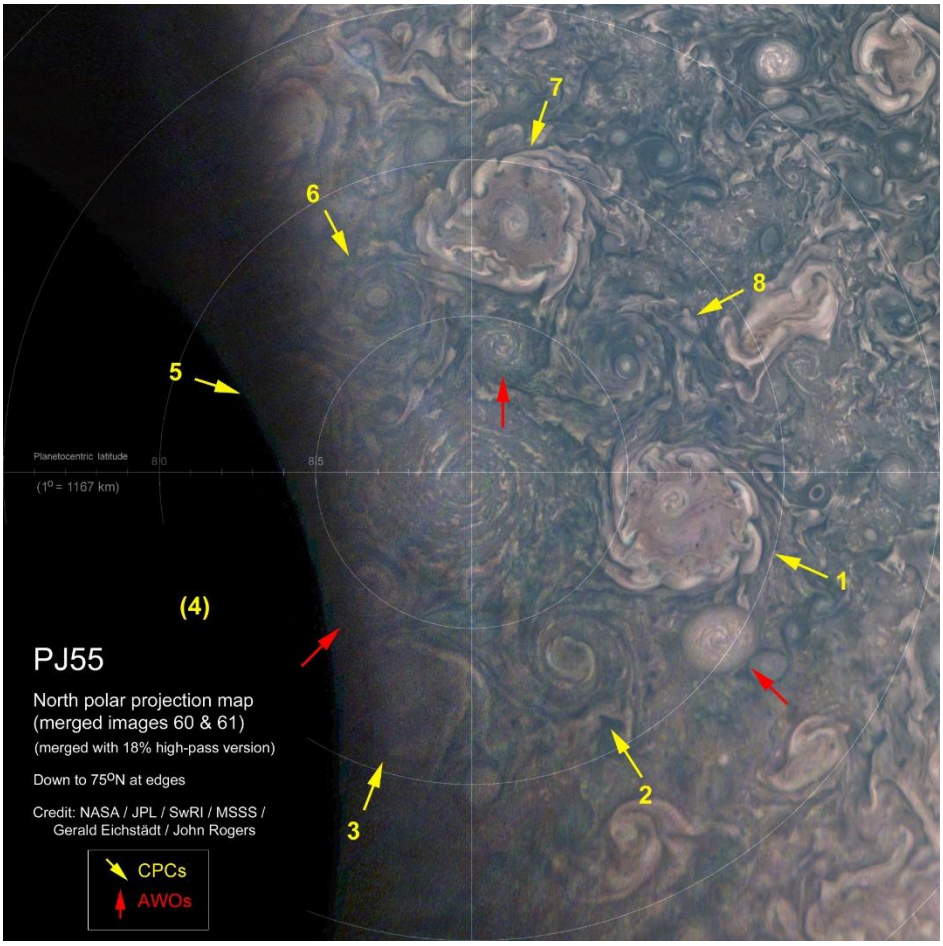

Figure 8.

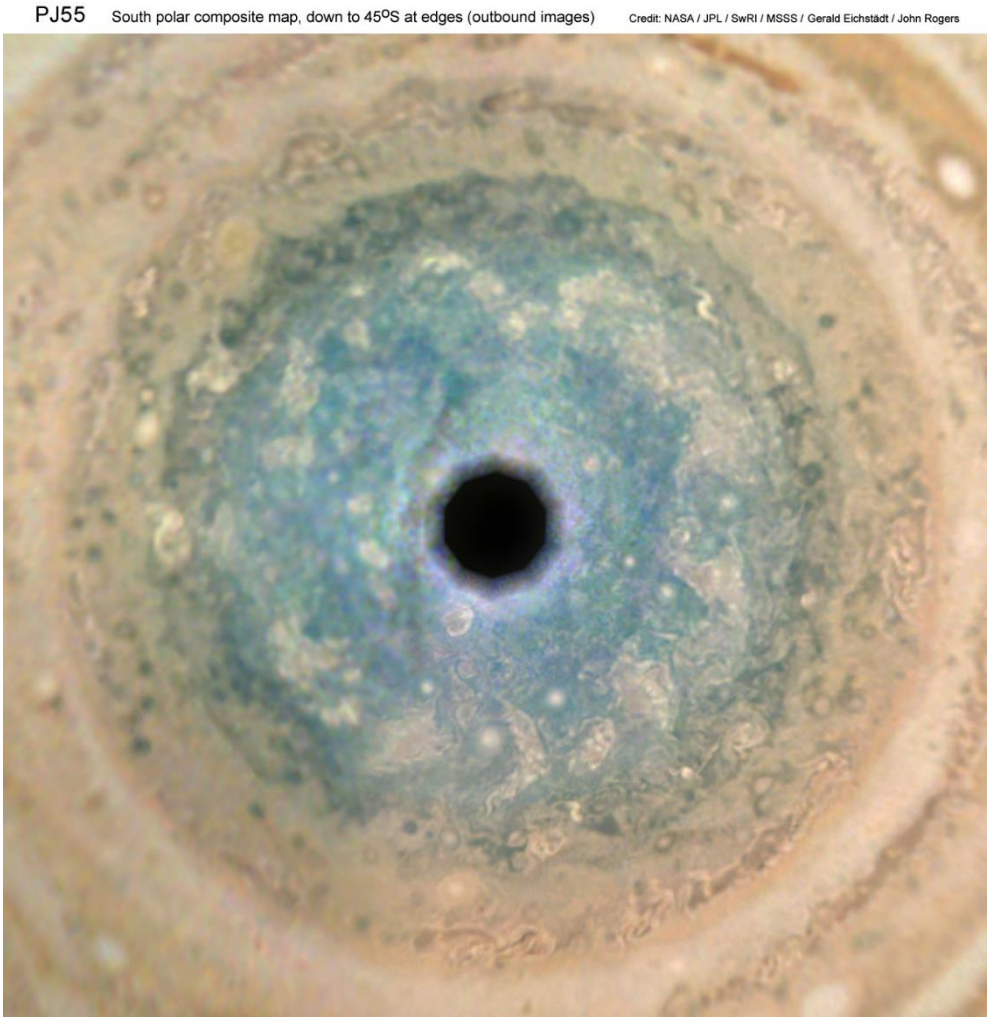
PJ55 South polar composite map, down to 45°S at edges (outbound images)
Credit: NASA / JPL / SwRI / MSSS / Gerald Eichstädt / John Rogers

Figure 9.