JunoCam images at PJ59

John Rogers (BAA) (2024 April 1)

Perijove-59 was on 2024 March 7. This 59th orbit did not include any flyby of Io, so all the imaging was directed to Jupiter. It covered two complete rotations inbound, thus covering the GRS on three consecutive rotations (Figure 1, images 5, 45, 129). At the third passage of the GRS, Gerald Eichstädt noticed a tiny black spot, which turned out to be Amalthea, projected in front of the GRS in image 127 and the STB in image 129 (Figure 1). Just north of the GRS, there is a large ring from the retrograding SEBs jet that was passing through the RSH at the time (Figures 1 & 2). The inbound imaging also included a sequence covering a shadow transit of Europa from Juno's unusual viewpoint (e.g. Figure 1, image 122).

These inbound images have been projected into two global maps by Gerald, which can be blinked to demonstrate the atmospheric currents over the 10-hour interval between them – not only the jet streams, but also turbulence and shear in the NEB and in STB segment G. The second map is in Figure 3, with the major features labelled, and notes on some features given in the figure legend.

The last of the inbound images, closing in over the north polar region, include an unusually large bright AWO in the Bland Zone (N6 domain); in contrast, the larger AWO following is the long-lived one belonging to the N5 domain. Just N of the N6 AWO are several FFRs that appear to be rich in thunderstorms (Figure 4).

Unfortunately, the closeup images of the north polar cyclones were incomplete or lost. However, images 159 and 160 could be combined to produce a satisfactory map covering four of the CPCs, though not the north pole itself (Figure 5).

Perijove on the dark side was at 49.4ºN, and equator crossing was at L3 = 17.

JunoCam's outbound sequence provided a map of the south polar region as usual (Figure 6). Between PJ38, PJ39 and PJ40, when the orbital period was 44 days, we had noted that the pattern of FFRs and AWOs in the SPR was consistent with a rotation of ~+34 deg/orbit (23 deg/30d), and thus with our previously published drift rate for this region. Likewise, comparing the PJ58 and PJ59 maps now that they are only 33 days apart, we find a similar arrangement of FFRs with a rotation of 25-30º (and the brightest AWO, 28º) (Figure 6) -- although we cannot be sure of matching up individual FFRs as they are so changeable.

Figures (small copies, on following pages):

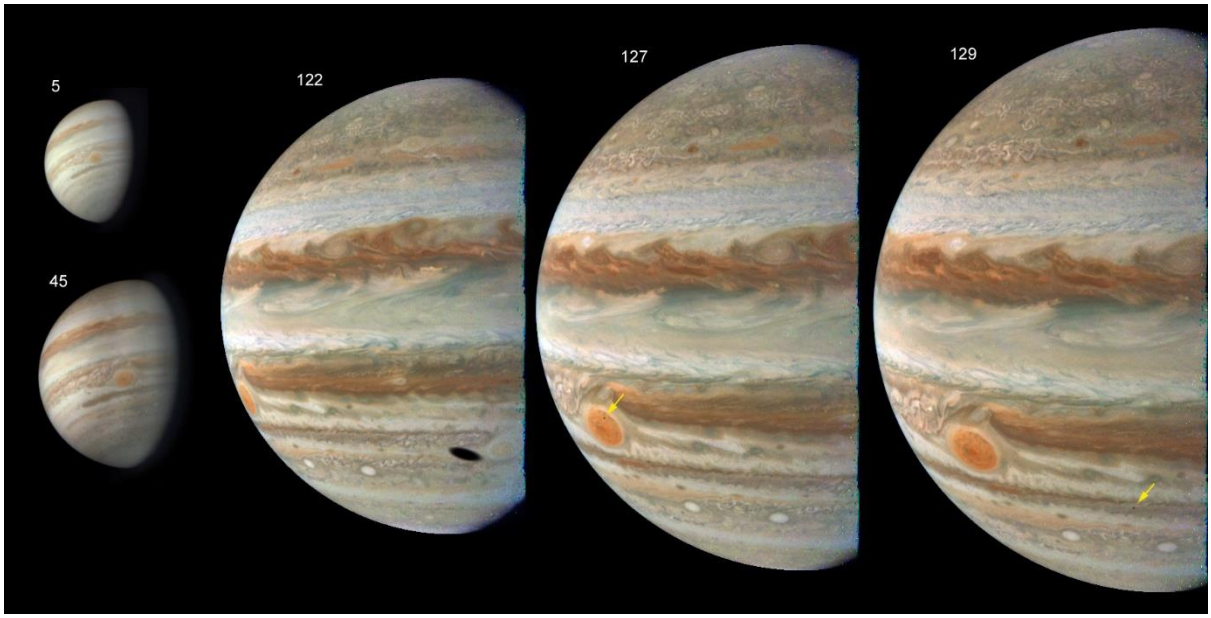

Figure 1. Examples of PJ59 inbound images, all at actual scale, processed by Gerald Eichstädt.

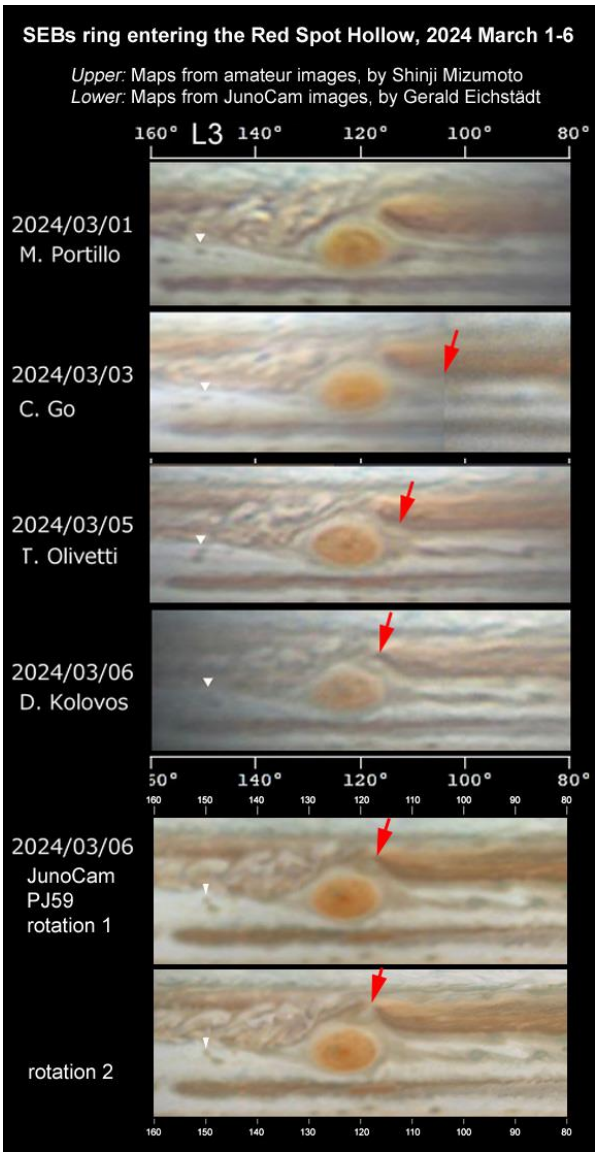

Figure 2. The GRS region from ground-based images (maps by Shinji Mizumoto) and JunoCam's inbound images (maps by Gerald Eichstädt), showing a retrograding ring on the SEBs that enters the Red Spot Hollow (red arrow).

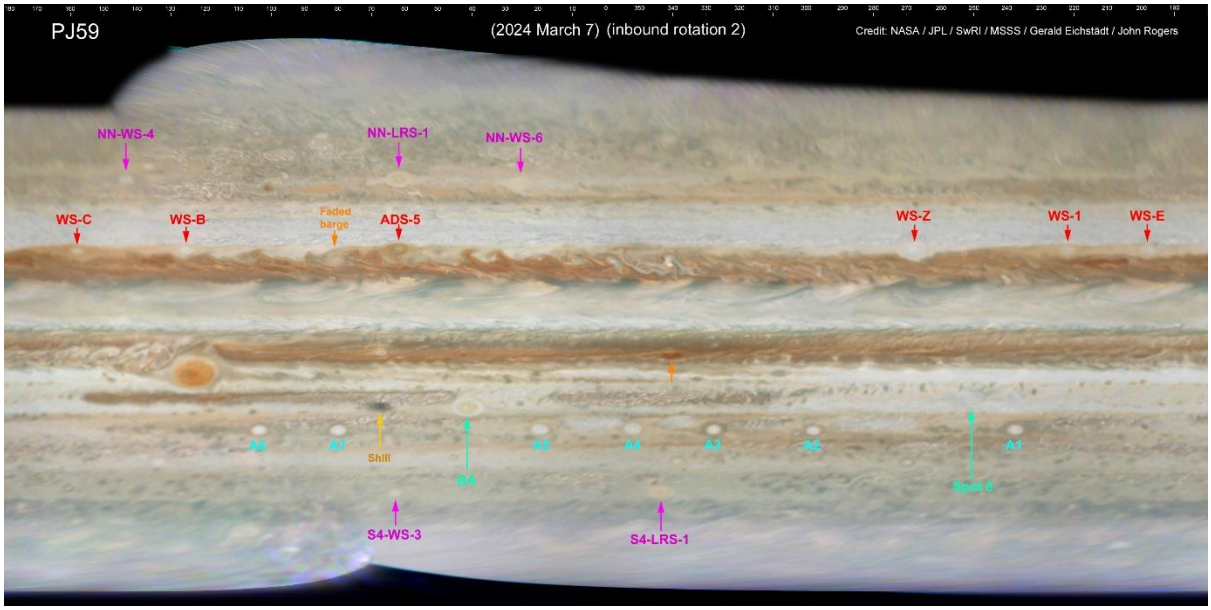

Figure 3. JunoCam map at PJ59. Major 'spots' are labelled. (ShIII = shadow of Ganymede.) In the *NEB/NTropZ*, we note various changes in recent months: (i) All the anticyclonic dark spots (ADS) have faded except ADS-5; ADS-1 had turned into an AWO, labelled WS-1 on the map. (ii) WS-C has reappeared, so there are now 6 labelled AWOs. (iii) Only one faded barge remains visible, but a few new dark brown barges are appearing.
In the *STB*, segment A is 111º long (L3 45-156), segment G is 67º long (L3 310-17).

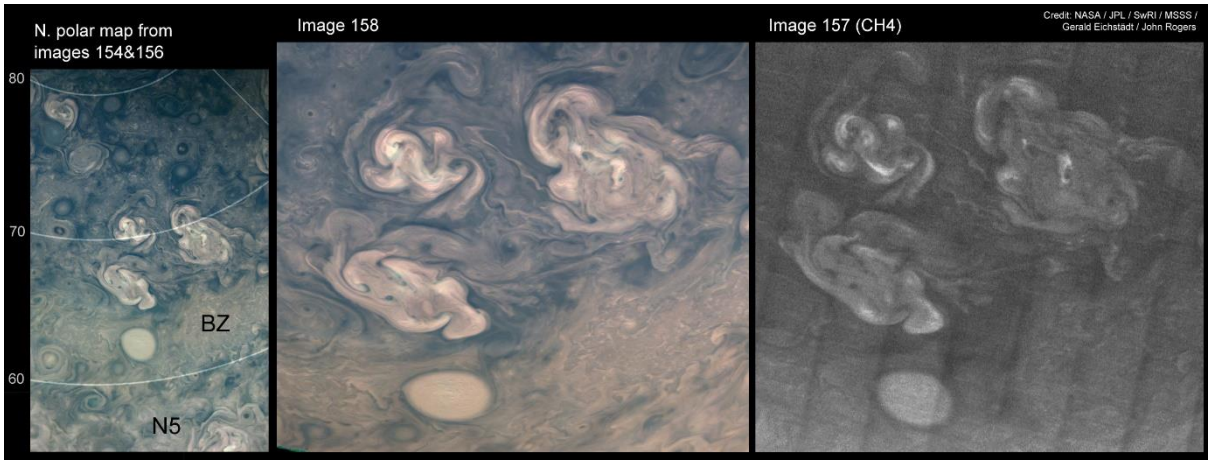

Figure 4. Closeup of a bright AWO in the Bland Zone (N6 domain), and three FFRs north of it: the bright white, methane-bright strips of clouds flanked by greenish haze in the FFRs are likely to be thunderstorms.

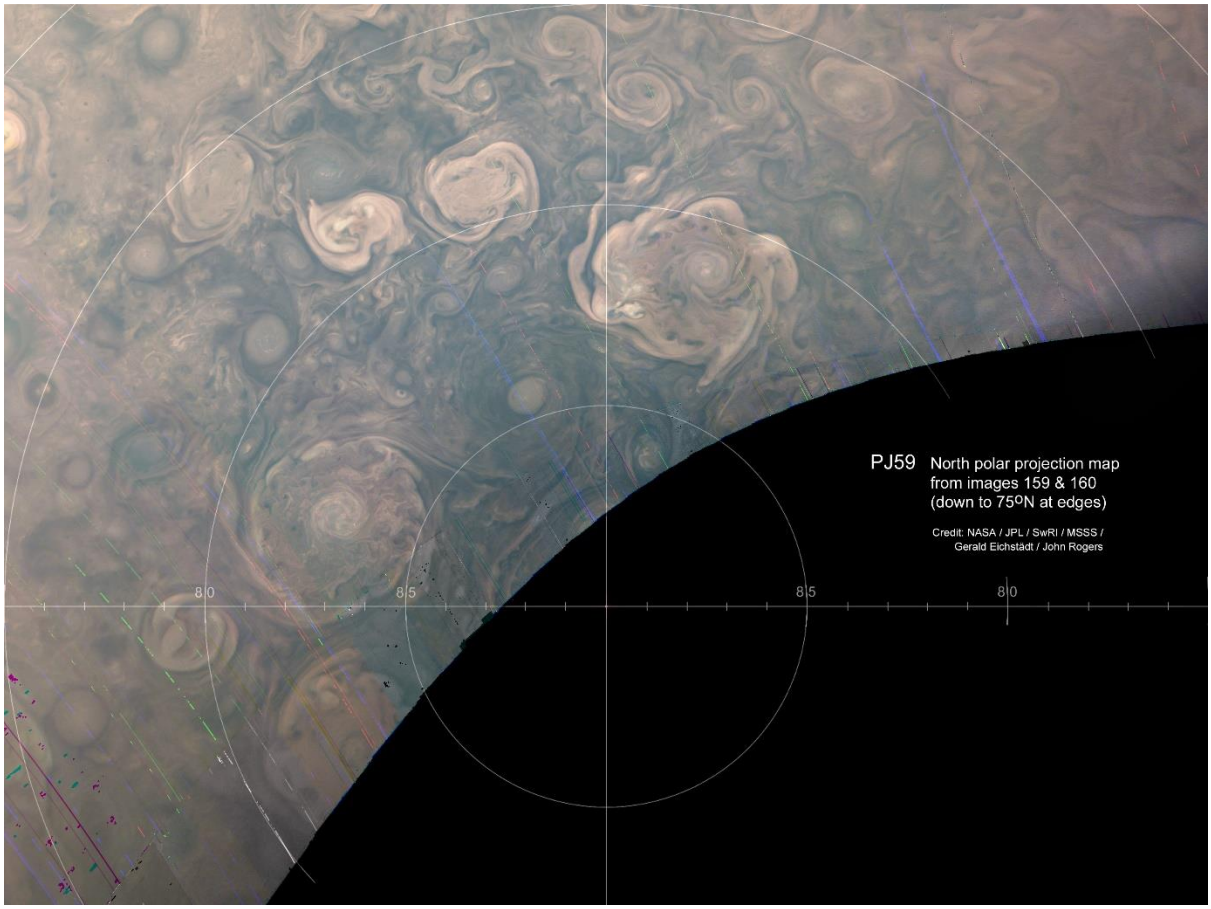

Figure 5. North polar projection map, from images 159 & 160, showing the CPCs.

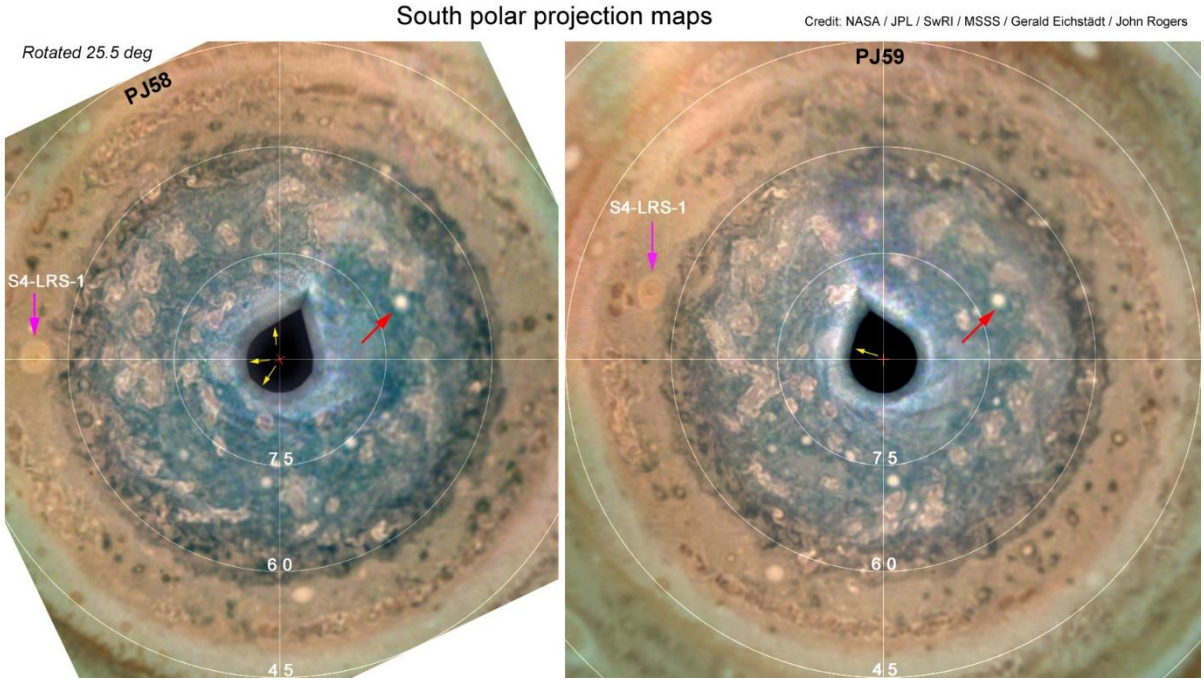

Figure 6. South polar projection maps at PJ58 and PJ59. Note the similarity in the arrangement of the FFRs in the 'southernmost belt' between ~59-72ºS, when the PJ58 map has been rotated 25.5º. The brightest AWO (red arrow) has drifted by 28º.