JunoCam at PJ29: What the pictures show

John Rogers (BAA) (2020 Oct.17)

PJ29 was on 2020 Sep.16. It was another Gravity orbit, with equator crossing at L1=216, L2=82, L3=176. Inbound, a series of images of Ganymede was taken (Figure 1).

North Polar Region (Figure 2)
The arrangement and appearance of the circumpolar cyclones (CPCs) (Fig.2A) is the same as at previous perijoves, including an AWO poleward of CPC-3, although that AWO is now white whereas at PJ25 it was reddish (compare with Fig.2 in our PJ28 report). All three 'filled' CPCs show signs of counterspiral in their central regions.

Colour and methane maps of the NPR are presented in Figs.2B & C (at different scales). The most notable feature is a large AWO which belongs to the N5 domain, although (as is common) it intrudes into the Bland Zone which is disrupted around it. This AWO has been tracked since 2019 March (see our 2020 report no.4), and repeatedly imaged by JunoCam. The view at PJ29 (Fig.3) is probably the closest yet.

Northern domains
Figure 4 is a map of the planet covering PJ29 from ground-based images (made by Rob Bullen), and Figure 5 is a map from the JunoCam images (made by Brian Swift). The track did not pass over any notable named features, but the images reveal a pale orange sector of the NNTB (evidently a cyclonic circulation like those we have followed in the STB). In the NEB, which is fully broadened after this year's NEB expansion event, the track passed over a dark sector with no obvious features in ground-based images, but the JunoCam images reveal well-formed ovals: two rather disturbed cyclonic ones and a dark brown anticyclonic one, with streaks indicating strong currents around them (Figs.5&6).

The main excitement at this time was about the NTBs jetstream outbreak, whose three brilliant white plumes were surging around the planet leaving huge turbulence in their wakes (see Fig.4 and our ground-based reports). Unfortunately, Juno's track was some way preceding the first plume, which was beyond Juno's horizon, and the NTB & NTropZ appear entirely undisturbed in the images (Fig.6).

Equatorial Region
On the NEB south edge is an exceptionally large NEBs dark formation, with a broad array of streaks extending SW into the EZ, where they are partly covered by innumerable small white clouds. There is also an exceptionally bright cloud streak on the preceding edge of this complex (Figs.5&7), which was also very methane-bright, i.e. high-altitude (not shown here) The ochre colour that was so intense and widespread in the EZ last year has concentrated into a well-defined ochre Equatorial Band (EB) (Figs.4&5). As at PJ28, JunoCam's views of the EZ are very oblique, but still show a plethora of wave-like patterns in the puffy white clouds and, more subtly, in the bland ochre cloud deck (Fig.7).

South Polar Region

Figure 8 shows our composite south polar projection maps in the usual format.
The two largest AWOs at 71˚S have continued their retrograding motion since PJ28.
Four of the five CPCs are visualised, and the fifth one is probably present but unresolved.
There is again a gap between CPCs-2 & -3, although the periphery of CPC-2 is not fully resolved. The CPCs have shifted a little, but the central South Polar Cyclone is at exactly the same position as at PJ28.

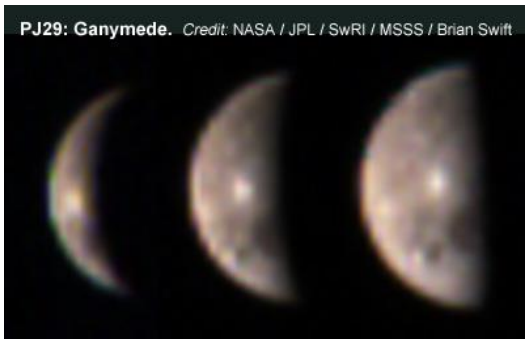

Figure 1

Figure 3

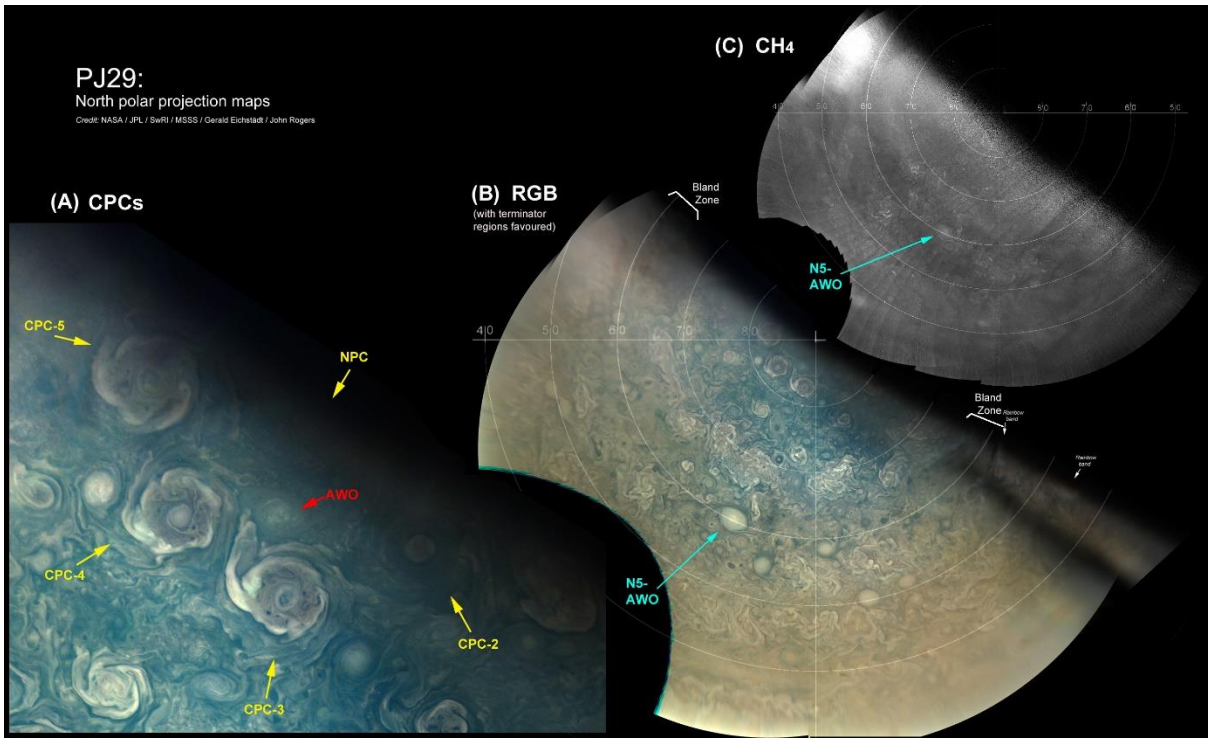

Figure 2

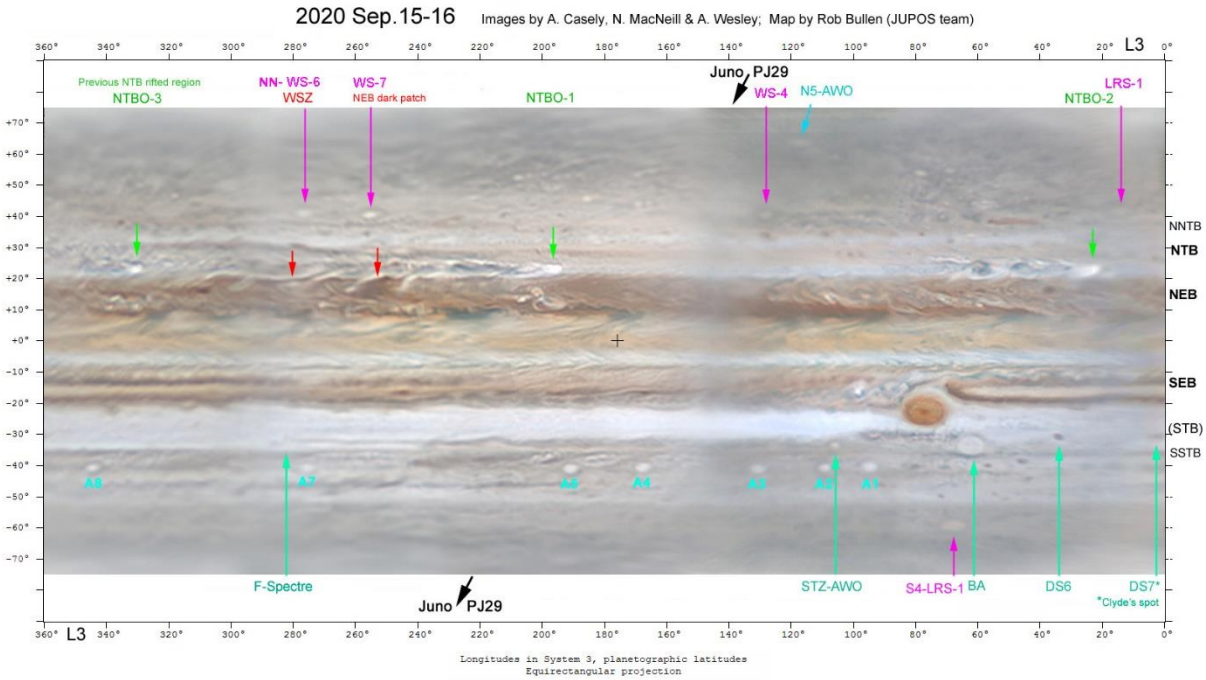

Figure 4 (above)

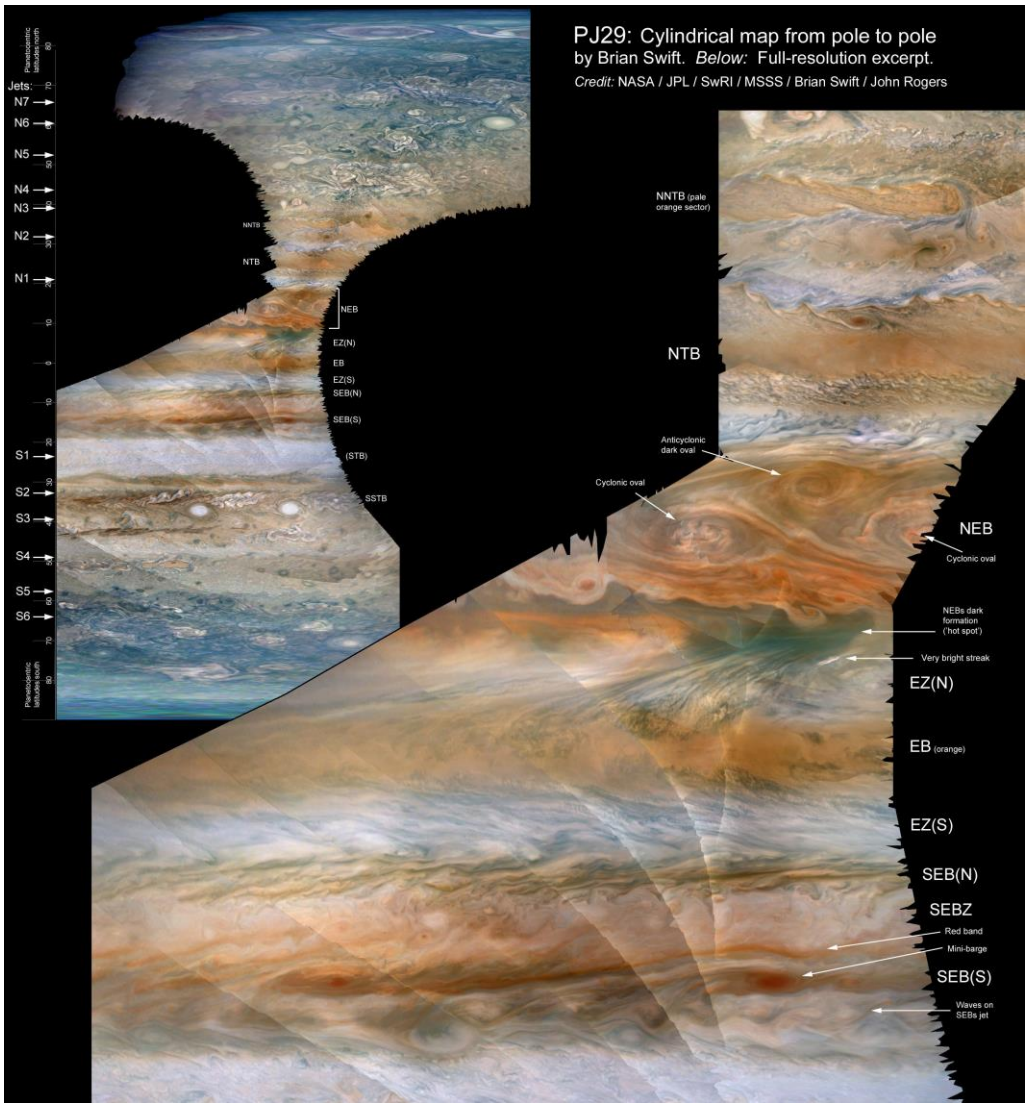

Figure 5 (below)

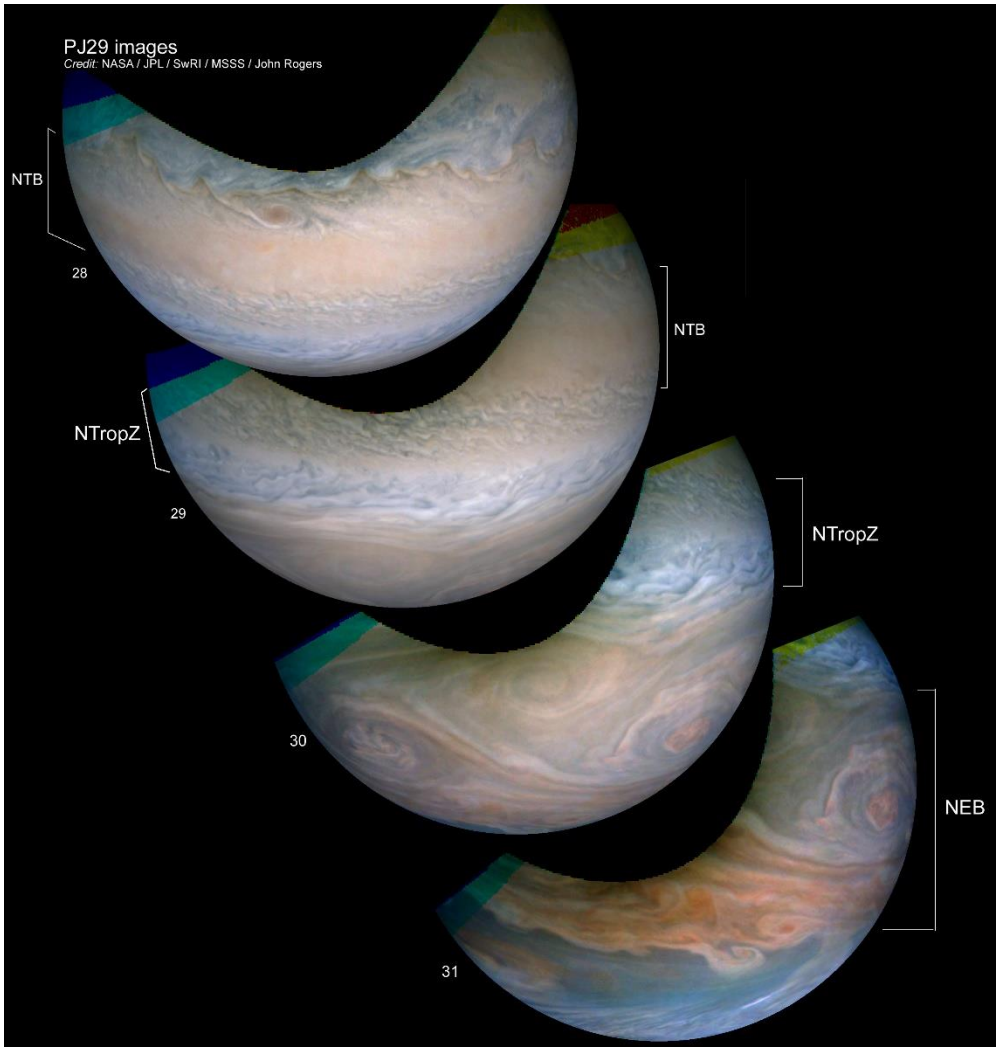

Figure 6

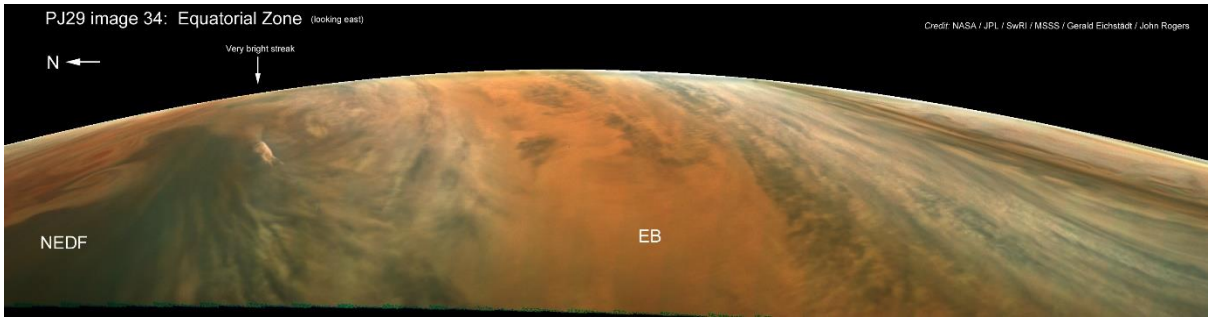

Figure 7

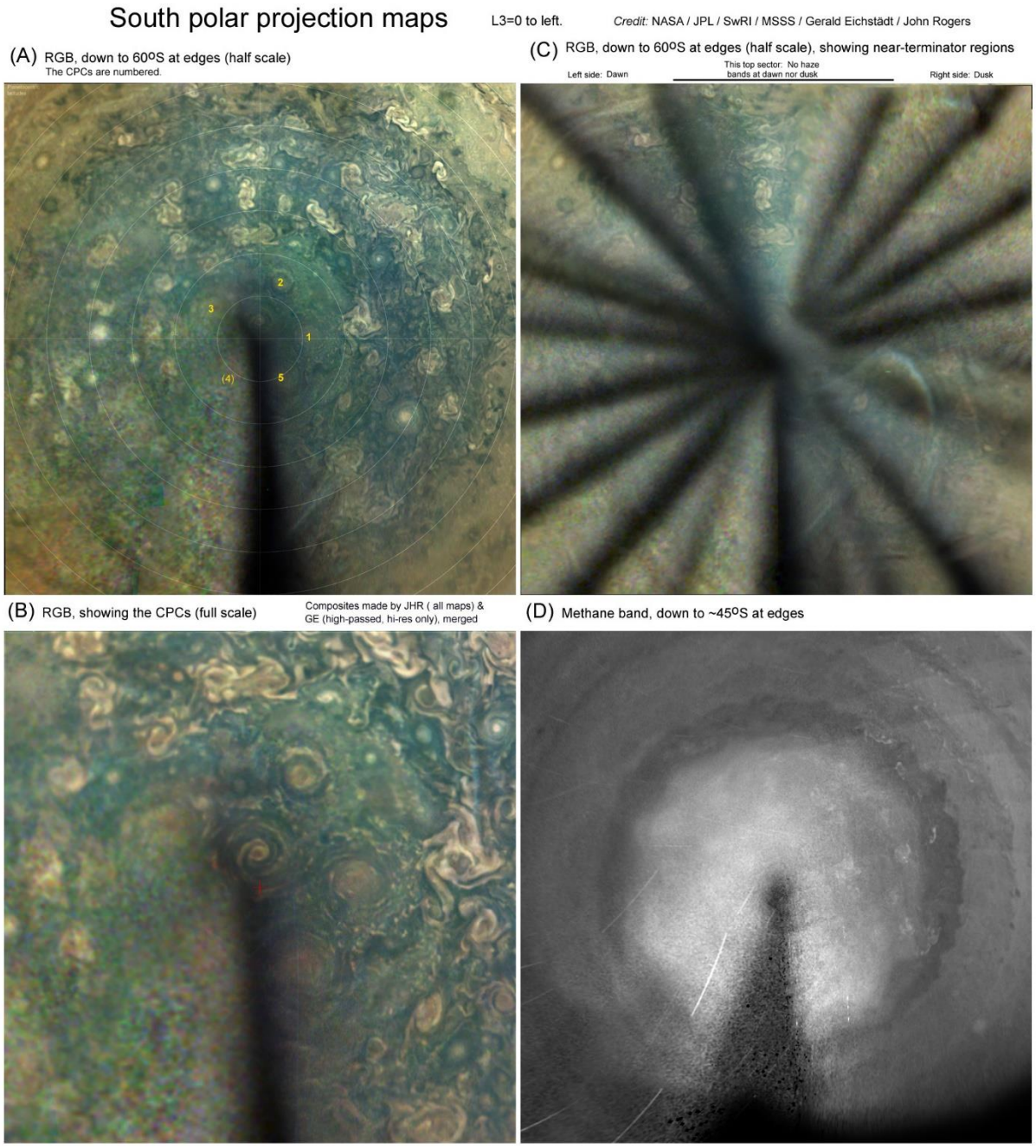
South polar projection maps
L3=0 to left.
Credit: NASA / JPL / SwRI / MSSS / Gerald Eichstädt / John Rogers
(A) RGB, down to 60ºS at edges (half scale)
The CPCs are numbered.
(C) RGB, down to 60ºS at edges (half scale), showing near-terminator regions
Left side: Dawn
This top sector: No haze bands at dawn nor dusk
Right side: Dusk
1
2
3
(4)
5
(B) RGB, showing the CPCs (full scale)
Composites made by JHR (all maps) & GE (high-passed, hi-res only), merged
(D) Methane band, down to ~45ºS at edges

Figure 8