JunoCam at PJ46: What the images show

John Rogers (BAA) (2022 Nov.23)

Figures (small copies)

Figures 1-4: Composite north polar projection maps. All have L3=0 to the right.

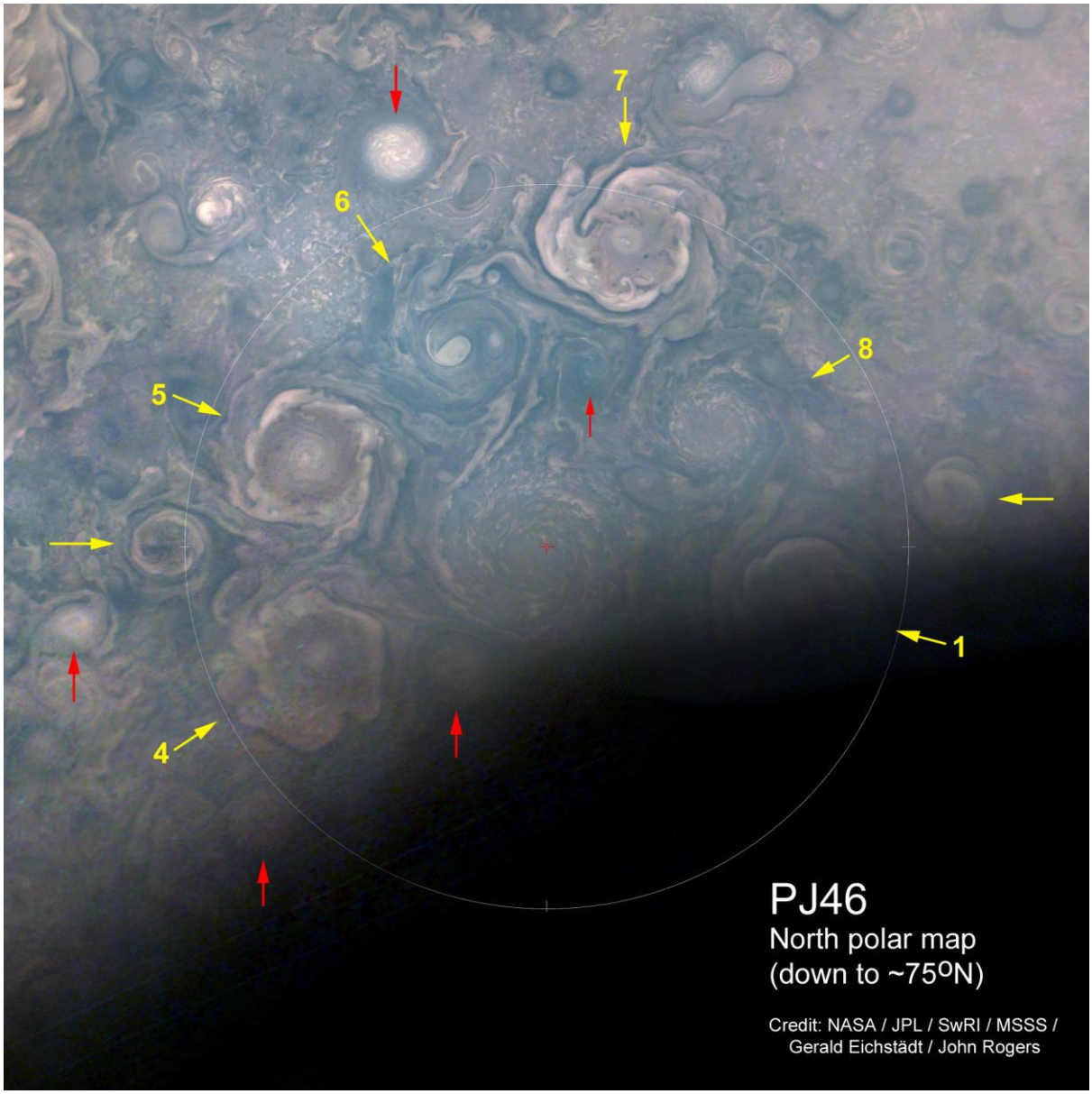

Figure 1: RGB map down to 75°N at edges. Yellow arrows mark cyclones including the CPCs (numbered); red arrows mark AWOs.

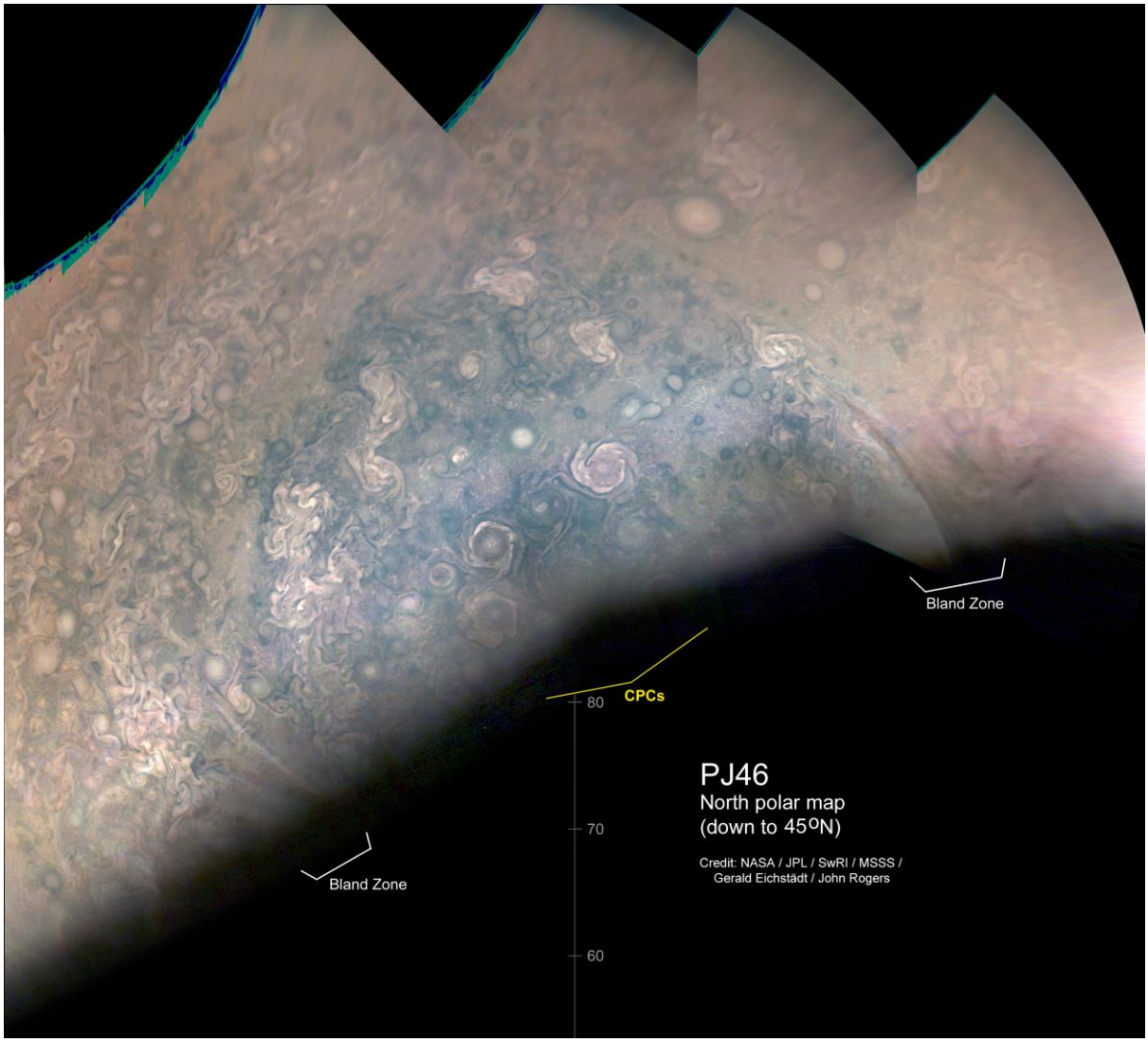

Figure 2: RGB map down to 45°N at edges.

On next page:

Figure 3: RGB map down to 45°N at edges, favouring the terminator regions to show haze patterns. BZ = Bland Zone (approx. N6 domain).

Figure 4: CH4 maps down to 45°N at edges: Composite map from images 76-88, then the image 88 map singly, showing how the appearance of haze layers varies with viewing angle. In image 88, the NPH directly below the spacecraft is less methane-bright, whereas bright hazes show up near the limb to the left.

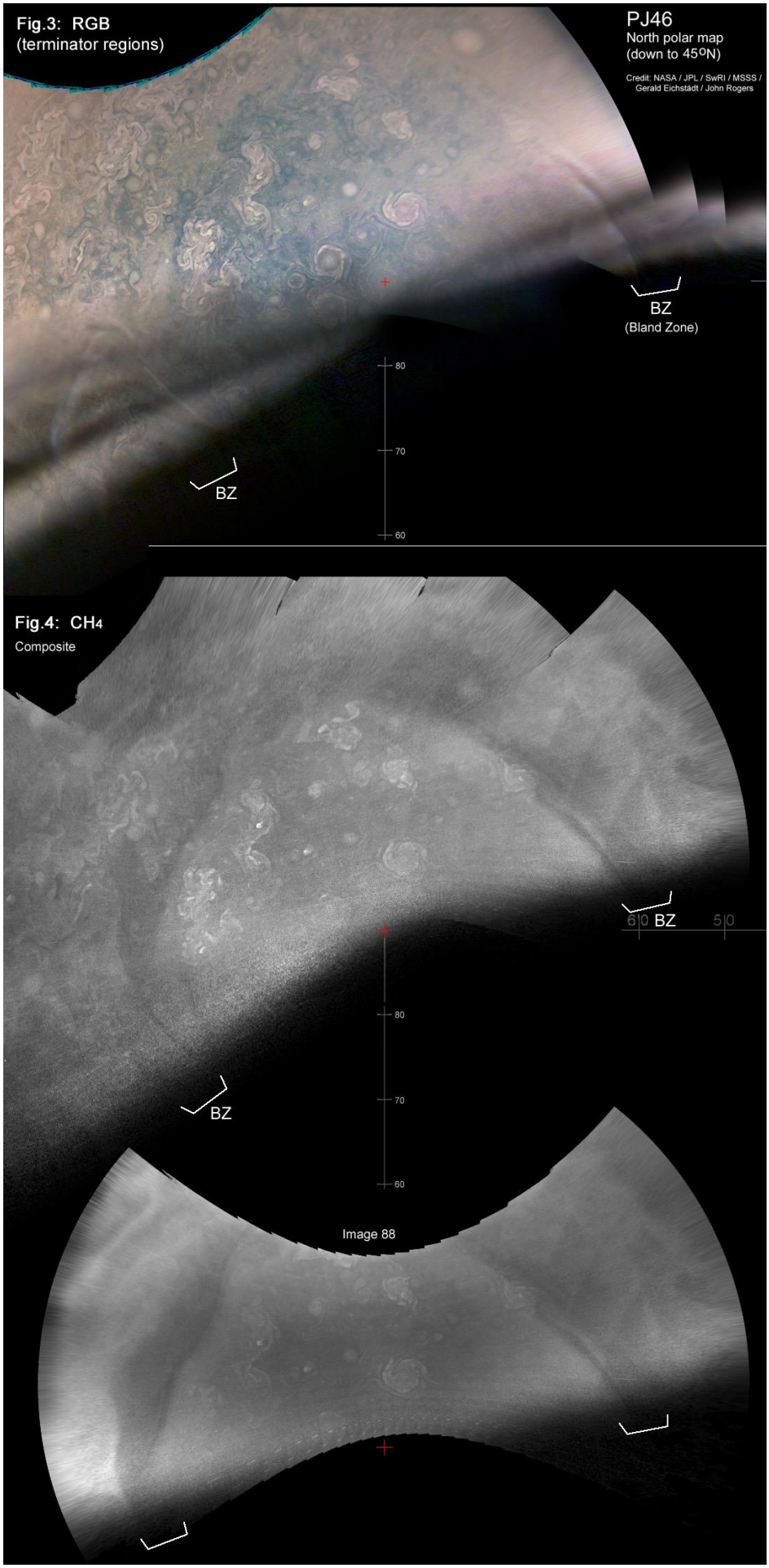
Fig.3: RGB
(terminator regions)
PJ46
North polar map
(down to 45ºN)
Credit: NASA / JPL / SwRI / MSSS /
Gerald Eichstädt / John Rogers
BZ
(Bland Zone)
80
70
60
BZ
Fig.4: CH4
Composite
60 BZ 50
80
70
60
BZ
Image 88

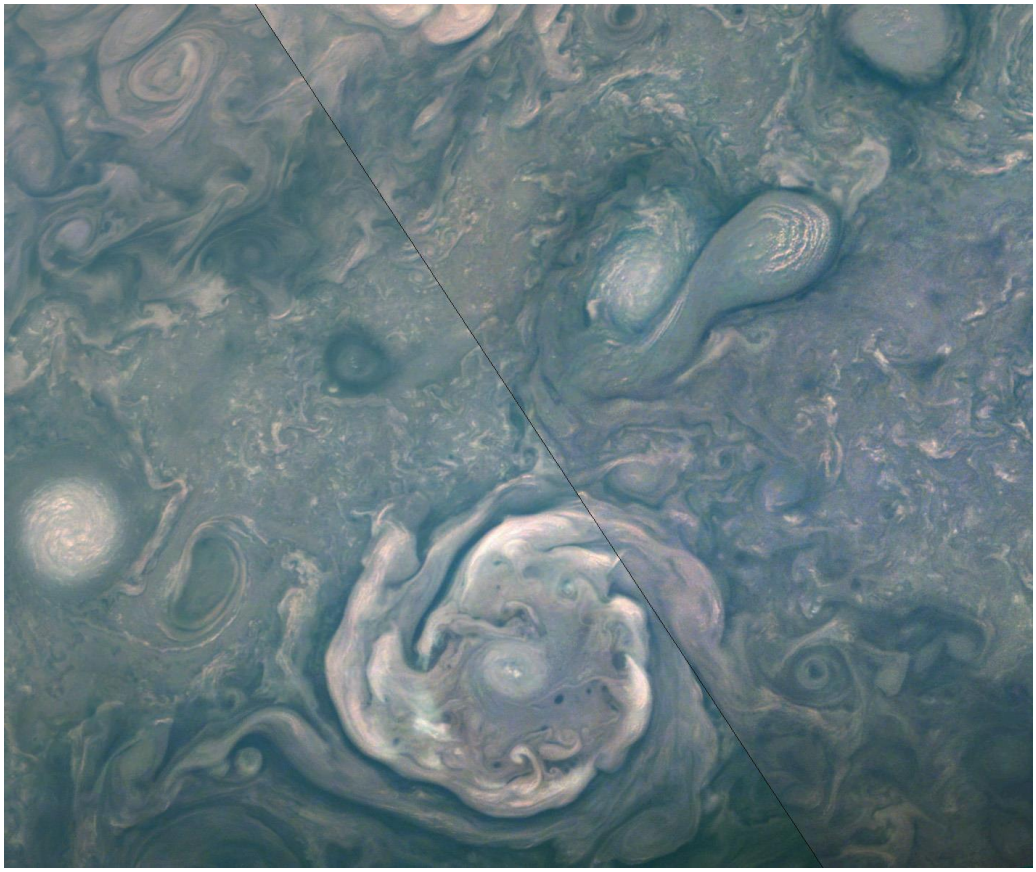

Figure 5: Full-resolution close-up of CPC-7 (bottom centre), and smaller features in a broad bland strip around the CPCs. This is a composite of images 89 (left) and 90 (right) (processed by Gerald). South is up, for consistency with Figure 1. At left, note a small AWO paired with a compact dark cyclone. Above right centre, there is a distorted pair of ovals topped with white pop-up clouds; these may be two small AWOs merging. Just right of centre, a small white band runs over a grey vortex. Between all these features, the bland strip has the same texture as the Bland Zone further south (Fig. 6), marked by swirling textures and white cloud flecks. The latter resemble pop-up clouds but cast little or no shadow; possibly this is because sunlight is diffused by the NPH that overlies this region.

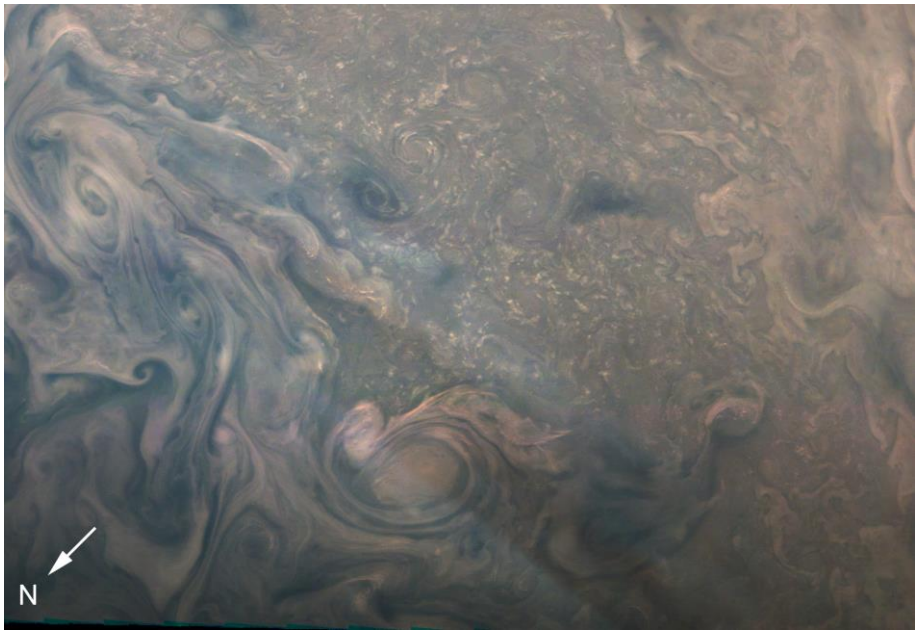

Figure 6: Full-resolution close-up of the Bland Zone, which is overlaid by a dark brownish linear band flanked by bright bluish bands. From image 92 (Gerald's processed version, with approximate correction of artefactual colour bands parallel to the terminator).

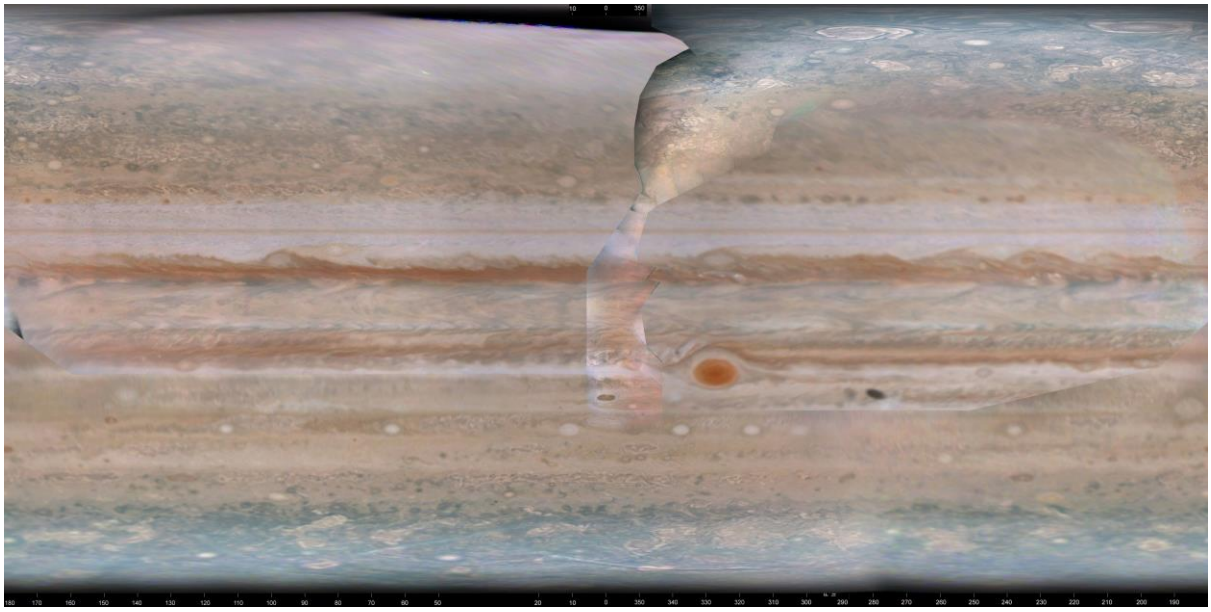

Figure 7: Global composite cylindrical map from PJ46. This is compiled from Gerald's automated inbound and outbound maps (divided along the STropZ, or along the STZ near the GRS), plus a manually assembled strip of perijove maps. North is up in this and subsequent Figures 8-13. Figure 8 provides a key to features.

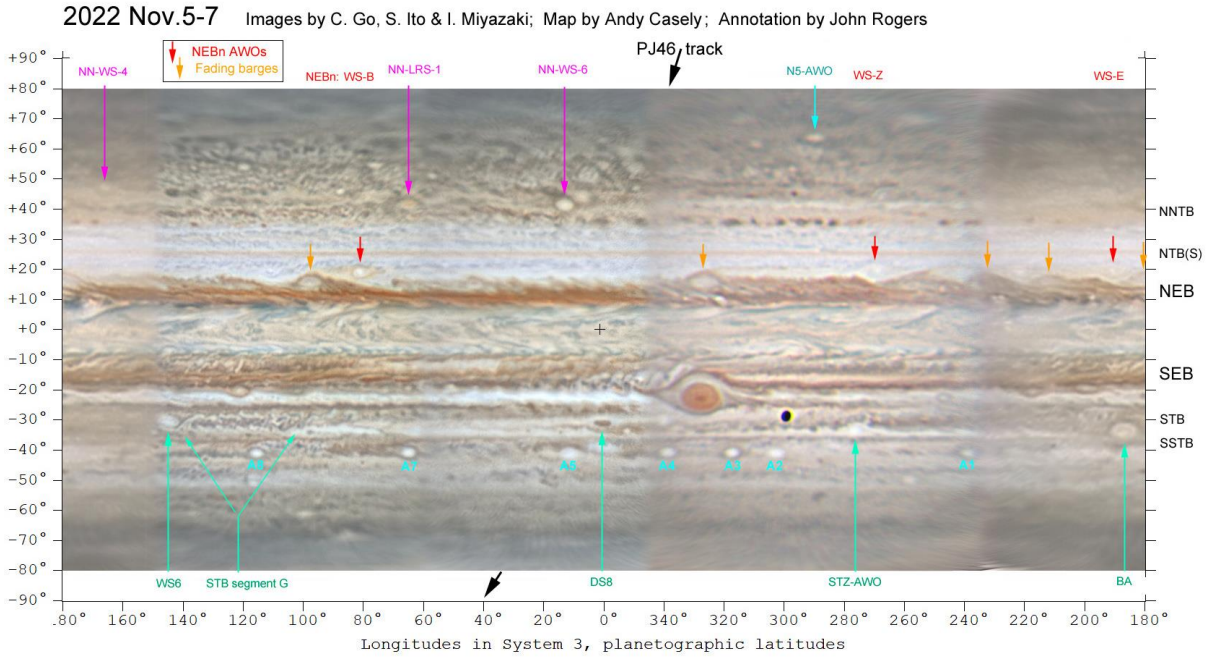

Figure 8: Ground-based map on Nov.5-7, spanning PJ46.

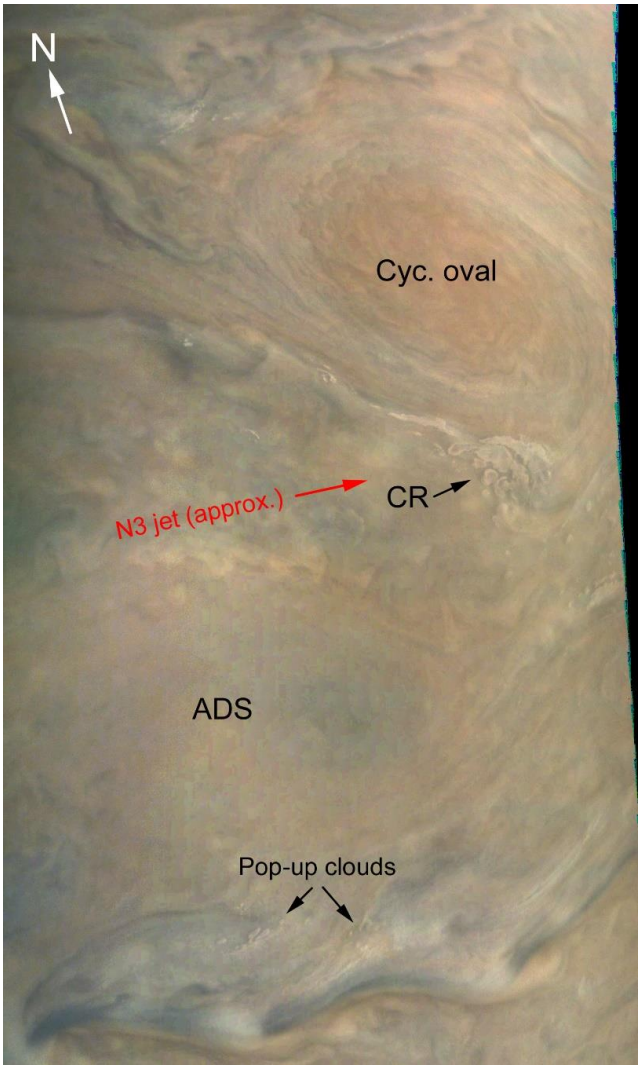

Figure 9: An orange cyclonic oval in the N3 domain, and a dull anticyclonic oval ("ADS") in the NNTZ. The latter has very low contrast and so is marred by compression artefacts. Also note a cluster of white crisp-edged cloud rafts ("CR"); these are increasingly seen in JunoCam images as perijove moves northward. This is image 99, taken close to perijove, from an altitude of only 3503 km. It was processed by Gerald then contrast-adjusted.

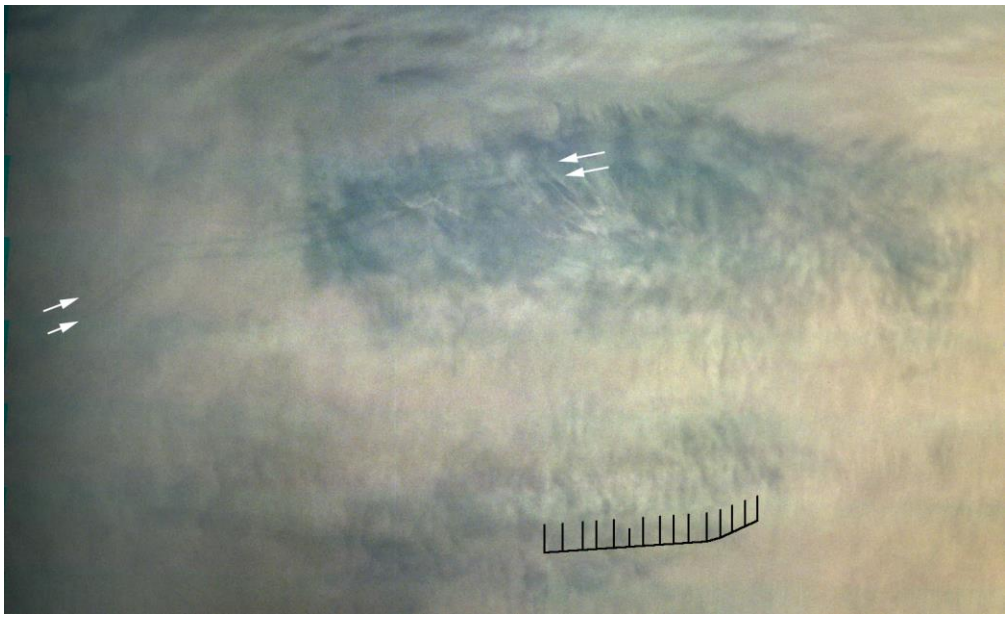

Figure 10: Details in the EZ, spanning 3.5°N to 1°S (a distance of ~3100 km), with north up. Part of Huffman-encoded image 107; Gerald's version, contrast-enhanced. Various forms of clouds are visible, especially overlying the darker bluish regions where the main cloud layer is presumably incomplete. The black "comb" indicates an array of mesoscale waves. White arrows indicate the "tyre-tracks". All these features are confirmed, at lower resolution, in images 106 and 108.

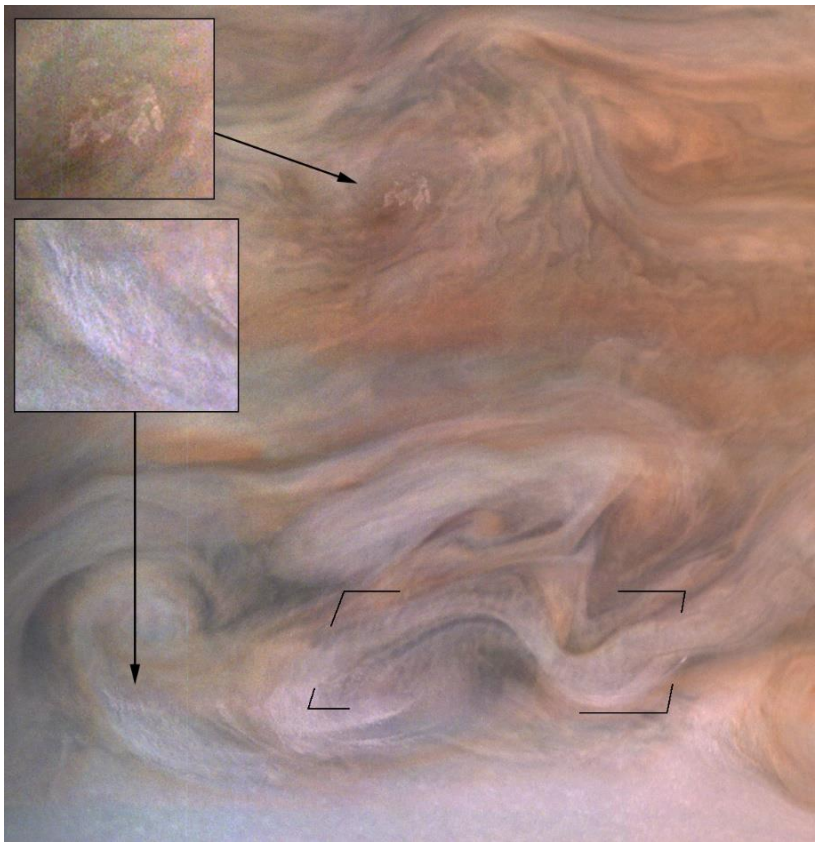

Figure 11: Details in the SEB. Part of Huffman-encoded image 110; Gerald's version, contrast-enhanced. Insets show more details of cloud rafts from images 109 and 111 (enlarged x1.6). North is up. An array of mesoscale waves is boxed.

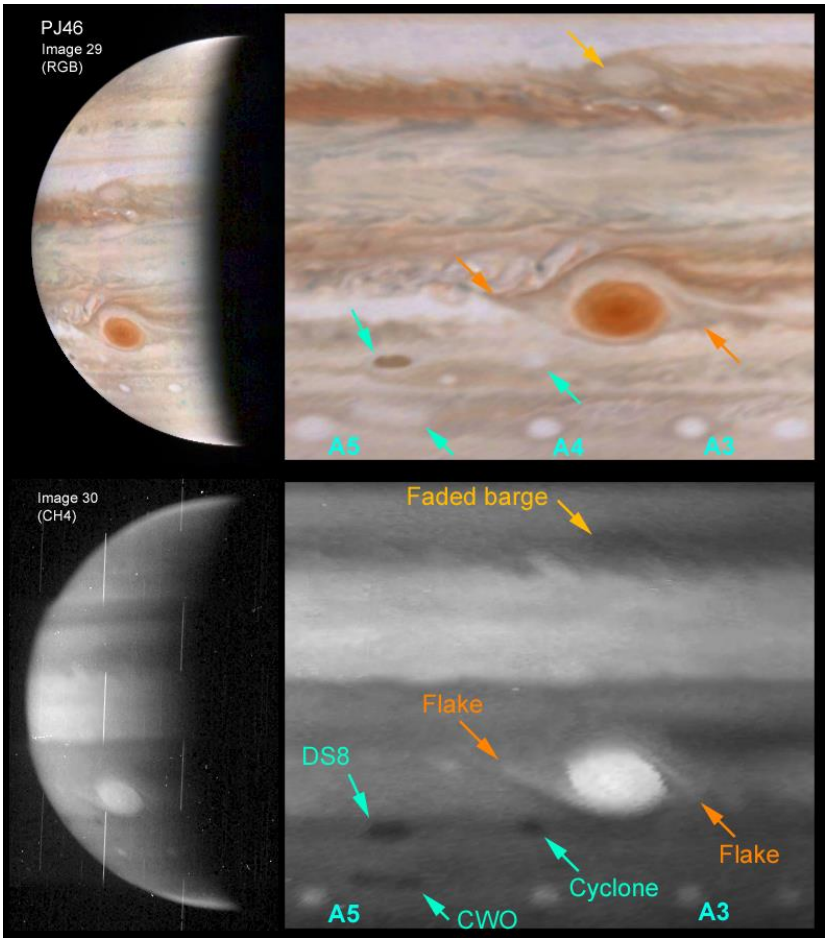

Figure 12: Inbound images and maps showing the GRS, in RGB and CH4, taken on Nov.6 around ~15:00 SCET. Methane-bright flakes can be seen extending from the p. and f. sides of the GRS. Also note that cyclonic features are methane-dark: a faded barge in the NEB, DS8 and a small white cyclone in the STB, and a cyclonic white oblong (CWO) in the SSTB.

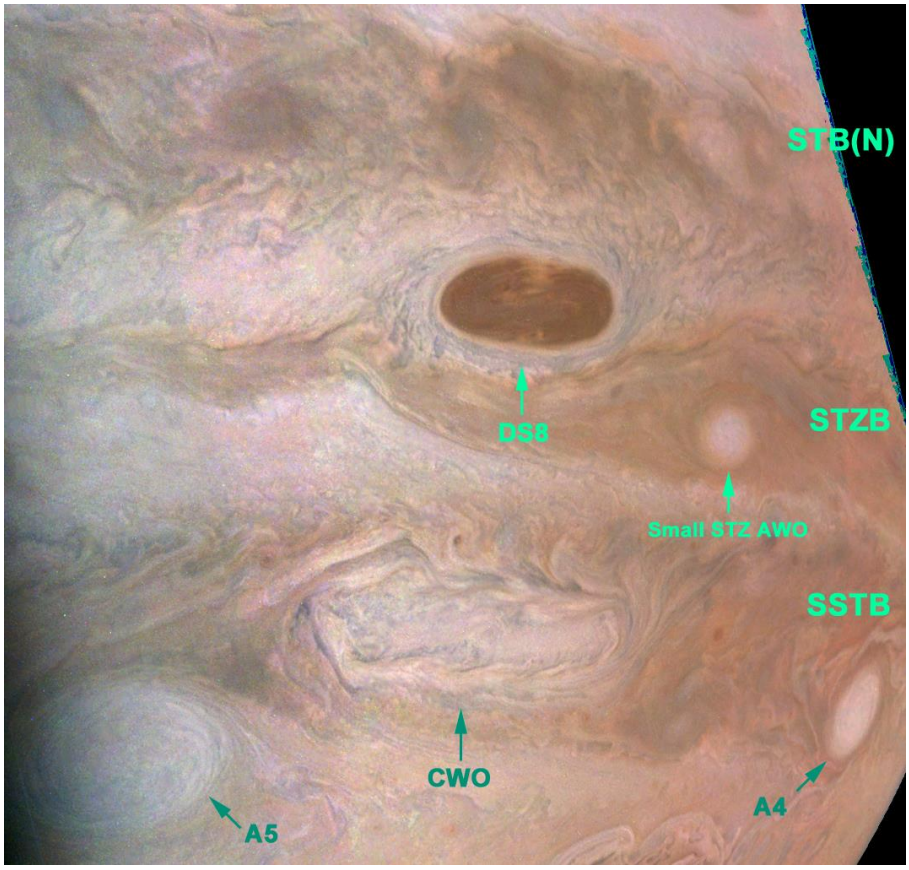

Figure 13: Close-up of the STB and SSTB, with DS8 and a cyclonic white oblong (CWO), and two of the S2 AWOs (A5 & A4). Image 114, Gerald's processing.

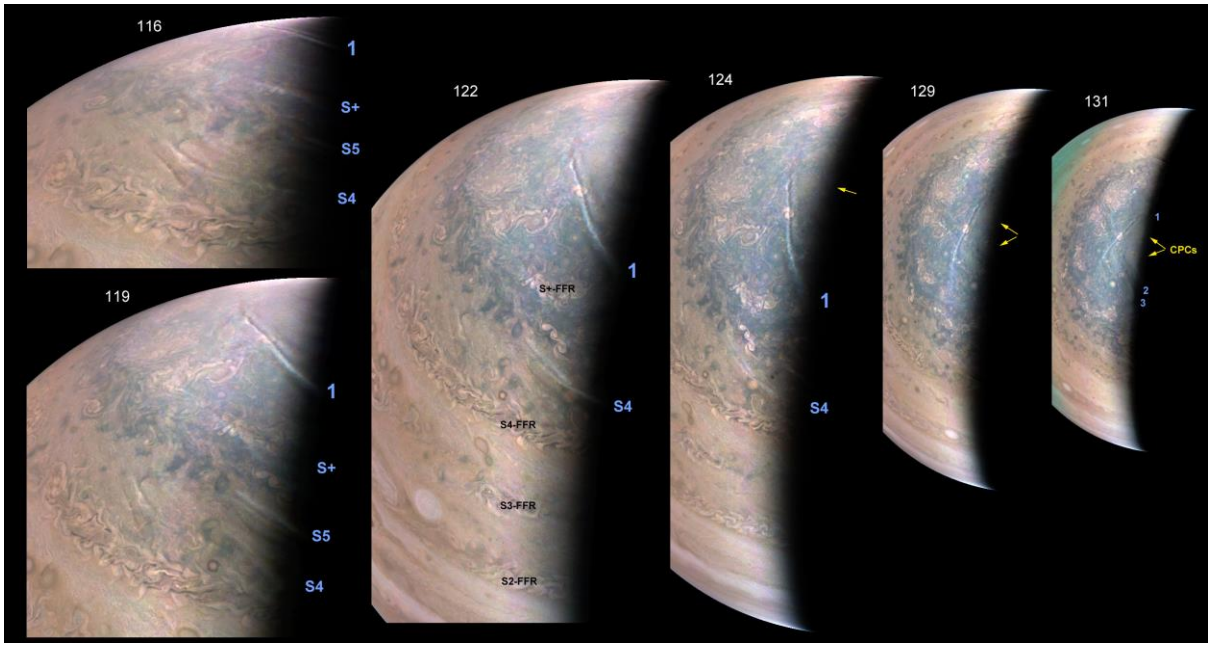

Figure 14: Images 116-131, showing southerly haze bands bright near the morning terminator and into daylight. They are labelled according to the domain in which they lie: S+ denotes the southernmost belt south of the S6 jet; no.1, in the SPH, is described in the text. Some of them, esp. no.1, appear to cast shadows, though there are also brown bands independent of bright bands. South is up.

Figures 15-18: Composite south polar projection maps. All have L3=0 to the left.

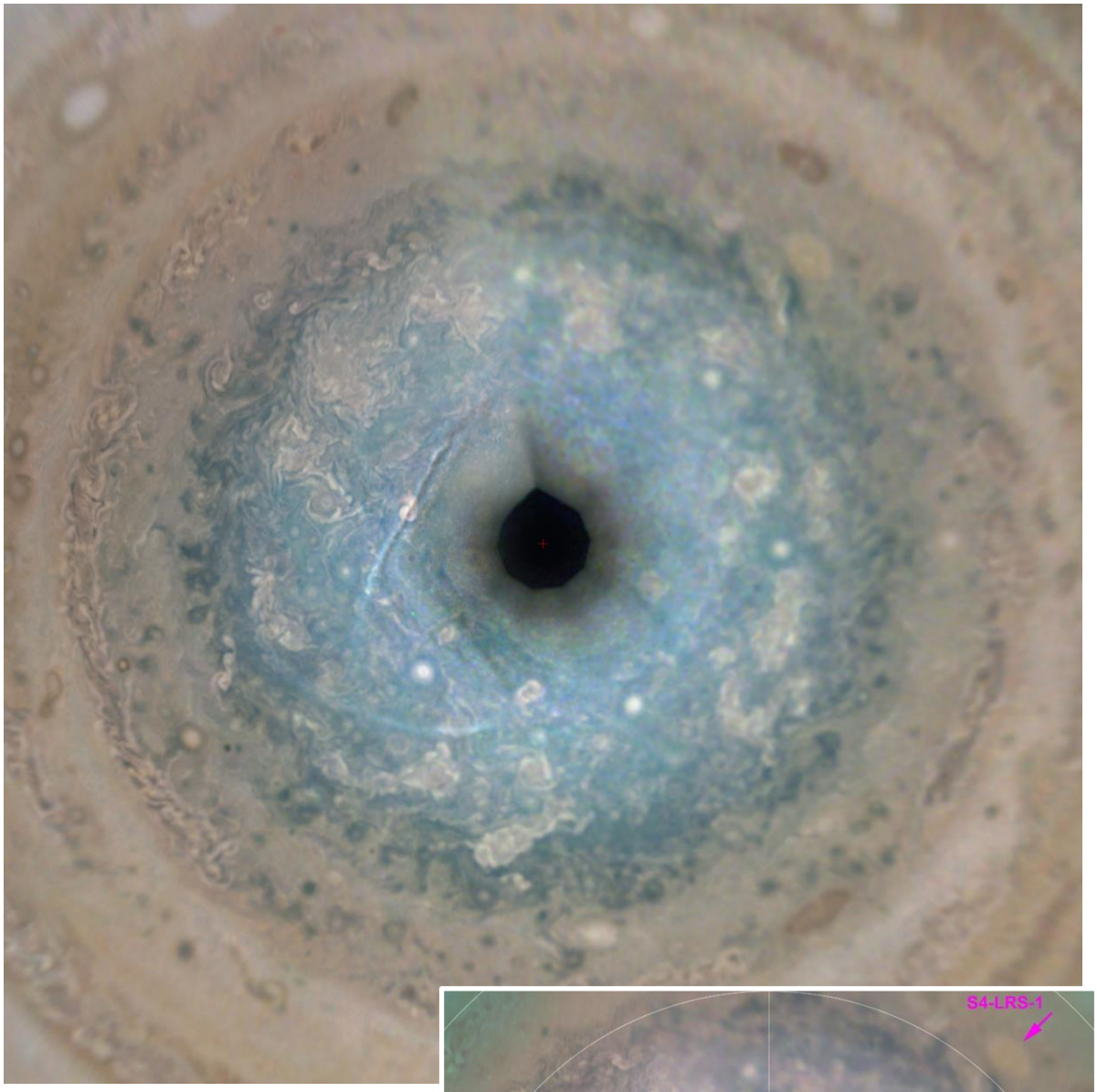

Figure 15: South polar RGB map down to 45°S at edges (Gerald's auto-assembly from short-exposure images).

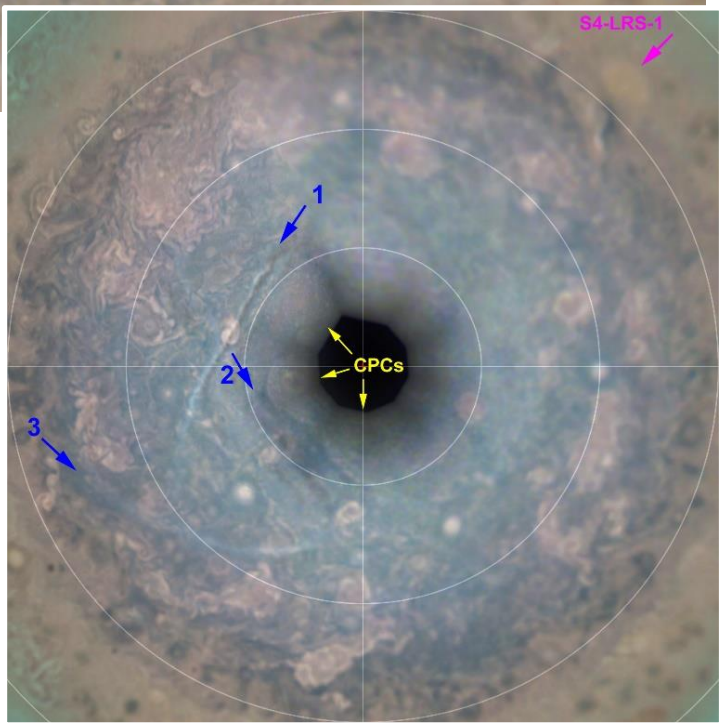

Figure 16: South polar RGB map down to 60°S at edges, with grid (Gerald's auto-assembly from long-exposure images, to look for CPCs: 2 or 3 are visible). Dark blue arrows indicate the main bright haze bands.

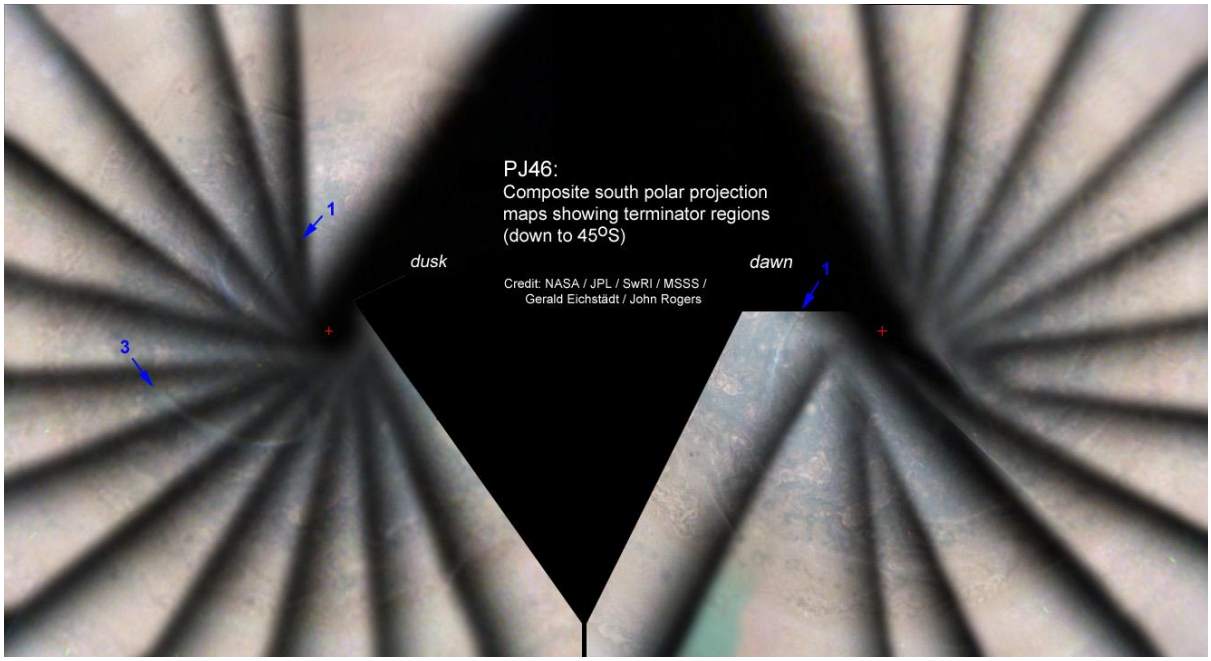

Figure 17: South polar RGB map down to 45°S at edges, favouring the terminator regions to show haze patterns: (L) dusk, (R) dawn. (Manual assembly from small copies of maps.)

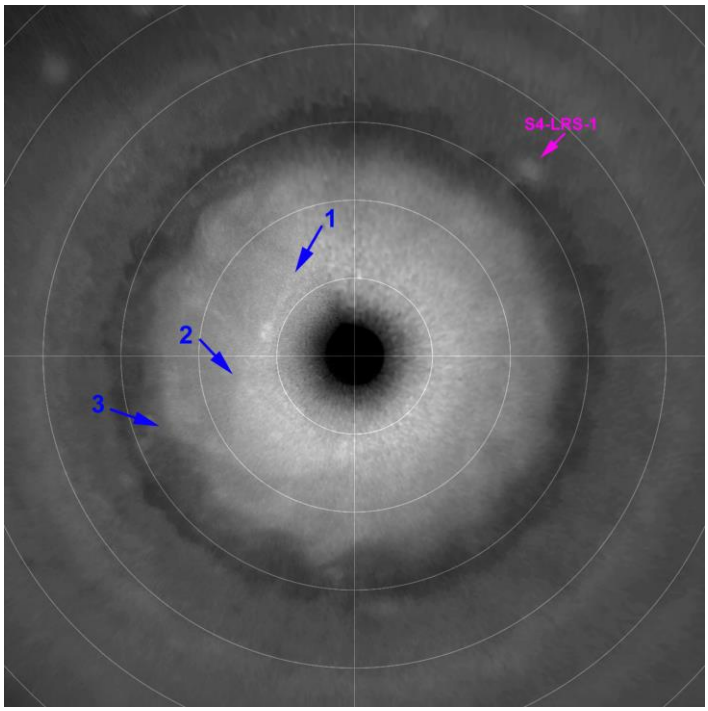

Figure 18: South polar CH4 map down to 45°S at edges (Gerald's auto-assembly).
(A manual assembly was also done for higher-resolution maps of some longitudes: not shown here.) Dark blue arrows indicate the main bright haze bands.

Animation-1. Blink of inbound and outbound maps covering parts of the SEB and STB, revealing the wind jets. This used Gerald Eichstädt's maps of images 37 & 123 (at right: 16:00 & 22:52 SCET: 6h 52m apart) and 43 & 129 (at left: 16:45 & approx. 23:23 SCET: 6h 38m apart).