Jupiter in 2016/17, Report no.10: Interim report (2017 May)

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Summary

This report covers Jupiter's features up to the end of April, 2017. Notable activity has continued in three of the major belts. The NTB has revived since its great outbreak last autumn, with a vivid orange NTB(S) and a dark grey NTB(N). In the NEB, the new 'rifts' have continued to expand so that over half the circumference is now intensely disturbed, and at many longitudes the north edge has expanded north again, while many small white ovals have formed within ithe NEBn. In the SEB, also, the two rifted sectors have expanded greatly: both the usual sector following the GRS, and the mid-SEB outbreak which began several months ago.

The v-hi-res images now produced by some observers appear to have crossed a threshold in resolution, such that they can resolve high-latitude turbulent regions, and also allow tracking of hitherto-obscure features. These include anticyclonic ovals which are so small that they collide and merge frequently. We report instances of this behaviour in the north polar region, the NEB north edge, and the S.S. Temperate region, as well as the recirculation of tiny spots adjacent to the STB Spectre. These may be processes leading to formation of larger ovals, which have not previously been recorded in such detail.

Introduction

Jupiter was at opposition on 2017 April 7. Here I describe the planet's atmospheric features up to the end of April, with JUPOS charts to April 23. This follows on from Report no.6, which (like all reports referenced herein) is posted on our 'Jupiter in 2016-17' page (https://www.britastro.org/node/8103). Juno's perijove-5 was on March 27, and a report on those images was posted on our 'Results from Juno' page (https://www.britastro.org/node/7982).

I am very grateful to all the observers who have contributed images; many are of superb quality. Many are included in compilations herein. I am also very grateful to the JUPOS team, who have measured vast numbers of features on the images. Drift rates were taken from the JUPOS charts and may be refined by subsequent analysis of the numerical data.

As usual, speeds are given as DL2 (degrees per 30 days in System II) unless otherwise stated. (DL3 = DL2 + 8.0 deg/month). Latitudes are planetographic. Images and maps in the main report are shown with north up, but Appendix 2 contains sets of maps with south up in the conventional manner, so that they can be aligned with the JUPOS charts.

The Appendices are as follows:
Appendix 1: Supplementary images, Figures N1-N6 (North up)
--including sets of methane-band images.
Appendix 2: Supplementary sets of maps, Figures S1-S4 (South up) and JUPOS charts.
Appendix 3 = Report no.9 (expanded), 'Interactions of ovals in high northern latitudes, 2017 March-April': https://www.britastro.org/node/10017.
Appendix 4 = Report no.8 (expanded): 'Mergers of small ovals in the S2 domain': https://www.britastro.org/node/9378.

Some of the very best images are compiled in Suppl. Figures N1 & N2.

Figure N1 shows images taken by Damian Peach remotely using the ChileScope 1-metre Cassegrain in Chile, in late Feb., all round the planet. (In the Feb.26 image, note the large FFRs in NTB(N), and waves on NEBn.) **Figure N2** shows images by Chris Go and by Tiziano Olivetti, covering just one face of the planet in March and April: they include WSZ, N2 jet spots, the p. part of the mid-SEB outbreak, and the chain of S2-AWOs. **Figures N3-N6** are sets of methane-band images by Chris Go, Marc Delcroix, and a few other observers.

Figure 1 is a map of the planet from April 9-10. A north polar projection of this is shown (with other maps) in Appendix 3 and our Report on Juno PJ-5. A north polar projection map from April 29-30 is shown in Fig.2.

North polar and temperate regions

N4 and N5 domains

There is currently much interest in the behaviour of features in the high northern latitudes, as these are shown in spectacular detail in the JunoCam images. Close pairs of white ovals in the N4 and N5 domains were noticed in the Juno PJ-5 images and in images by Chris Go and others. Appendix 3 (= Report no.9) presents the interactions of 3 such pairs, from the best amateur data. Given the chaotic nature of these domains, such events may well be common, but this was an exceptional opportunity to study them in detail. In summary:

1) A trio of ovals in the N4 domain (51-55ºN), named a,b,c: a overtook b then possibly merged with c, reversing its drift on March 17; but then b converged on a in turn, and they were nearly in contact on April 21. Further v-hi-res images showed that ovals a and b merged on April 30—May 1, and there was just a single oval thereafter.

2) A pair of ovals in the N4 domain: one (d) caught up the other (e) and they apparently merged on April 8-10, at 54ºN.

3) A pair of ovals in the N5 domain (~62ºN): they probably merged on April 11.

N3 domain

The N3 domain contains both dark and bright spots, with typical 'N3 Temperate Current' drifts, mostly around DL2 = -19 deg/mth, ranging from ~-14 to -29 deg/mth.

N.N. Temperate (N2) domain & jet

Three long-lived anticyclonic ovals (AWOs) in the NNTZ are tracked; all three are now methane-bright. LRS-1 is obvious with its dark grey collar, but is virtually white internally. It has had a very steady drift since Dec., DL2 = -1.5 deg/mth (Jan-Apr.).
WS-6 is very bright white: DL2 = -14 (Feb-Mar.) but now decelerating.
WS-4 is hard to see: DL2 ~ -9 (±oscillations; Jan-Apr.).
WS-8 may still exist as a very small, bright reddish oval, retrograding with DL2 ~ +8 (Feb-Apr.), so I tentatively call this LRS-8. (However there was no white oval in the expected position on the Juno PJ-1 map.)
The JUPOS chart suggests strong retrograde drifts for dark spots at L2 ~ 0-70. f. WS-4.

The NNTB is still mostly absent, except for one dark segment from L2 ~ 315-360.
However, intense activity has resumed on the *NNTBs (N2) prograde jet*, which carries typical dark spots at most longitudes. If it was partially suppressed by the great NTB outbreak, it has recovered in March with this substantial outbreak of spots.

N. Temperate (N1) domain

The revived NTB has not changed very much in the last 2 months. Figure 3 shows typical sectors of it ever since the great outbreak which initiated the NTB revival. The NTB(N) has become a more coherent, very dark grey belt, with small irregularities moving with typical (but poorly defined) North Temperate Current A drifts. The long-lived folded filamentary region (FFR), which survived the great NTB outbreak, still persists, with DL2 ~ +21 deg/mth [see Fig.1 & Appx 1 Fig.N1 (Feb.26 image)]

The NTB(S) is still a diffuse, featureless, strikingly orange belt at all longitudes. In methane images (Figure 7), its southern (yellower) half is methane-bright but its northern (browner) half is methane-dark, as we also noted in 2007 and 2012 after similar revivals.

N. Equatorial Belt (NEB)

N. Tropical Zone and NEBn:
The NTropZ has now resolved into a very narrow, bright white strip between the diffuse orange NTB(S) and the expanded, very disturbed NEBn.

The NEBn broadened to 20-21°N around most of the circumference from Feb. to April. It is not yet clear whether this expansion is stable, as it is largely associated with the large, very broad rifted region, and/or the rapidly changing new small AWOs (all described below). Neither is it clear whether this fits into the known patterns of NEB expansion events, given that it comes only a year after the previous event failed to proceed to completion.
In methane-band images, the expanded northern NEB is moderately dark, though not nearly as dark as the diffuse waves along the retrograde jet and central NEB (see below). As usual, the NEBn AWOs are not strongly methane-bright, although they can be discerned as lighter areas in the methane images, and may be brighter when disturbed by interactions.

Spot Z (WSZ) (Fig.N2) is gradually returning to the form of an AWO, though still not fully white. V-hi-res images show filaments from NEB rift activity twisted anticyclonically around it. Its speed has been fast, varying between DL2 = -18 and -23 deg/mth since Dec.; recently, -22 deg/mth (Mar.20-Apr.20).

Several new off-white anticyclonic ovals in the same latitude (19-20°N) (provisionally named WS-a, -b, -c) were mentioned in Report no.6. These still exist, and a few smaller ones have appeared, but have not yet stabilised. WS-a is a large off-white oval; WS-b and –c are smaller and greyer.

Interactions of these AWOs with smaller, new-born ovals have been followed in v-hi-res images, as follows. (See L2 maps and JUPOS charts in Appx 2, and hi-res image compilations in Figures 5 & 6; Fig.5 is an extended version of Report no.6 Fig.5.)

Around Feb.16-23, a and b suddenly decelerated. The event involving a was striking (Fig.5). On Feb.17, the rather northerly rift D (see below) was revived by sudden appearance of a new very bright spot erupting just Sp. WS-a [Report no.6], though it is not clear if this had anything to do with the interactions of the AWOs. At the same time, a tiny white oval was prograding rapidly in the NTropZ from WS-b towards the north edge of WS-a, and apparently twisted around WS-a on Feb.19-21, resulting in two substantial AWOs on Feb.24. The p. one, named WS-d, prograded very rapidly (DL2 ~ -50 to -60 deg/mth).

This event was almost repeated on April 10, when another rapidly-prograding little white spot became entangled with WS-a (Figure 6, & map Figure 1); however on this occasion WS-a was the only survivor of the interaction.

There have also been tiny AWOs retrograding rapidly from WSZ in the NEBn jet [see JUPOS chart]. Two of them (dubbed e and f on the JUPOS chart) suddenly halted in early March. WS-d probably merged with both in turn [it appeared elongated in Fig.1 on April 9 as it merged with e] and apparently halted on colliding with f. In early May it collided with another such mini-AWO, g. [See map, April 29: WS-d is now a fine AWO, g a tiny spot. Images show them approaching on May 1 (Go) & 2 (Foster), but g disappeared by May 5 (Foster) & 6 (Wesley, Milika).]

There is only one barge in the NEB, between WS-a and –b, at L2 ~ 270 --> 260 (Figures 4-7). Its track suggests that it could be barge B-1 from 2016, though NEB rifts A and B have erupted from this location in the meantime [Report no.4].

NEB Rifts:

Two of the recently generated rift systems in the NEB are still very active and have spread to cover the entire circumference in April.

Rift system A (see Reports nos.4 & 6) revived in mid-Jan. while passing the (then obscure) WSZ. Its p. end continued to prograde rapidly, and it spans the whole width of the NEB (Fig.3 & Fig.S2 = maps). It has generated an unusual pale sector of the NEB, in which the turbulence is small-scale though vigorous, and so only resolved in hi-res images. The p. end of the pale sector has advanced with DL2 ~ -60 deg/mth, while its f. end remained hung up around WSZ (with filaments spiralling around the oval). [An individual white spot at the f. end of rift A had DL2 = -48 (Jan.1-30) then -54 (Feb.12—Mar.2, as it passed WSZ).] In April the p. end of rift system A (tenuous and chaotic and southerly) advanced as far as WS-a, so there were then rifts all around the NEB.

Rift system D has arisen by three successive outbreaks of a very bright white point just Sp. WS-a (Figure 5), viz: Rift D1, Feb.10 (L2 = 255); Rift D2, Feb.17 (L2 = 251)* ;
Rift D3, March 29 (L2 = 229; DL2 = -39, Mar.25—Apr.15).

*[The bright spot generating Rift D2 prograded with DL2 ~ -24 deg/mth from Feb.17-25, then brightened again in early March, and had DL2 = -50 from Mar.25—Apr.5.]

Methane-dark waves:

These large-scale diffuse dark patches, which represent thinning of the haze that overlies the main cloud tops, are still conspicuous in long sectors of the NEB. They have probably persisted ever since late 2015, though with varying extent. Professional infrared imaging in 2015-16, in collaboration with amateur imaging, has shown that they are thermal waves (as in 2000): the haze is thinner where the atmosphere is warmer [L.N. Fletcher et al., 'Thermal wave activity associated with the expansion of Jupiter's North Equatorial Belt ahead of Juno's arrival.' Geophysical Research Letters (in press, 2017).]. Full documentation – mapping, measurement, tracking, and photometry -- remains to be done, perhaps in collaboration with professional astronomers. Here, I just offer a preliminary overview from a sample of images.

Figures N3-N6 are sets of methane-band images from aseveral time periods, in which these waves are well shown. The extent of the prominent wave patterns can be summarised roughly as follows:

Feb.24--March 5 (Fig.N3): L2 ~ 110-360, esp. 145-240 (f. WSZ -- p. Rift C)
[L3 ~ 220-110, esp. 255-350]
April 8-10: Less extensive.
April 16-20 (Fig.N4): L2 ~ 60-210, esp. middle part (f. WSZ -- p. Rift C)

& L2 ~ 230-350 (f. Rift C)
[L3 ~ 180-330 & 350-110]
April 21-30 (Fig.N5): L2 ~ 55-155 (f. WSZ -- p. Rift C)
& L2 ~ 245-320 (f. Rift C)
[L3 ~ 245-320 & 10-80]

Thus the waves are most prominent over the least disturbed sector of the NEB, between WSZ (which marks the f. end of the pale sector generated from Rift A) and Rift C; and also over the sector f. Rift C, even though in April the leading rifts of the Rift A system are running along the southern NEB in this sector. The waves are weaker or absent in the sectors that are most disturbed by rifts. The NEB appears lighter in methane images in the disturbed sectors than in the waves, suggesting that the phenomenon is not due to the rifts disrupting the overlying haze; rather, the waves themselves are clearings in a haze that is widespread over the rest of the belt.

In order to correlate the methane-dark waves with the underlying visible features, in Figure 7, selected methane images from Figs.N3 & N5 have been rotated in Adobe Photoshop to (approximately) match the visible images. The latitude of the retrograde NEBn jet can be visualised from the cloud textures, and most of the methane-dark waves appear to be centred roughly over it, whereas some are slightly further south (including one over the barge). There seems to be partial correlation with visible features, as follows:
i) The waves often coincide with browner areas of the NEB –avoiding AWOs and rifts, but also on a less obvious scale. [Especially note the correlation with dark regions in Delcroix's blue images in Fig.N6.] This may just mean that the dark brown appearance of these areas is due to the thinning of the overlying haze in the waves.
ii) Some of the waves coincide with large <-shaped features on the NEBn jet, which link dark streaks to the north (along the expanded NEBn at ~21°N) with streaks bordering rifts to the south. This could be a sign that cloud dynamics on the NEBn jet is promoting the formation of the (more diffuse) waves in the overlying haze, perhaps in a manner consistent with our results in 2000. However, we have not tracked these <-shaped features so their drift rate and life-span are unknown.
iii) In the March 2 image, waves coincide with visible projections of dark brown NEB northward.
More extensive and rigorous study will be needed to test whether these are dynamically significant correlations.

NEBs/EZ(N):

There are 11-12 persistent NEBs dark formations. They are mostly large and dark bluish – some very much so, although these enhancements are only temporary. A series of maps is shown in Appx.2 (Fig.S3). Their drift rates range from DL1 ~ 0 to +10 deg/mth; +6 is still typical.

The EZ is still largely white, apart from the classic pattern of festoons in EZ(N); there is no coherent Equatorial Band. The narrow EZ(S) is white. However, hi-res images reveal the usual slender blue-grey streaks all over the EZ.

S. Equatorial Belt (SEB)

SEBn:
There are no major features on SEBn, just many tiny irregularities which sometimes have the classic chevron shape. On the JUPOS chart, many short tracks suggest a gradient of speed with longitude, with DL1 ranging from -94 deg/mth at L1 ~ 10 down to -42 deg/mth at L1 ~300.

This gradient, and the paucity of measurements around L1 ~ 340-360 (in March-April), suggest the presence of a S. Equatorial Disturbance, but no such feature is visible. In any case, most of the tracks on the JUPOS chart have only 4-7 points and it is difficult to exclude aliasing; we need higher-frequency measurements to be sure of the drift rates.

Mid-SEB outbreak:
The disturbance spans ~120º in April. This account is still preliminary as we have not yet done a day-by-day accounting of plumes, but from the maps (Fig.S4) we can see:
--Bright white spots (plumes) were appearing at the source (L2 ~ 208) up to mid-Feb. Then the f. end of the disturbance prograded very slowly (DL2 = -6.6 deg/mth) until early April, and possibly faster thereafter.
--Successive plumes or cells spread in the p. (E.) direction, as usual, forming a long, very turbulent sector across almost the whole SEB, whose p. end moved steadily with DL2 = -26 deg/mth [L2 ~ 195 (Jan.10), 160 (Feb.18), 130 (Mar.30), 110 (Apr.19)].
--Bright white plumes have also been erupting near the leading edge of this sector [e.g. maps on March 11 & 30 & April 19 & 30).
--Further p.(E.), large-scale disturbance ('the NE extension') is prograding rapidly in the N half of the SEB, often in the form of a regular array of large cells (very clear on March 11), but with no bright plumes.
--The scale of turbulence in the main disturbance may be gradually getting smaller.

In methane images (e.g. Fig.N5), the white plumes are methane-bright, both in the post-GRS rifts and within the mid-SEB outbreak (L2 = 110, Apr.26; this is in the leading edge). Also, there are some equally notable methane-dark features in the NE extension of the mid-SEB outbreak; visibly, these are pale blue streaks.

Post-GRS rifts:
The usual rifted region f. the GRS has also expanded to dramatic proportions, with at least 9 new white spots (plumes) erupting at successively greater distances from the GRS between Jan.29 (w.s. at L2 = 305) and Apr.20 (w.s. at L2 = 360). (The GRS was at L2 = 262 --> 268.5. Again, these values are taken from JUPOS charts and maps, without any day-by-day alignment of images.) So this disturbance spans ~85º in late April.

Less disturbed sectors:
The main quiet sector contains two red-brown 'mini-barges' at L2 = 50 --> 70 and L2 = 70 --> 80. One of these was beautifully imaged by JunoCam at Perijove-5.
Meanwhile, p. the GRS, there was a diffuse white spot at L2 = 217 --> 232, a twin of the former one in which the mid-SEB outbreak erupted. In Feb.-March, white and brown filaments extending f.(W.) from the mid-SEB outbreak encroached on its S edge, and it became progressively enveloped in brown material, so in April it appears as a dark brown barge with a pale core, at 16ºS (Fig.8). This confirms that both white and brown spots in this latitude are cyclonic circulations. It is very methane-dark (Figs.7&8).

Great Red Spot (GRS):
It is still 14º long. Its longitude increased exceptionally rapidly in March-April, reaching L2 = 268.5 in mid-April. It has thus lurched 2º ahead of its previous track (which had DL2 = +1.8 deg/mth), over and above the 90-day oscillation.
Close-up images of the GRS, showing typical internal detail, are in Figure 8.

South temperate and polar regions

S. Temperate (S1) domain

The STB is completely absent, with not even any STB(N) nor STBn jet spots: just the three visually inconspicuous structured sectors.

Oval BA:
Oval BA is still orange. The dark spot f. it is still moderately active, emitting retrograding dark spots (DL2 ~ +21 deg/mth), and generating a grey (not very dark) collar around BA. The region f. it has not darkened. [The JUPOS chart shows that one of the dark spots in the tail Sf. it decelerated and oscillated between DL2 = +5 and -14 deg/mth, at the f. end of the Sf. tail. In early April this came into contact with a small rimless AWO and the p. end of the STB Ghost.]
Oval BA still has a mean drift rate of DL2 = -11.8 deg/mth since Dec., but this encompasses two cycles of an oscillation with period ~2 months, that has probably been operating since early 2016. With this oscillation, it is currently cycling between DL2 ~ -13 and -10 deg/mth.

The STB Ghost:
This is 15º long internally, and ~22º long externally (including its tapered blue-grey ends). It passed the GRS in March-April, without change, except that as it drew ahead of the GRS in April, pale blue shading developed in the STropZ alongside it. It has decelerated slightly since Nov., to DL2 = -16.5 deg/mth, as it begins to catch up with oval BA.
With their present drift rates, the p. end of the Ghost should reach oval BA in 2018 April, although given the recent variability in drift rates, this could occur any time in 2018. When it happens, or soon after, we expect that the Ghost will become a disturbed dark STB segment, oval BA will accelerate, and other phenomena will occur as described in our long-term reports.

The STB Spectre, with evidence for more coherent recirculation:
The STB Spectre, a cyclonic circulation like the STB Ghost, is ~3.5º long internally, and ~10-11º long externally. Its drift rate is unchanged at -15.5 deg/mth. It was beautifully imaged by JunoCam at Perijove-5, especially its p. end.
Once again we find that prograding spots from the S2 (SSTBn) jet are halting or recirculating south of the Spectre, as shown in Figure 9. In fact (as described in detail on Fig.9), these spots seem to be travelling around an elongated 'recirculation loop' – which can be seen as a pale grey line around an orange oblong in some v-hi-res images, esp. by Olivetti. It is ~20-27º long with its p. end due south of the Spectre. The JunoCam closeup images at Perijove-5 on March 27 actually covered the p. end of this recirculation loop (Fig.9), although it was not recognised at the time. The loop can also explain observations from last apparition**. It remains to be seen whether this loop is now a permanent structure, or will gradually become one. If so, it could be the start of the next generation of great white ovals in the S. Temperate domain.

***From our final report for 2015/16* (https://www.britastro.org/node/8263):
"The SSTBn and STBs jets and recirculation at the STB Ghost and Spectre:
These events confirm that the STB Ghost and Spectre, like the earlier STB Remnant, block the passage of all SSTBn jet spots, and cause most of them to recirculate. Indeed we recorded more such recirculations in this apparition than in any previous one. But it is notable that all the recirculated spots, f. the STB Ghost and Spectre, retrograded for only a few tens of degrees before they either disappeared or reversed their drift again to join the STC. (This was also typical for spots recirculated from the STB Remnant and Ghost in earlier years [refs.18 & 19].)"

S.S. Temperate (S2) domain

The SSTBn (S2) jet shows few spots except that, from Feb. to April, several quite prominent dark spots have been prograding with various speeds over tens of degrees both p. and f. oval A5a. Speeds have ranged up to DL2 = -68. As shown in Appendix 4 (Fig.1). , they are within a densely disturbed stretch of SSTBn f. A5a, and encounter a prominent dark spot (probably anticyclonic vortex) almost fixed just Np. A5a; a few spots, with DL2 ~ -50, continue prograding on SSTBn p. this spot.

There are now 8 long-lived AWOs (Fig.1), and a smaller, newer one provisionally named A5a (see below). Six of the 8 are still in a close array, with mean DL2 ~ -30 deg/mth, even though A6, A7 & A7 have been wandering to and fro within it. A4, A5 and A5a had mean DL2 ~ -27 deg/mth in April.

The main cyclonic features are as follows:
--A FFR p. A6.
--A small dark spot between A6-A7 in Dec-Feb., which became a brown streak in Feb. then faded away.
--FFRs between A7-A8-A1 and between A2-A3 (in April).
--A whitish oblong between A3-A4, which had expanded to be 40º long in March and April; but in April it contains some thin grey streaks which reduce its brightness.
--The giant FFR f. A5 [still impressive in Go's images on April 20 (Fig.7b) & 22-25 (Fig.N5)].

F. the giant FFR, v-hi-res images over the past 2 years have shown 2 or 3 very small AWOs. The furthest f.(W.) of these, and the largest, currently called A5a, may be becoming a ninth long-lived AWO. The JUPOS chart and recent hi-res images show that the tiny AWOs are forming in the wake of the giant FFR, and successively merging into A5a. Thus we may be observing the formation of a new large AWO in detail for the first time. All this is described in Appendix 4 = Report no.8 (expanded).

S3 domain

The S3 jet displays a large outbreak of exclusively white spots: there are 12 of them spaced 7-15º apart (mean 10.5º), with DL2 = -98 (±1.5) deg/mth.

S3-AWO-1, at 50ºS, is still on a course with exteme oscillations of irregular period, typically ~1-2 months. Its speed during solar conjunction had an average of DL2 = -21 deg/mth, and now ranges between +1 and ~-56 deg/mth.
The sector of retrograding dark streaks also appears to persist (though the JUPOS chart also hints at similar motions at many longitudes). The maps (Figures 1 & 10) show a giant FFR just p. this sector (at L2 ~ 215-270), and another equally large one further p. (at L2 ~ 115-170). This region will be worth investigating in JunoCam images.

S4 domain

The best images and maps can now just resolve extensive FFRs at 53-59ºS (e.g. Go, April 19; Olivetti, April 30), which can be seen in their full complexity in JunoCam images.
All 3 S4-AWOs, at 59-60ºS, are now well tracked. Over the month up to April 20, all 3 were moving with DL2 = -30 deg/mth, except for a brief slower fluctuation by AWO-3. AWO-2 may have merged with a smaller white spot p. it in early April. AWO-1 (LRS-1) is shown in Figure 8.

South polar region

In the JunoCam images, looking south beyond the highest prograde jet (S6 jet), there is a belt of FFRs then a retrograde jet at ~72ºS then a loose chain of AWOs; these features can be considered to comprise the highest (S6) domain (see our 'Results from Juno' page). These features can be recognised in JUPOS maps such as Fig.10: a belt of light patches at ~66-72ºS corresponds to the FFRs in Juno images, and a white oval at 74ºS is the largest of Juno's AWOs.
In the report 'Juno at Perijove-5' (https://www.britastro.org/node/9891) I noted that the white oval which we had tracked retrograding at 71ºS in spring 2016 was almost certainly the large AWO seen at ~74ºS in Juno images at Perijoves 1, 4 & 5, and also seen in recent amateur images. A supplemental figure with that report showed it in several recent south polar JUPOS maps. This oval is still visible, at 74ºS (e.g. south polar map Fig.10, and images in Fig.8). It is now near-stationary (DL2 = +5), and further south than when it was retrograding rapidly a year ago, indicating that it shifts in latitude as well as speed, like ovals in other domains. It is remarkable that such a near-polar feature can now be tracked in amateur images.