Jupiter in 2013/14: Interim report no.6 (2014 March)

John Rogers (British Astronomical Association), including data from the JUPOS team (Gianluigi Adamoli, Michel Jacquesson, Hans-Jörg Mettig, Marco Vedovato).

****

Figure legends & miniatures

Full-size figures are in a separate ZIP file. South is up in all figures.

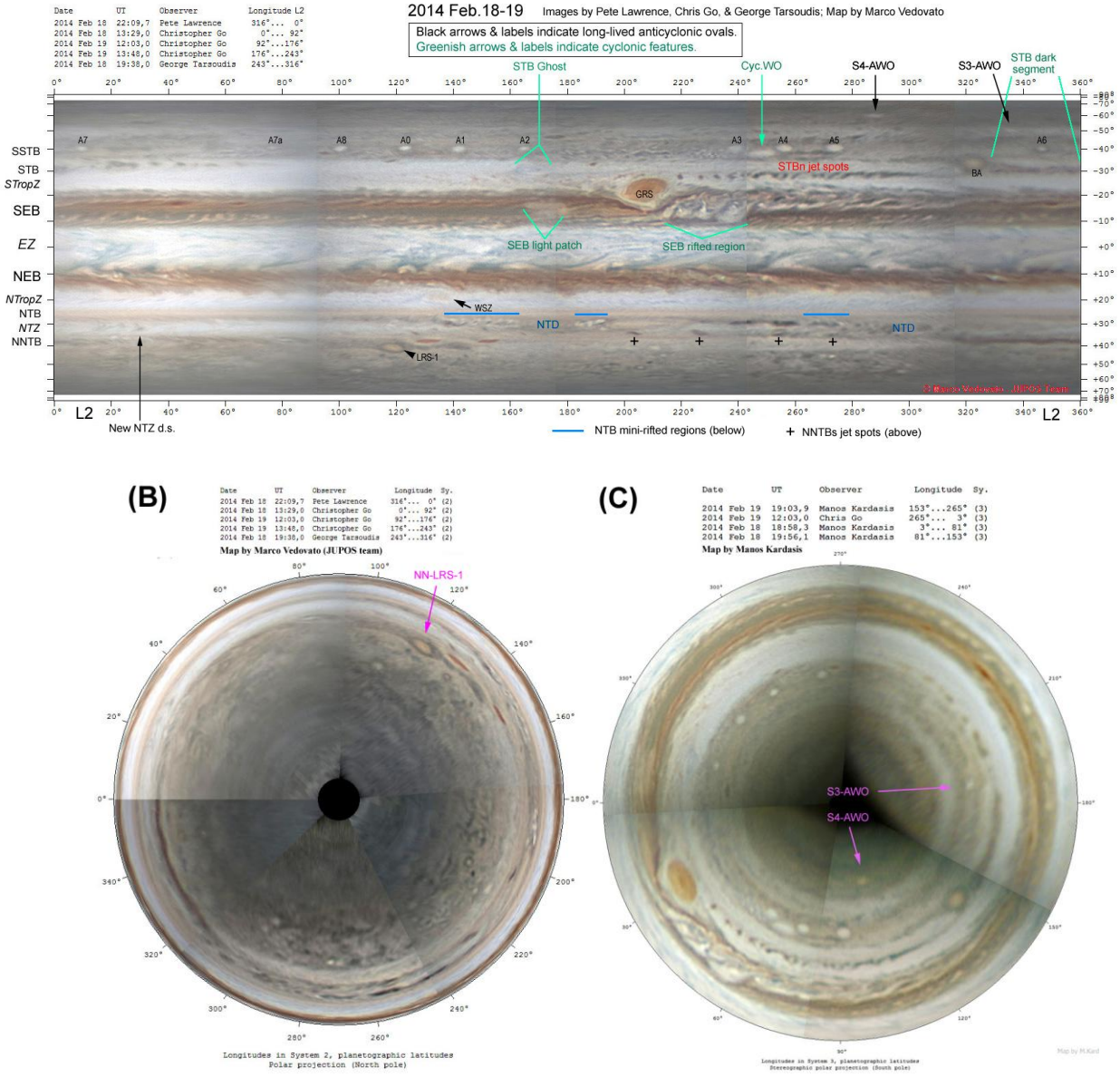


Figure 1: Maps, 2014 Feb.18-19. (Credits are on the maps.)
(A) Cylindrical projection; System II longitudes; south up; map by Marco Vedovato.
(B) North polar projection; System II longitudes; map by Marco Vedovato. Note the remarkable amount of detail in the polar regions.
(C) South polar stereographic projection, i.e. constant latitude scale; System III longitudes; map by Manos Kardasis. The south polar region, as always, has much less detail but more regular belt patterns than the north polar region.

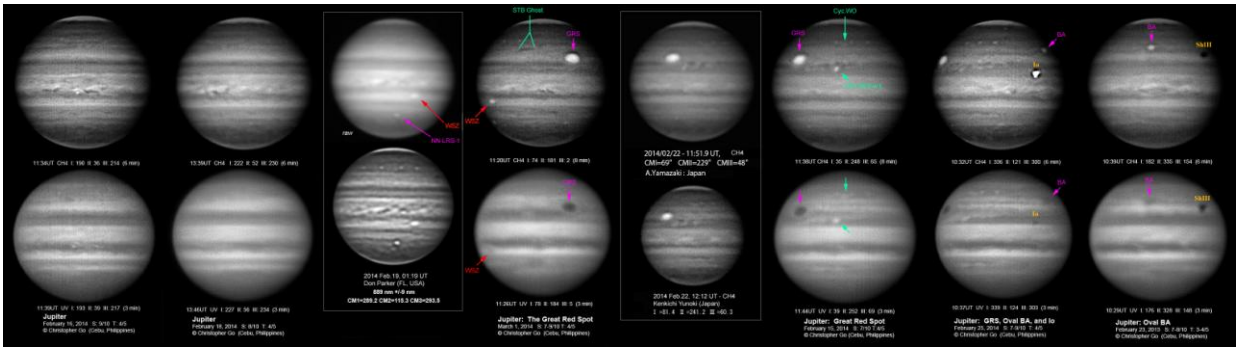


Figure 2: Images in methane band and ultraviolet, around the planet. Long-lived anticyclonic ovals are marked in purple, and some major cyclonic features in green. (Also see **Fig.6.**)

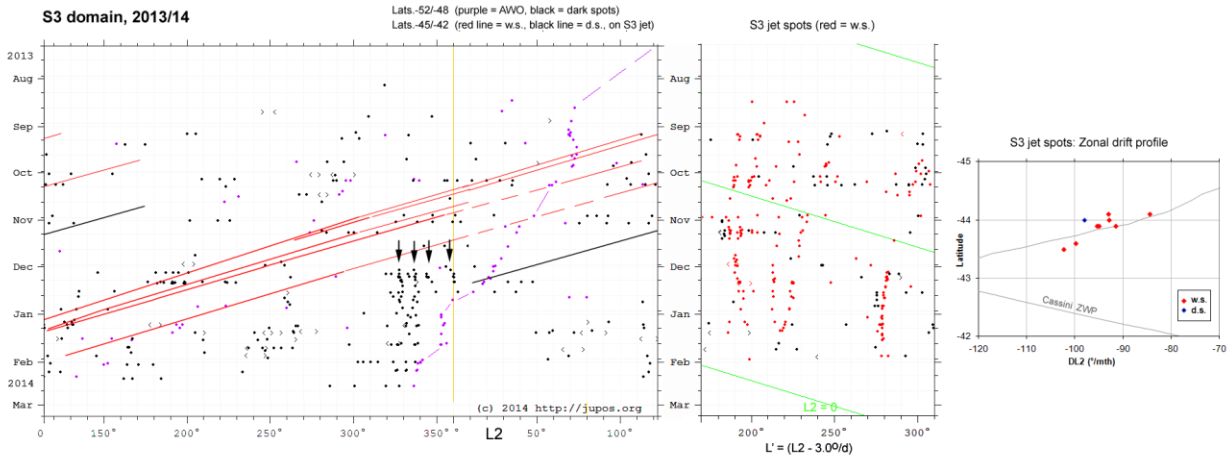


Figure 3. Charts of the S3 domain. (A) JUPOS chart of longitude vs time, showing the long-lived AWO, a chain of slow-moving dark spots (arrowed), and the tracks of the S3 jet spots.
(B) JUPOS chart for the S3 jet white spots, in a system moving at -3.0 deg/day in System II.
(C) Zonal drift profile for the S3 jet spots (analysis by G. Adamoli).

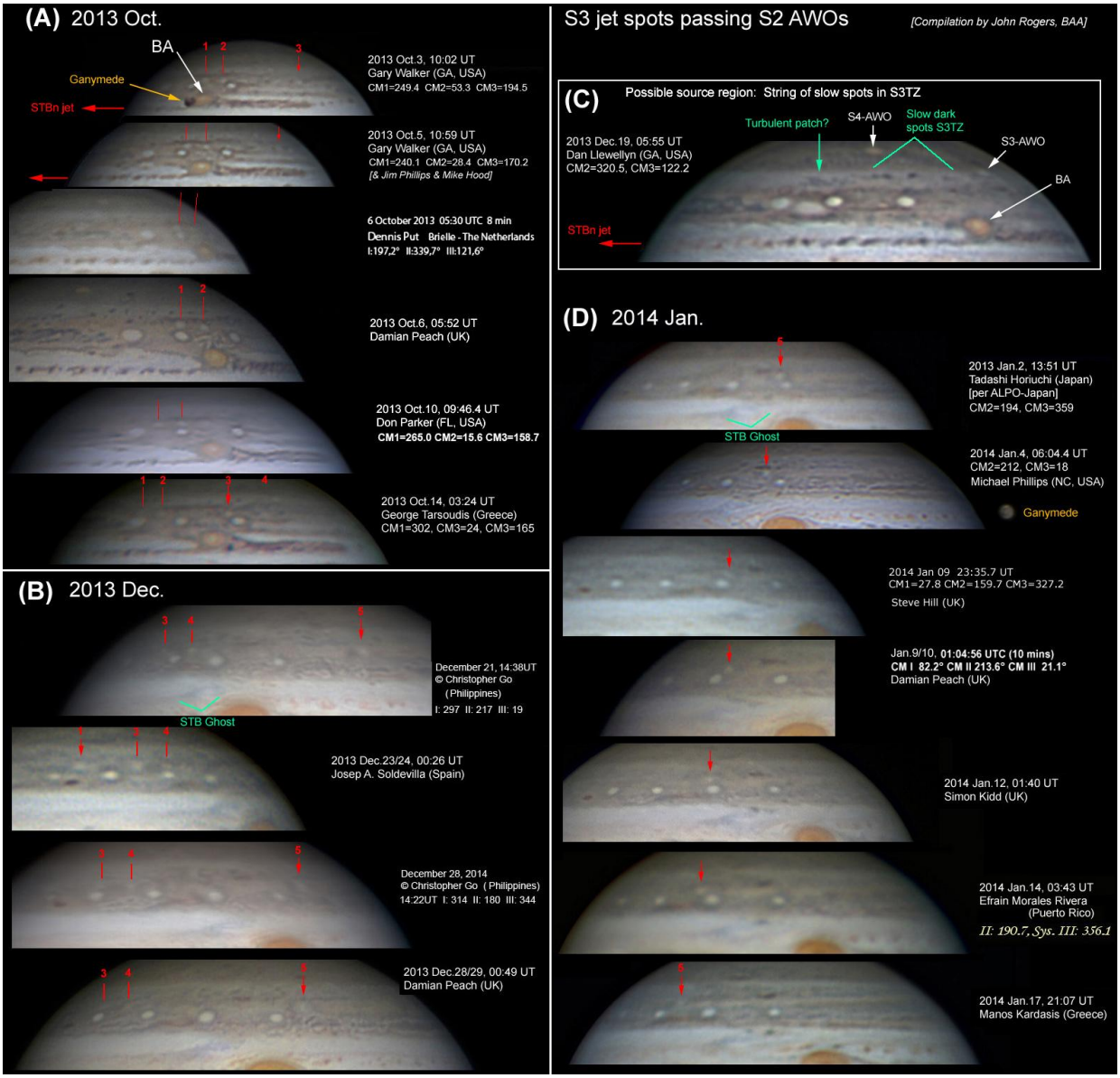


Figure 4. Images showing the high southern latitudes, inc. long-lived anticyclonic ovals in the S4, S3, S2 and S1 domains. The S4-AWO is slightly reddish, as usual. (For another v-hi-res image of these ovals, see Fig.6, bottom right image.) Note the white spots prograding in the S3 jet (marked in red). The images also show important features in the S. Temperate (S1) domain: **(A,C)** Oval BA with the STBn jet outbreak p. it and the dark turbulent STB f. it; **(B,D)** the STB Ghost, having just passed the GRS.

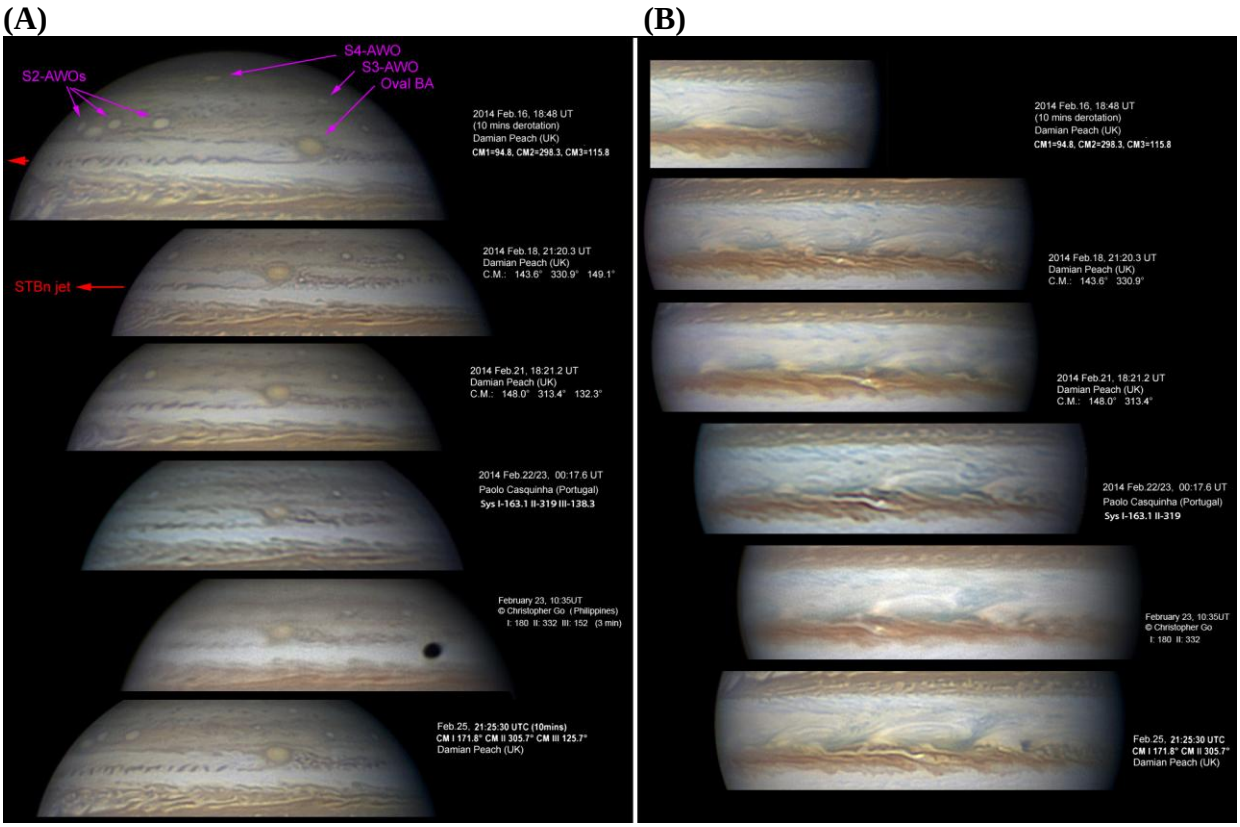


Figure 5. (A-C) Set of 6 v-hi-res images in 2014 Feb., in 3 separate alignments.
(A) S. hemisphere, showing oval BA and the origin of STBn jet spots p. it. Note how the narrow dark STB(N) becomes wavy and breaks up into the string of dark spots (probably anticyclonic vortices) – a classic illustration of an instability breaking up the flow of a jet into waves and eddies.
(B) Equatorial region. Fine views of some large NEBs projections and a bright NEB rift, which seems to induce transient brightening of a white plume adjacent to one NEBs projection (L1 = 162).
[continued on next page]

(C) **(D)**

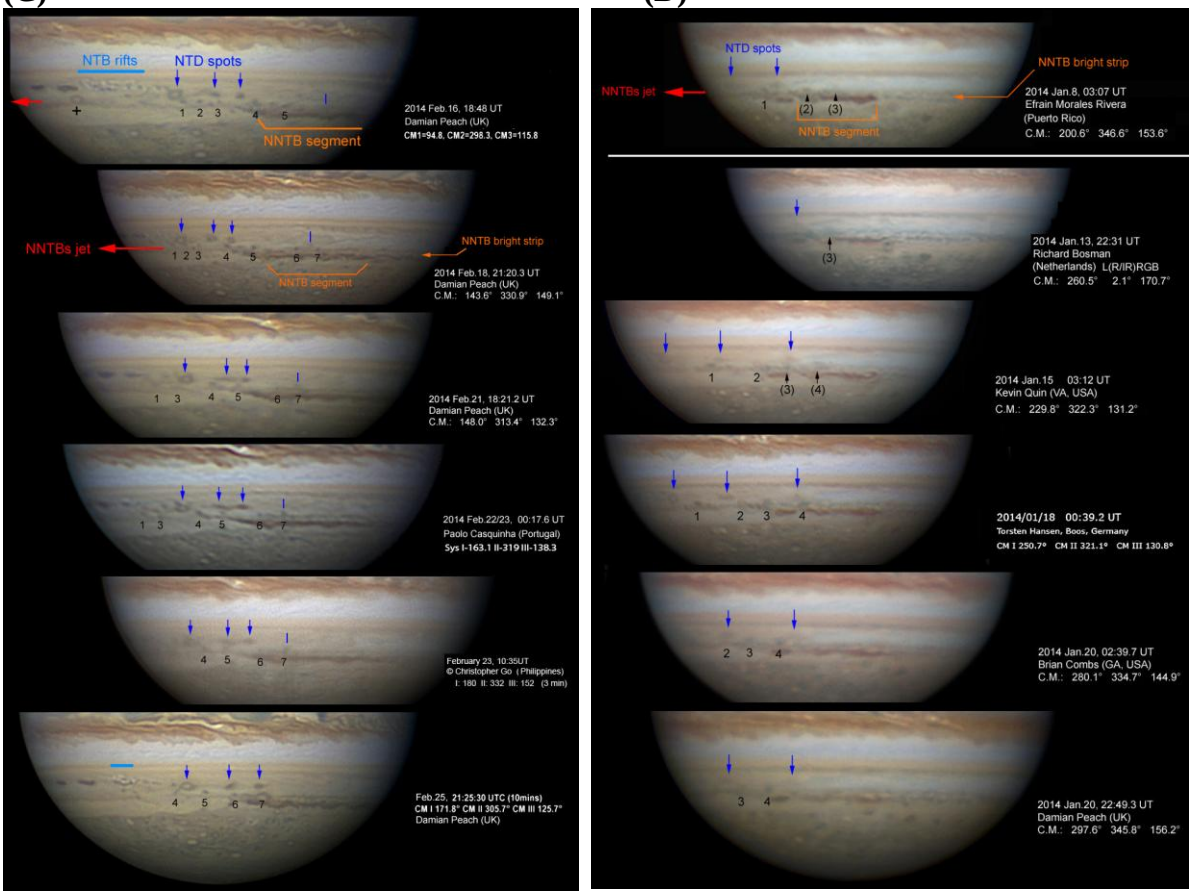
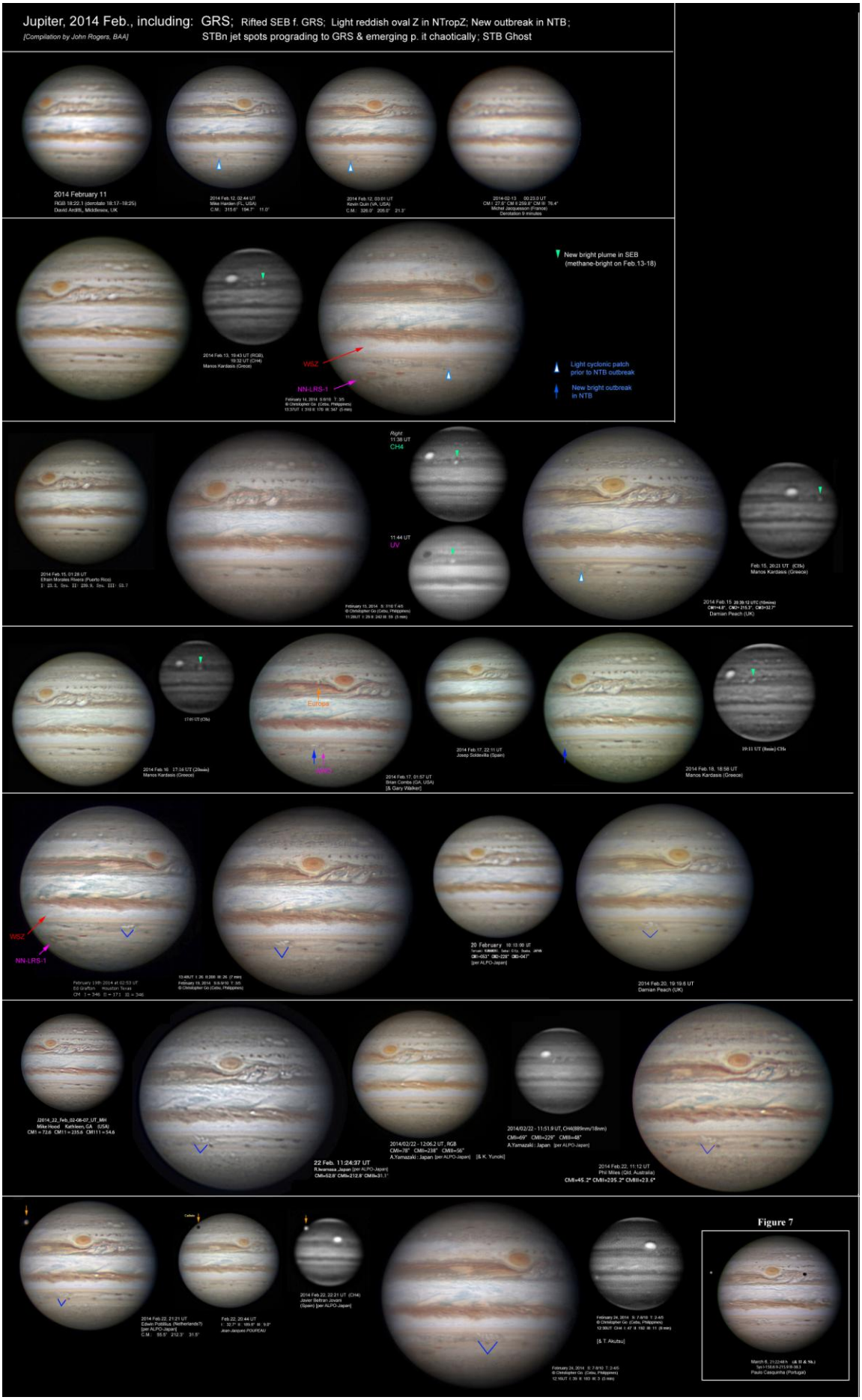


Figure 5 *(continued)*
(C) N. hemisphere, showing the origin of the rapidly prograding NNTBs jet spots alongside a dark brown segment of NNTB. The dark spots (anticyclonic vortices), numbered 1-7, seem to form at lower latitude from little narrow streaks, whose origin is unclear, but could be alongside the irregular bright strip further f. (possibly a turbulent mini-rift). The new NNTBs jet spots are prograding into the NTD (NTB sector 7), which at this time consists only of light shading and a scattering of dark spots in the NTZ. The mini-rifted region (NTB sector 6), which is believed to generate the NTD, had been largely quiescent since Jan., but shows intermittent activity in this sequence. Further north, several small white ovals can be seen with differential drifts.
(D). Set of 6 v-hi-res images in 2014 Feb., N. hemisphere, as for (C). The NNTBs jet spots, numbered 1-4, form from ill-defined streaks alongside the dark brown NNTB segment, possibly originating alongside the irregular bright strip, as in (C). [Also see images in **Fig.13**.]

[On next page]
Figure 6. Images of the GRS side of the planet in 2014 Feb. Some features of interest are marked, especially new cyclonic outbreaks in the SEB and NTB. Methane-band images are included, showing that the new white spot in the SEB was initially methane-bright. An alignment of the GRS images is shown in Report no.7 [ref.7].
Figure 7 [*included in Fig.6*]. An image showing the GRS region on 2014 March 6.


Jupiter, 2014 Feb., including: GRS; Rifted SEB f. GRS; Light reddish oval Z in NTropZ; New outbreak in NTB;
[Compilation by John Rogers, BAA]
STBn jet spots prograding to GRS & emerging p. it chaotically; STB Ghost
2014 February 11
New bright plume in SEB
(methane-bright on Feb.13-18)
WSZ
NN-LRS-1
Light cyclonic patch
prior to NTB outbreak
New bright outbreak
in NTB
Right
11:38 UT
CH4
11:44 UT
UV
Europa
WSZ
NN-LRS-1
Figure 7

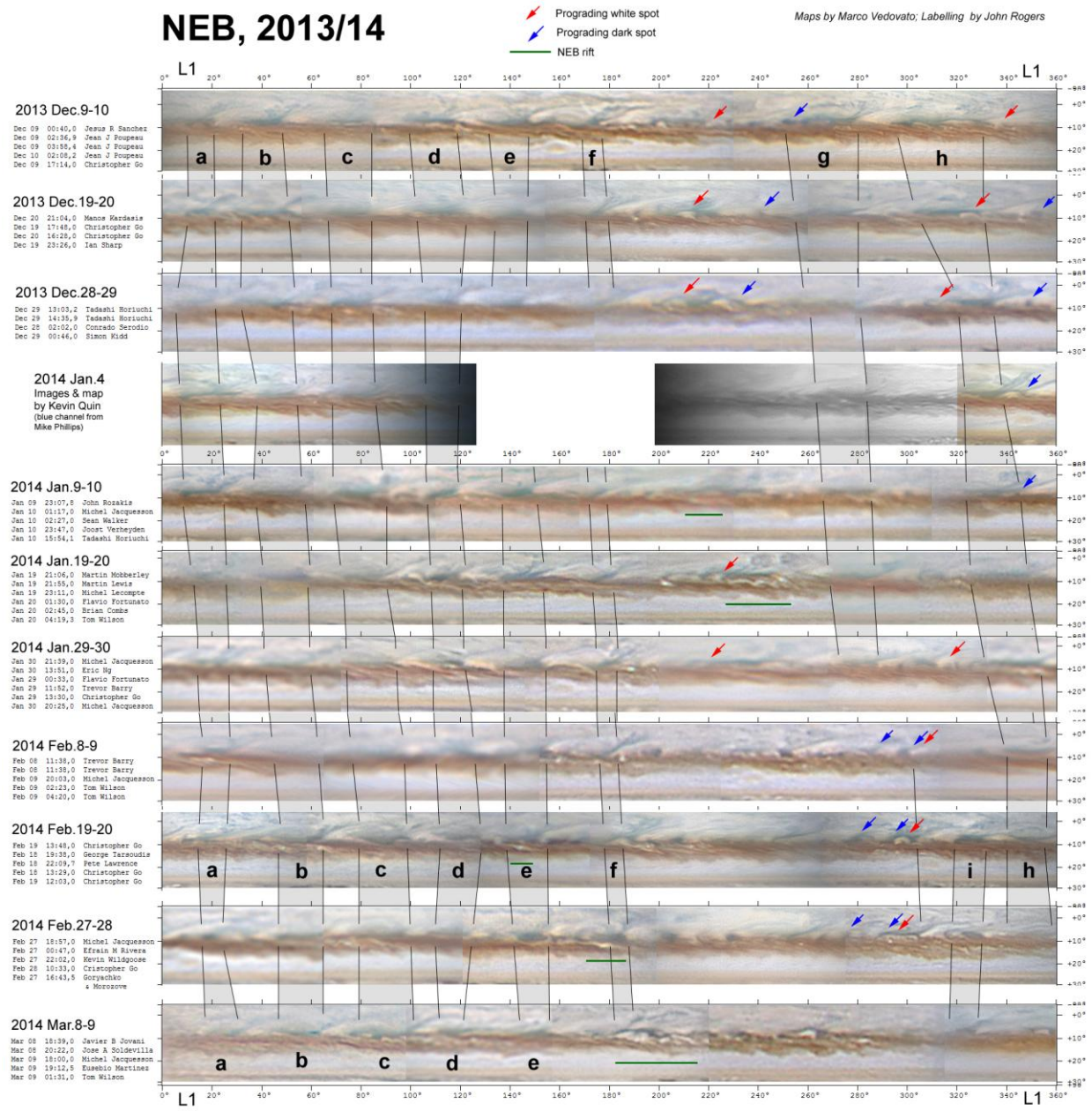


Figure 8. Set of maps showing the northern EZ and NEB, 2013 Dec. to 2014 March. (Key and credits are on the maps.)

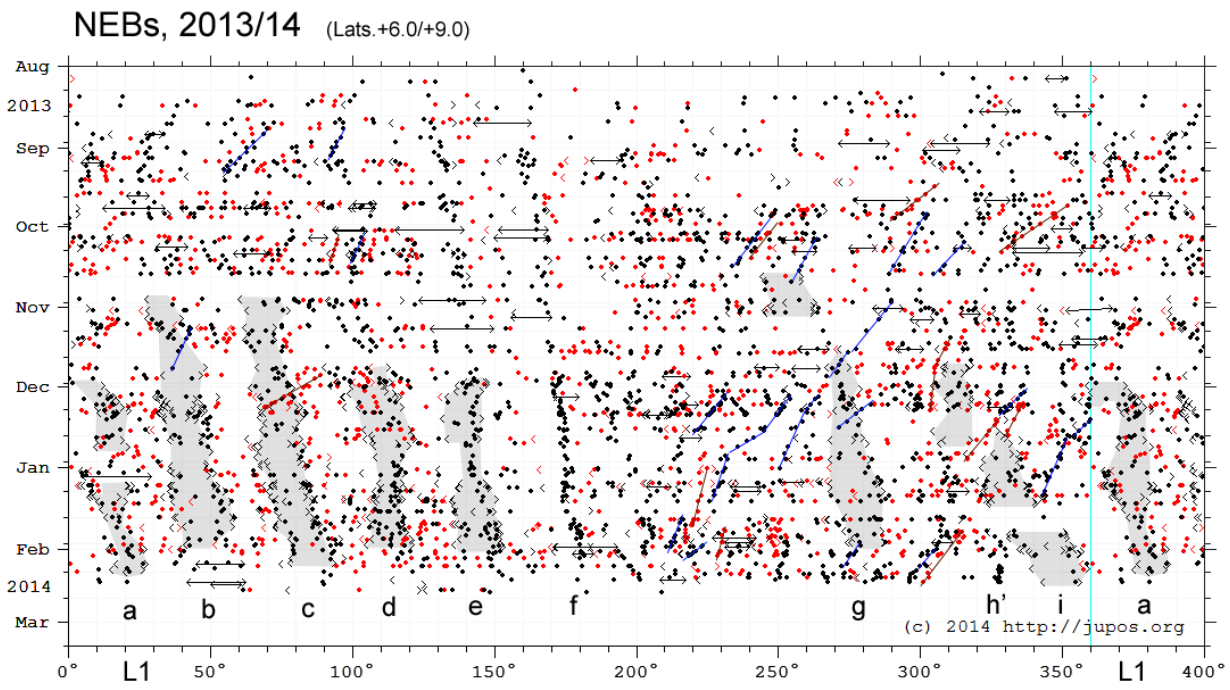


Figure 9. JUPOS chart for the NEBs.
As usual in JUPOS charts, black points are dark features, red points are bright features. Tracks of large formations are filled in grey. Lines indicate tracks of faster-moving spots.

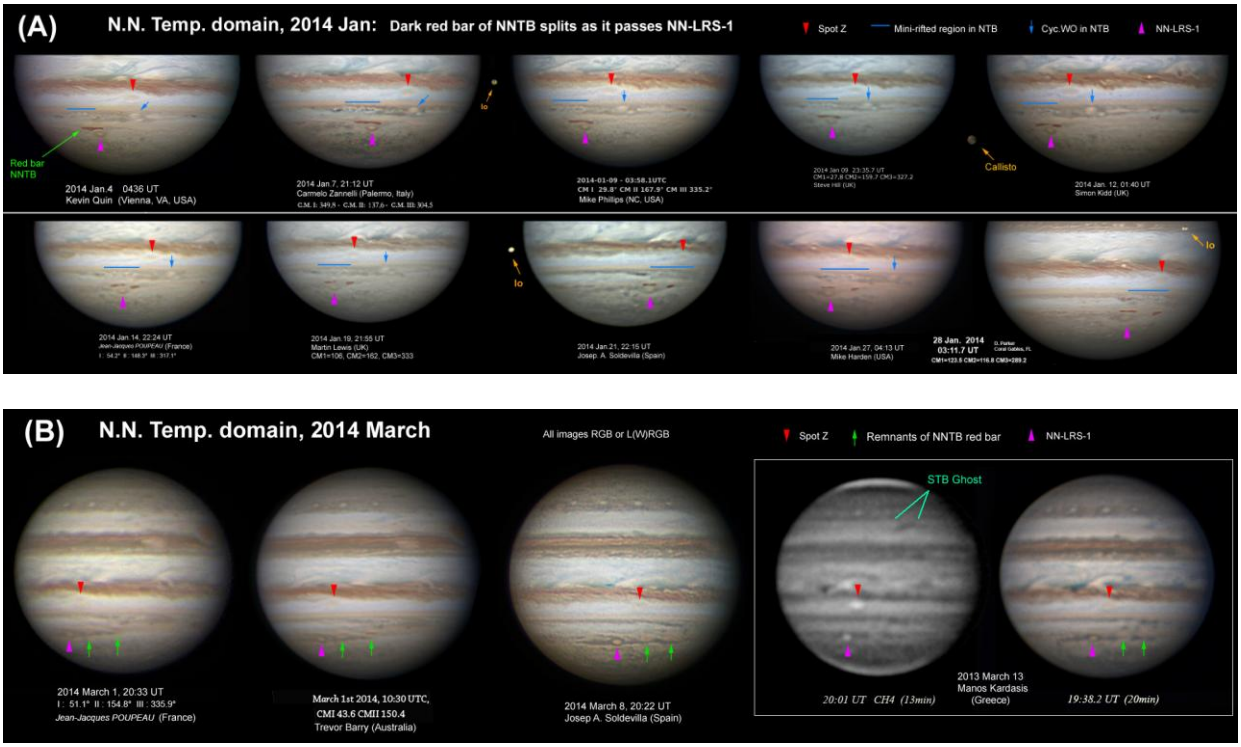


Figure 10. Two long-lived anticyclonic ovals which are now reddish, in the NTropZ (Spot Z) and the NNTZ (NN-LRS-1). Both are strongly methane-bright. The images also show sectors 1-3 of the disturbed N.Temp. domain.
(A) 2014 Jan. Spot Z is reddish-grey. NN-LRS-1 is orange with a dark grey rim. A dark red-brown NNTB bar splits in two as it drifts past NN-LRS-1, as it is disrupted by the anticyclonic circulation of the oval.
(This is just a small selection of the available views, which include good images by C. Go, J. Phillips, K. Quin, C. Zannelli, P. Lazzarotti, M. Jacquesson, J-J. Poupeau, D. Parker, D. Peach. P. Edwards, S. Hill, M. Phillips, S. Kidd, J. Soldevilla, M. Kardasis, T. Barry, M. Harden, and E. Morales Rivera.)
(B) 2014 March. Spot Z is very light reddish or pink, difficult to discern in visible light, but still very bright in a methane image. NN-LRS-1 may also be lighter with paler orange colour internally. It still has a dark grey rim which has expanded into a long NNTB(N), enveloping the fading remnants of the red-brown bar which split in Jan. (green arrows).

Figure 11 *(next page).*
Maps of the northern hemisphere north of the mid-NEB, showing the disturbed sectors of the N.Temp. domain. Blue bars overlie the mini-rifted sectors of NTB. NNTBs jet spots are marked by symbols below: * (older spot), + (newer spot).

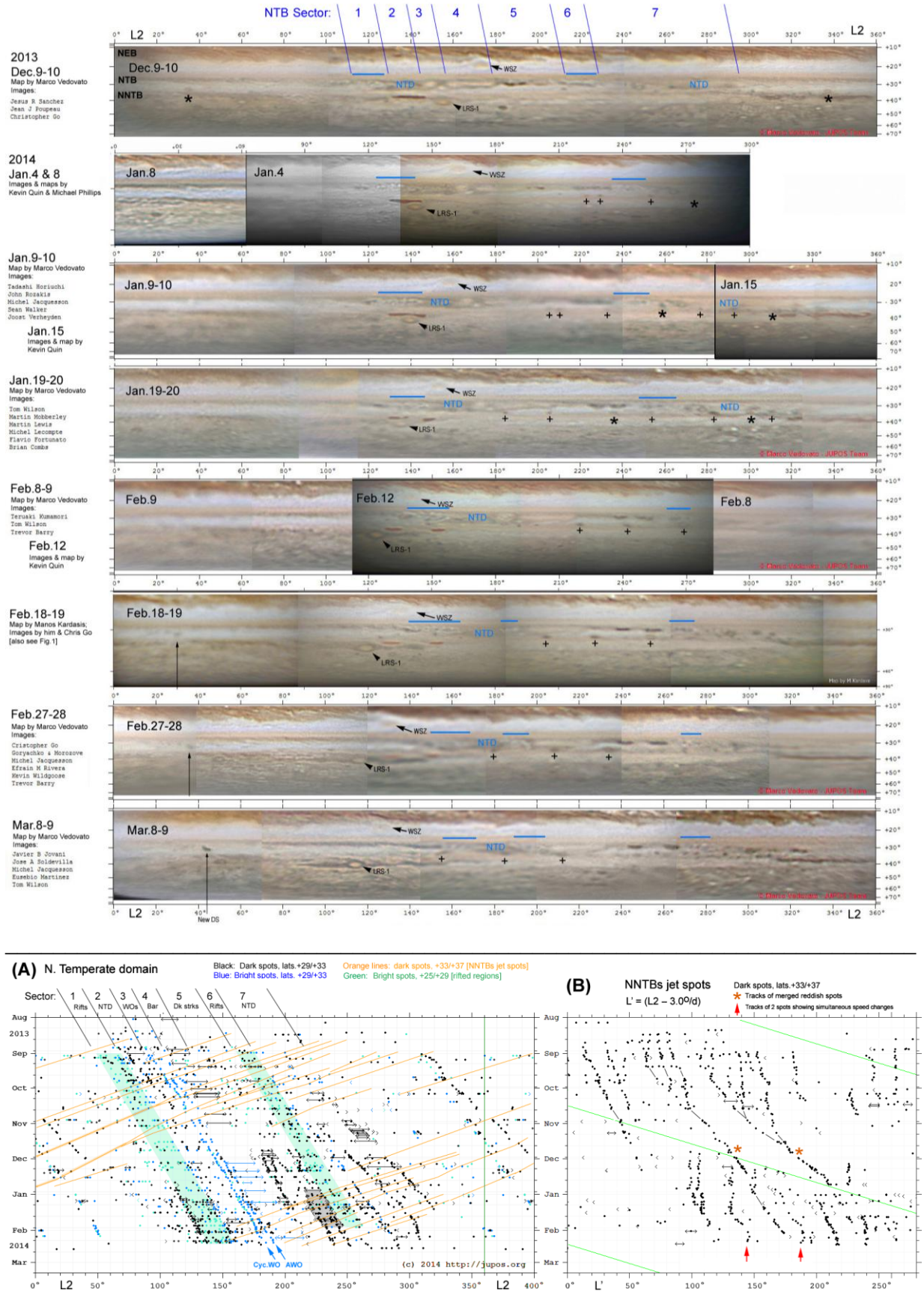


Figure 12. JUPOS charts. (A) N.Temperate domain, as annotated.
(B) NNTBs jet spots, in longitude system moving at DL2 = -3.0 deg/day.

Figure 13. Origin of the new mini-rifted region in the NTB and very dark spot in NTZ (in orange box). The orange box also partly encloses the mini-rifted region in the NNTB, which may be the ultimate origin of the NNTBs jet spots. (A version with north up is also available.)