[Final version, 2015 March 16]

JUPITER IN 2005 AND 2006

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using results from the JUPOS team (Hans-Joerg Mettig, Gianluigi Adamoli, Michel Jacquesson, Marco Vedovato, Grischa Hahn)

IV. NORTHERN HEMISPHERE

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FIGURE LEGENDS & MINIATURES (continued)

IV. NORTHERN HEMISPHERE

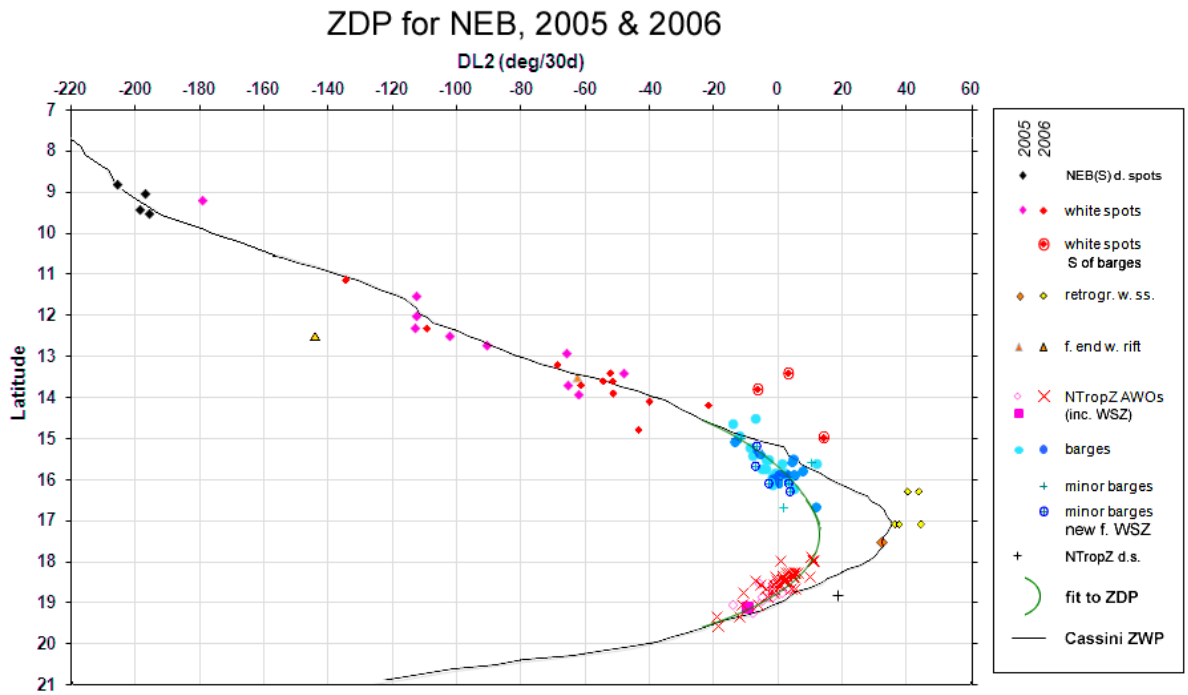


Fig.32: ZDP for NEB and NTropZ, 2005 and 2006.

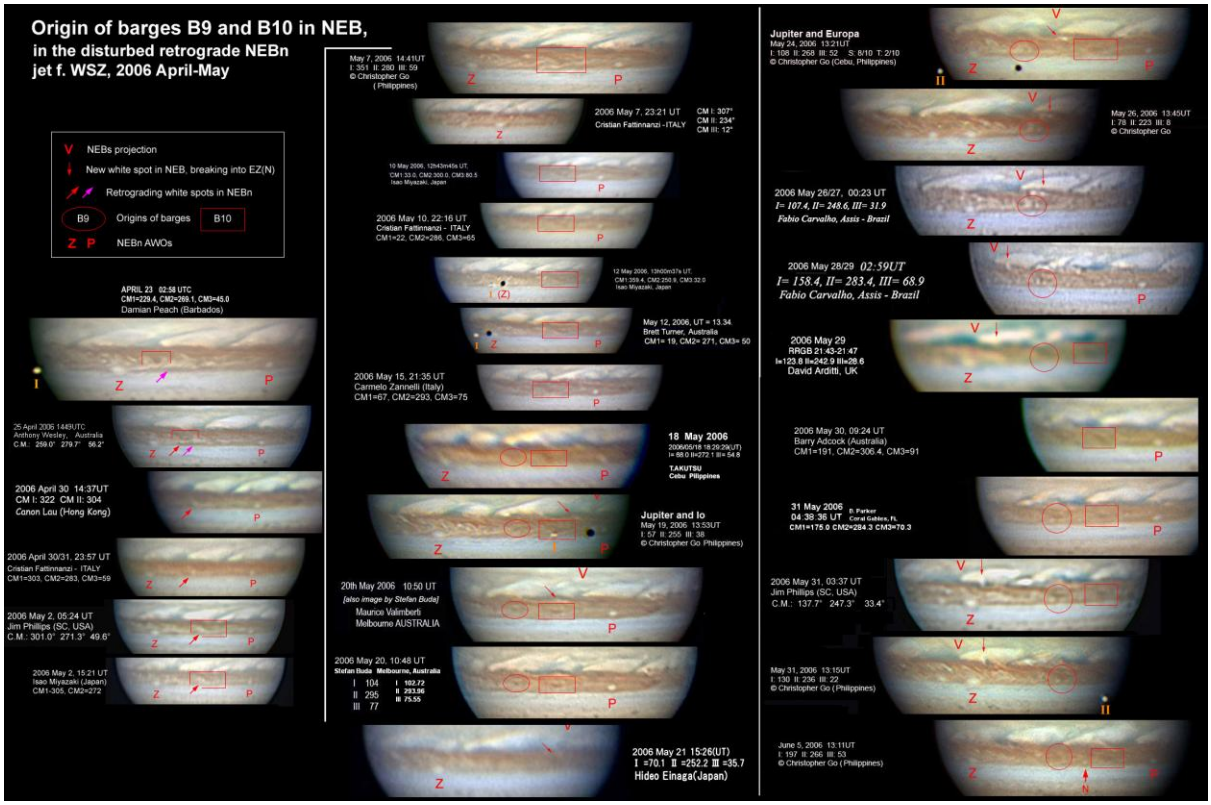
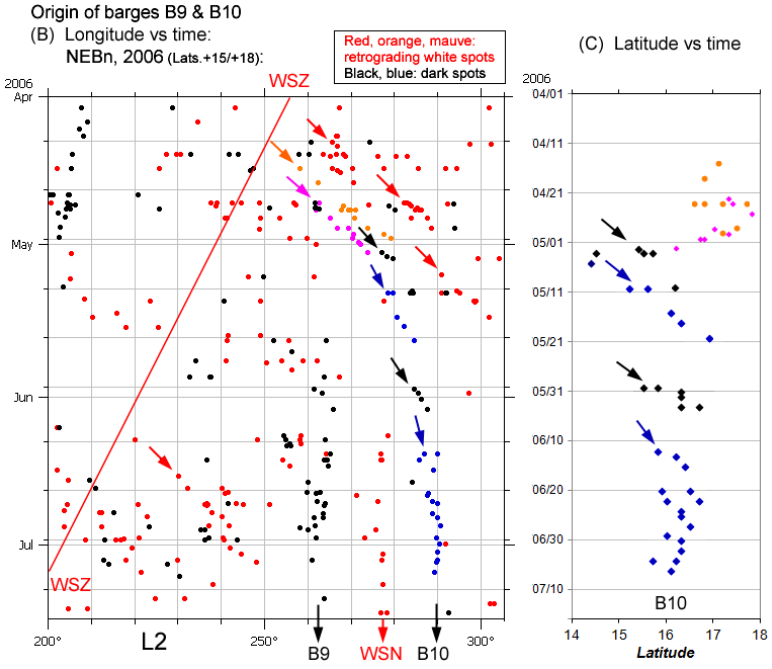


Fig.33: NEBn, 2006: Origin of barges B9 & B10.
(A) Images showing WSZ and its 'wake' with the incipient barges enclosed in an ellipse (B9) and a box (B10).



(B) Enlargement from the JUPOS chart: longitude vs time. Barges B9 and B10 arise near the f. end of the retrograding 'wake' f. white spot Z. Note how B10 is seen first as a dark spot retrograding between two white spots in the 'wake', and then as a succession of similar dark spots at the same longitude, eventually stabilising as the barge.
(C) Latitude vs time for incipient barge B10 and the preceding white spots, aligned with (B).

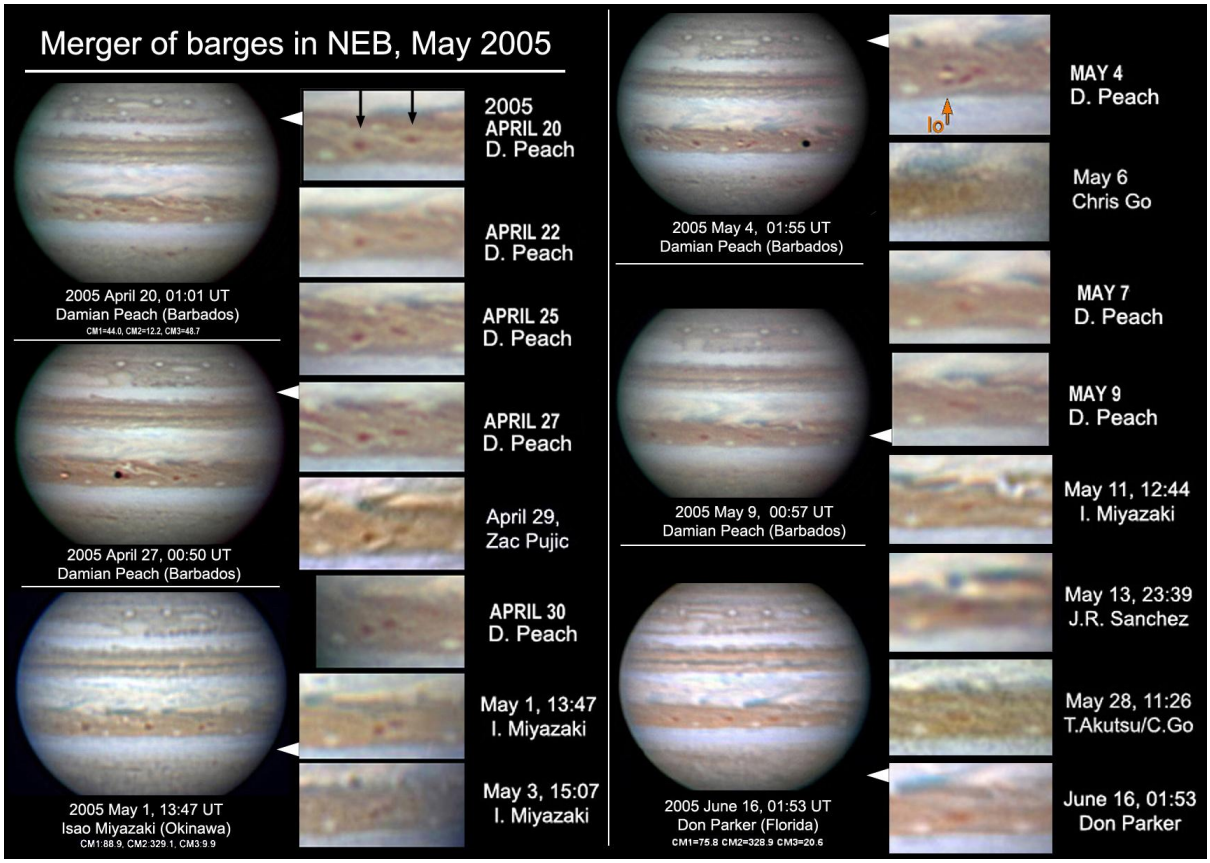
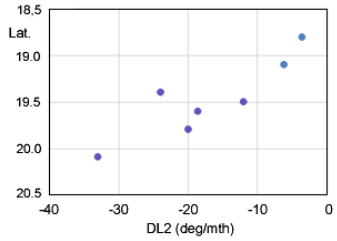


Fig.34: NEBn, 2005: Merger of two barges. (The pair before merger are shown in Fig.13.)
[A version of this compilation was published in Ref.11, and Peach made an animation of the merger from his images.]

Collision of white ovals Y and Z on NEBn, 2006 June-July: Speed vs latitude

	2006	DL2	Lat.	SD	N
WSY	March-May	-6.3	19.1	0.54	78
	June	-3.6	18.8	0.51	49
(conjunction June 27-29)					
WSZ	Feb-May	-18.6	19.6	0.39	87
	June 1-24	-12	19.5	0.41	43
	June 25-29	-33	20.1	0.55	13
	July 1-6	-20	19.8	0.67	6
	July 13-30	-24	19.4	0.40	19
(WSZ, July 6-13, appeared multiple)					
WSY'	June 29, July 1		18.2	0.47	3



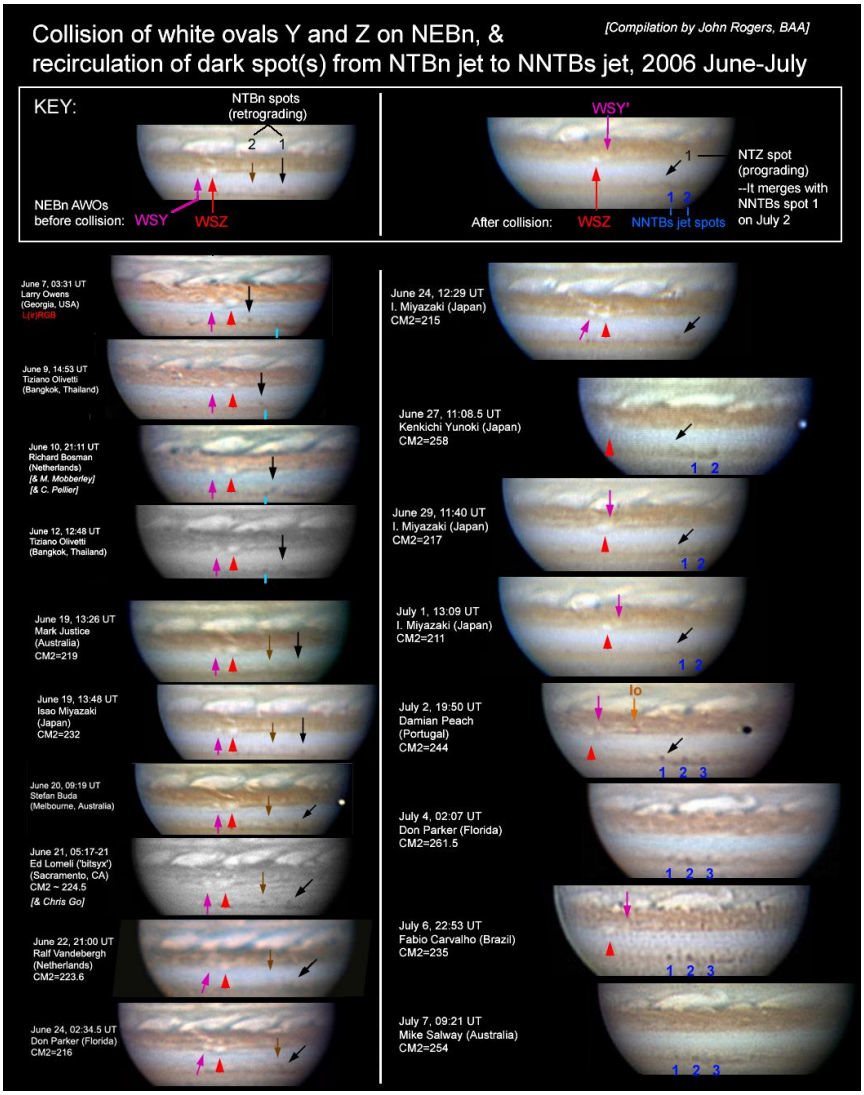


Fig.35: NEBn, 2006 June-July: Collision of white ovals Y and Z.
(A) Speed and latitude of each AWO are tabulated and plotted, showing that both ovals obeyed a typical ZDP during the encounter.
(B) Images of the event. *[A fuller image set was posted in Ref.5 no.10.] (Also see Fig.23).*
The images also show recirculation of small dark spot(s) from NTBn to the NNTBs jet. Dark spots in the NNTBs (N2) jet are marked in blue.
The aftermath of the encounter was not well observed, because in the first 3 weeks of July, the Australian observers were all clouded out, while the Philippines were ravaged by 3 typhoons. However, occasional hi-res images showed WS-Z double on July 1-6, and triple on July 11.

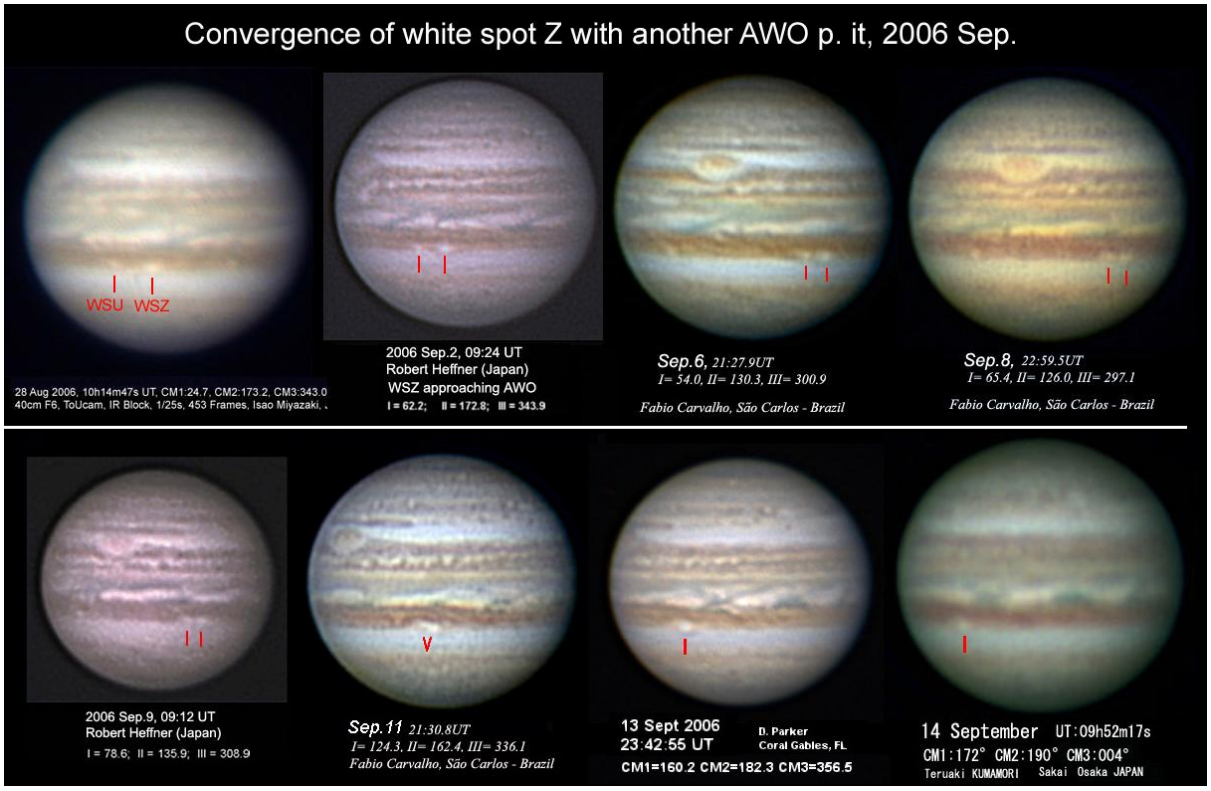


Fig.36: NEBn, 2006 Sep: Convergence of white ovals U and Z. The event proceeded as in the previous figure up to Sep.13, when the ovals were unresolved in contact, but no hi-res images were obtained in subsequent days.

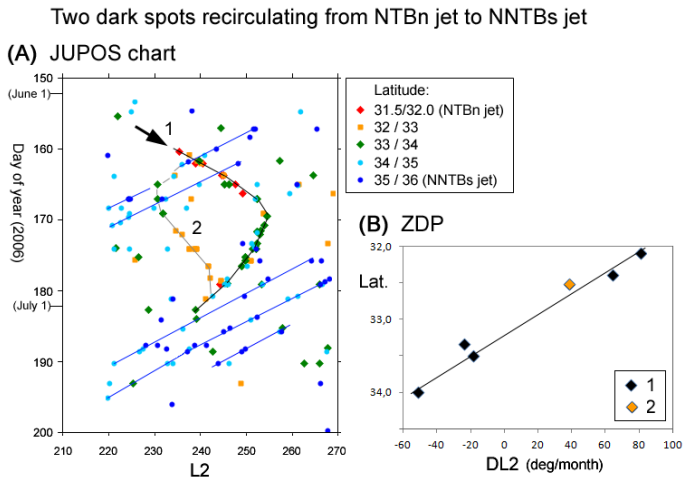


Fig.37: Charts of the two small dark spots recirculating from NTBn jet to NNTBs jet, 2006.
(A) Enlargement from JUPOS chart, dark spots, colour-coded by latitude.
(B) ZDP for the recirculating spots. (For spot 1, this shows overlapping track segments independently analysed by G.A. and J.H.R.)

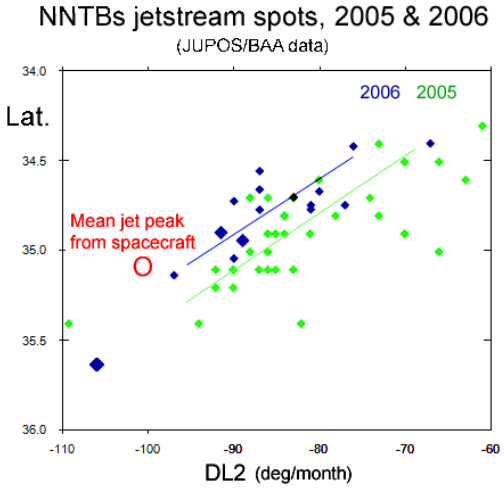


Fig.38: ZDP for N2 (NNTBs) jet spots. Larger symbols in 2006 are for groups of spots.

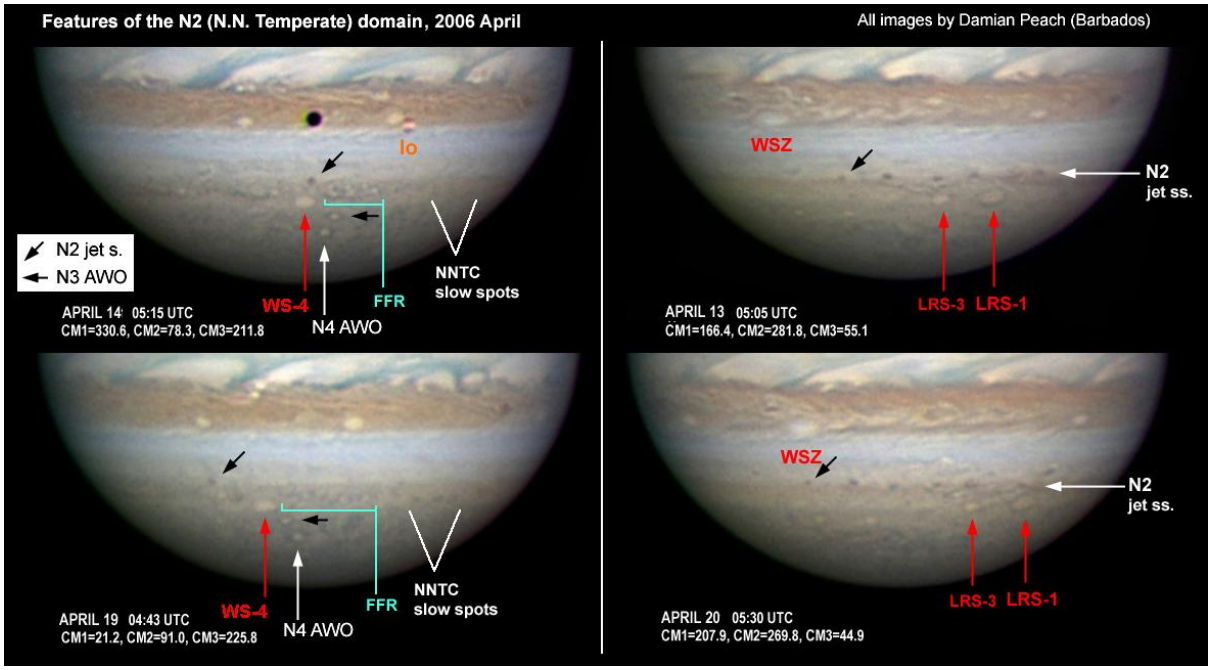


Fig.39: Hi-res images of the major features in the N2 (N.N.Temperate) domain, and spots further north, 2006 April. Two examples of N2 (NNTBs) jet spots are arrowed.
(Also see Figs.8 & 14 for NN-LRS-1.)
(Left) In the N2 domain, the region of origin of the retrograding spots at 40 deg.N; there appears to be a 'folded filamentary region' (FFR) here, only just resolved, abutting WS-4. Just N of WS-4 is a small AWO prograding in the N^3TC (not well tracked, but similar to later spots with DL2 ~ -22 at 46ºN). Just N of that is a small AWO retrograding in the N^4TC.
(Right) The fawn-coloured NTZ contains vague grey wisps, and a chain of 6 N2 jet spots is prograding on its N edge. In the N2 domain, the two Little Red Spots. Alongside them there is much turbulence in the NNTB latitudes.

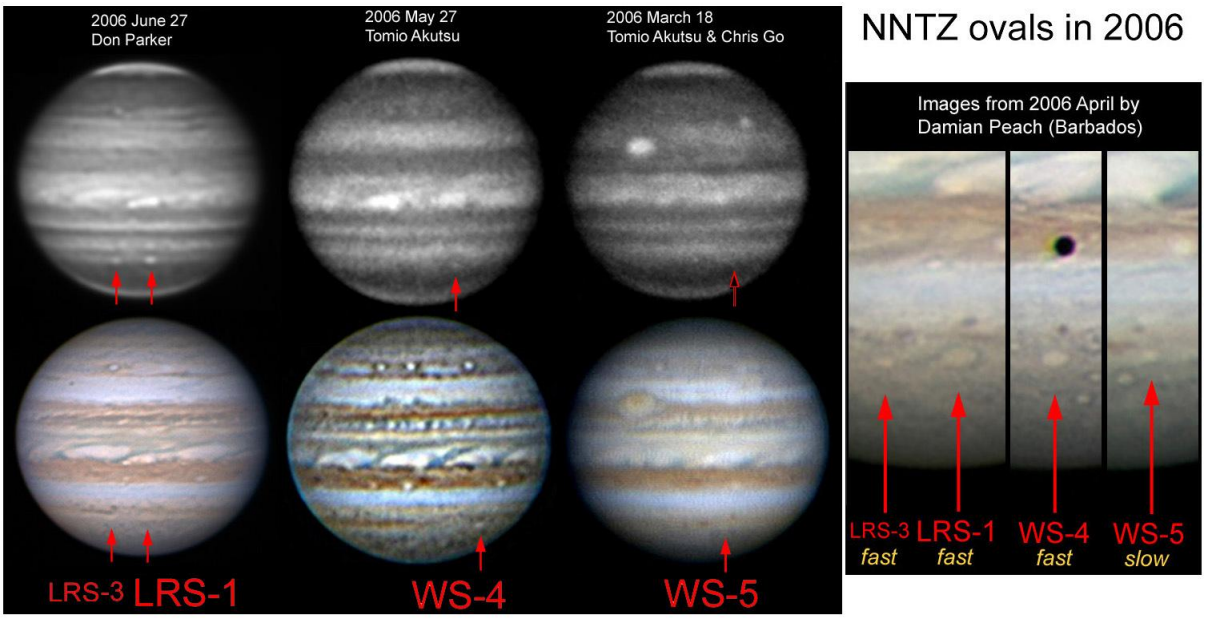


Fig.40: The long-lived NNTZ ovals in 2006: (Left) Colour and methane-band images; (Right), hi-res colour images. *[This was Fig.S4 from Ref.14]* . Note that LRS-3 is visibly methane-bright in spite of its small size; WS-5, about the same size, is not methane-bright.

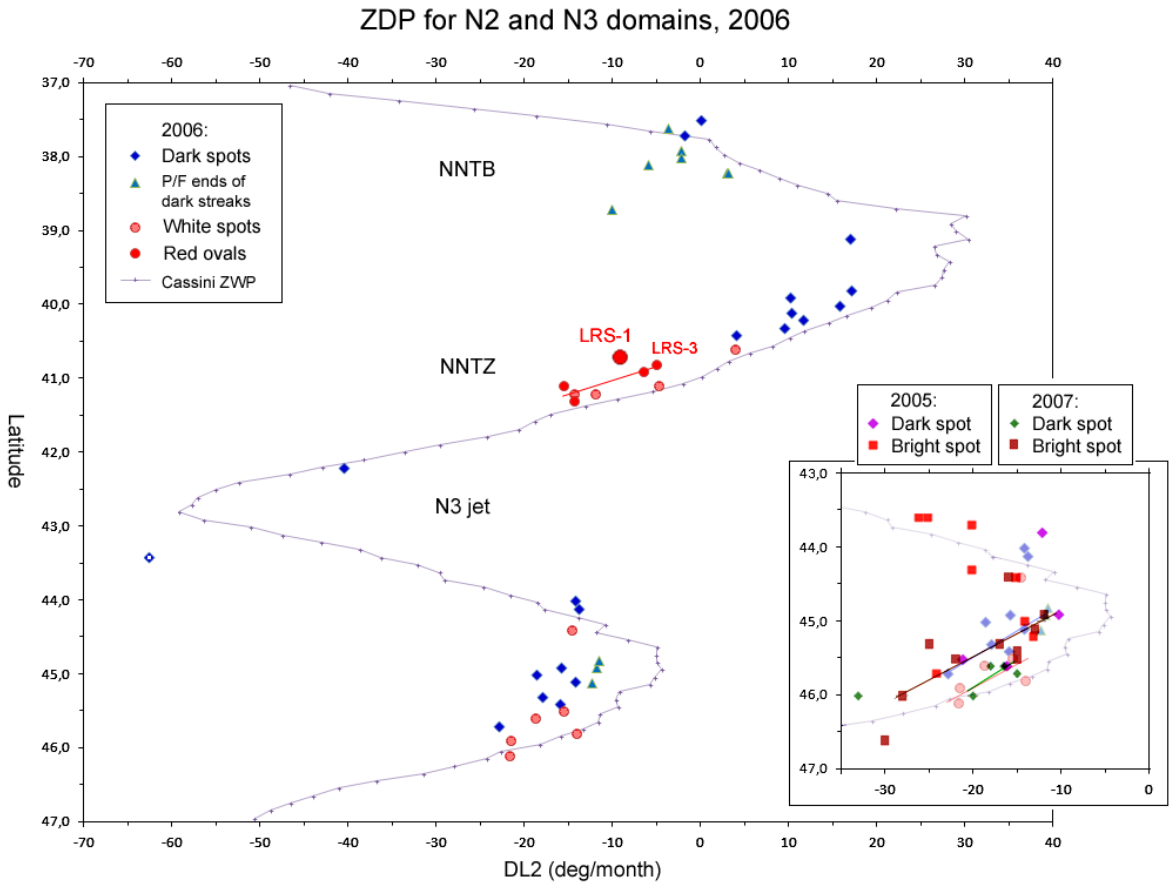
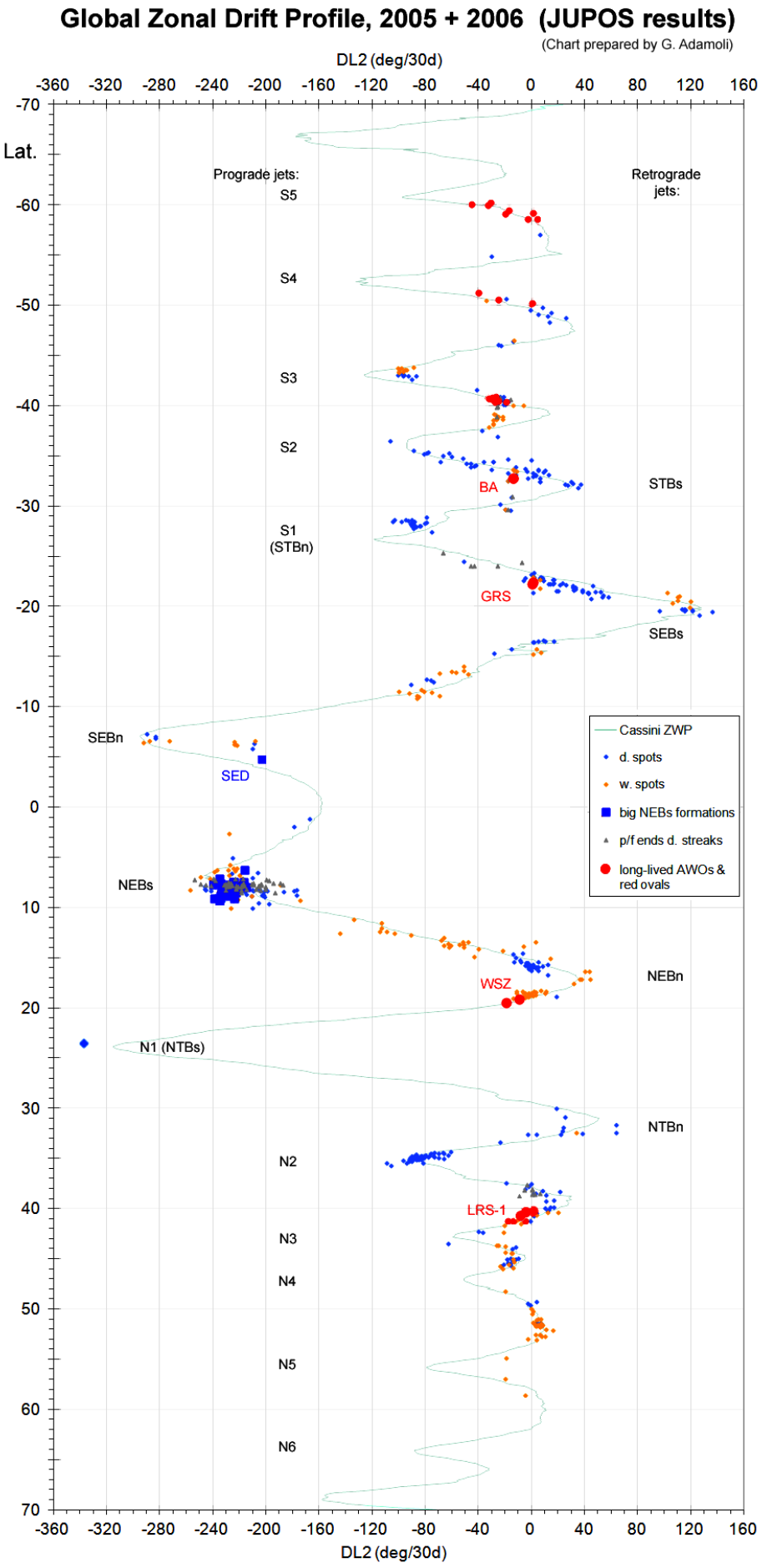


Fig.41: ZDP for N2 and N3 domains, 2006. *Inset:* ZDP for N3 domain in 2005 and 2007, superimposed on the 2006 chart.

Fig.42: Global ZDP. The ZWP from Cassini [Ref.33] is shown for comparison.



V. IMAGES OF THE GALILEAN MOONS, 2006

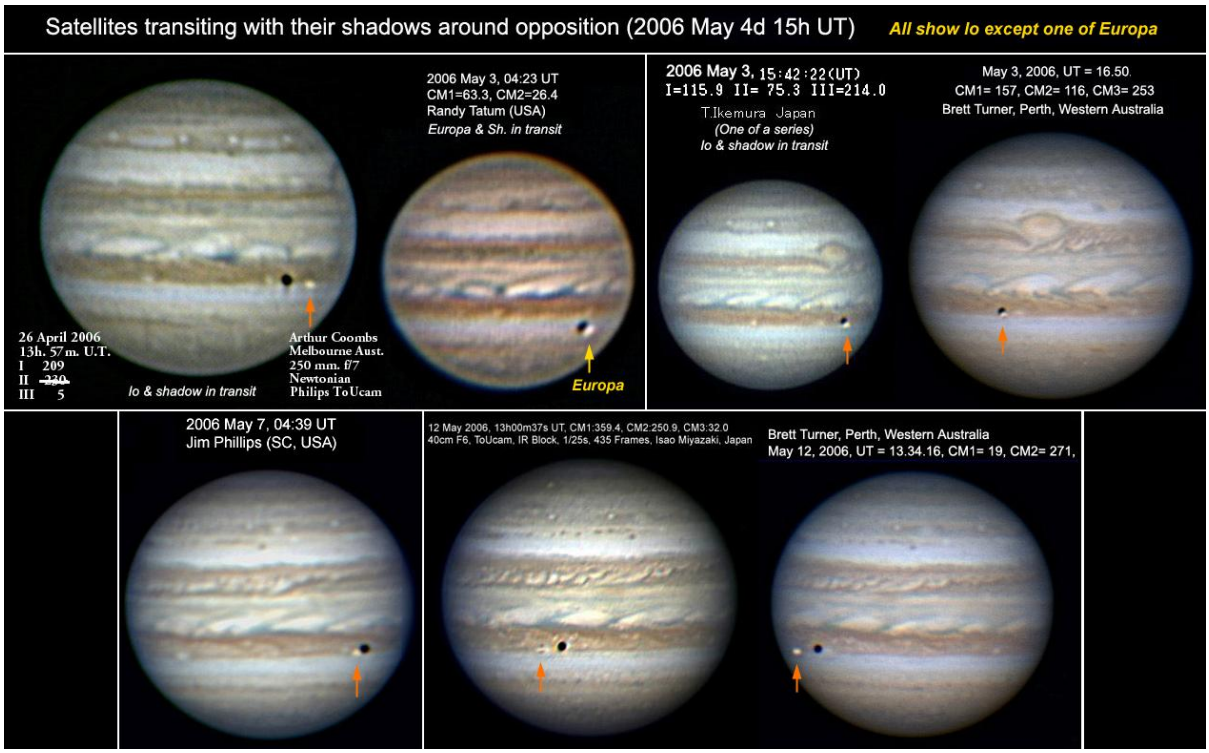


Fig.43: Transits of Io on its shadow near opposition in 2006 (and one of Europa). (For the same in 2005, see Fig.4).

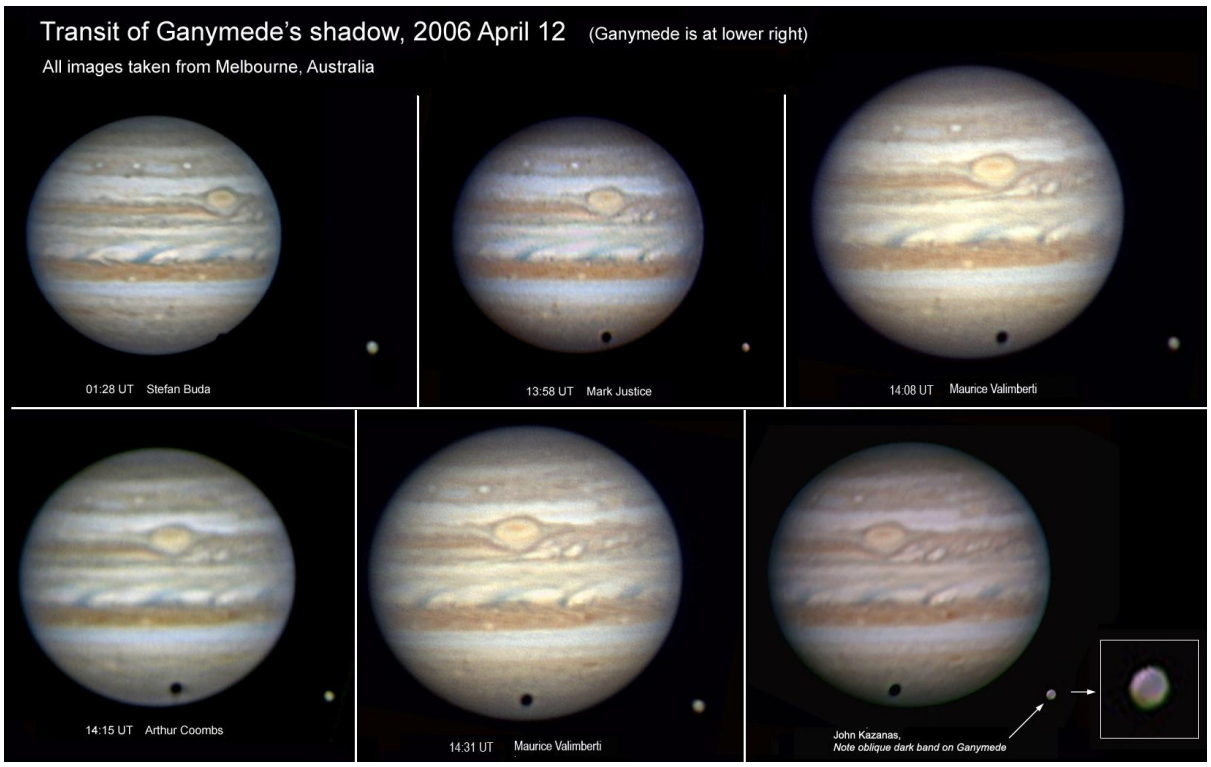


Fig.44: Transit of Ganymede's shadow over Jupiter's north polar region on 2006 April 12. The oblique dark band on Ganymede is the dark areas, Marius Regio and Galileo Regio (Fig.46).

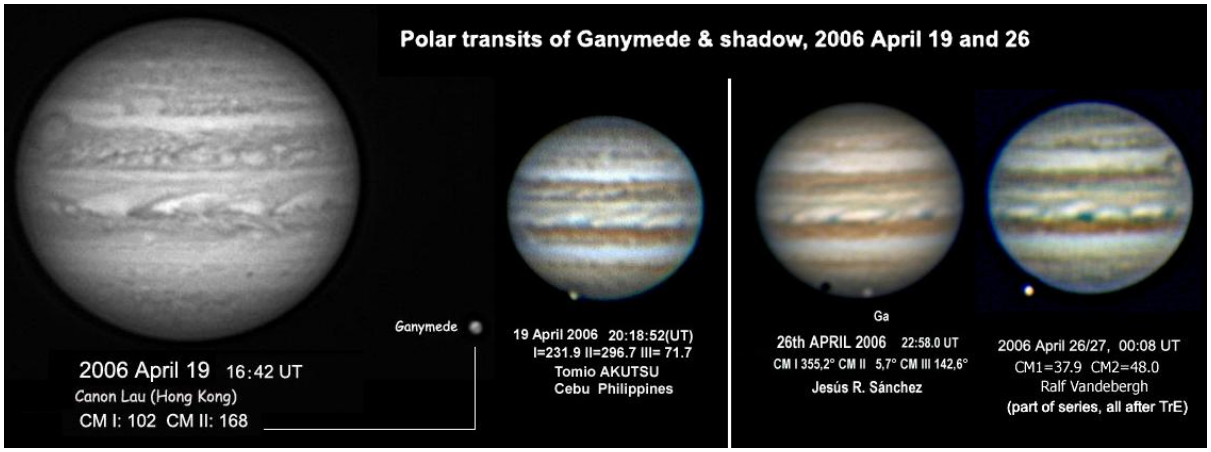


Fig.45: Transits of Ganymede over Jupiter's north polar region on 2006 April 19 and 26.

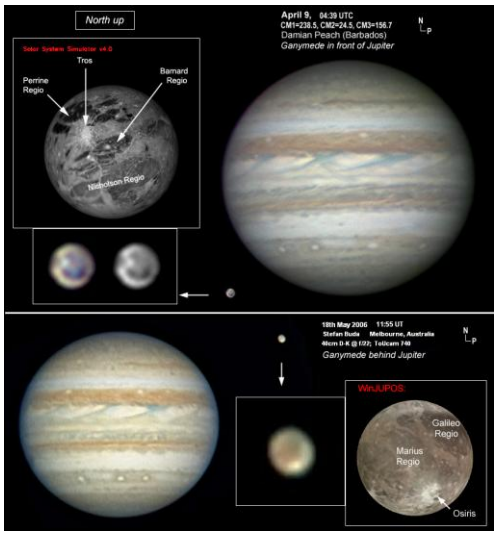


Fig.46: Hi-res images of Ganymede off the disk, showing dark regions and crater ray systems, with simulations from spacecraft maps for comparison. *(North is up, unlike other images.)*

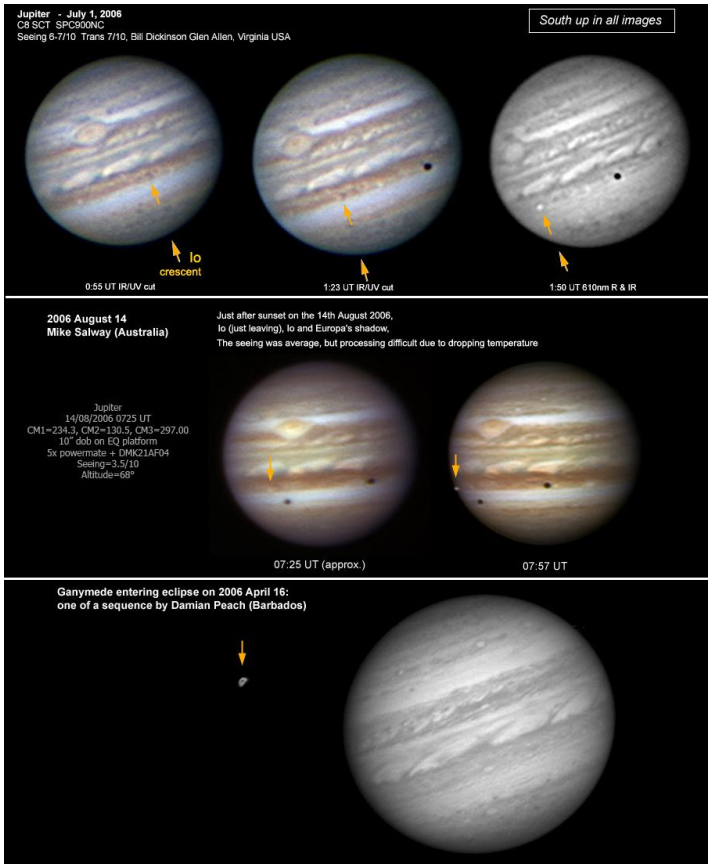


Fig.47: Some more shadow phenomena of the satellites:
(A) Io appearing as a crescent in transit due to the phase (Dickinson);
(B) Double shadow transit with Io (Salway);
(C) Ganymede bisected as it enters eclipse (Peach).

Chart J10

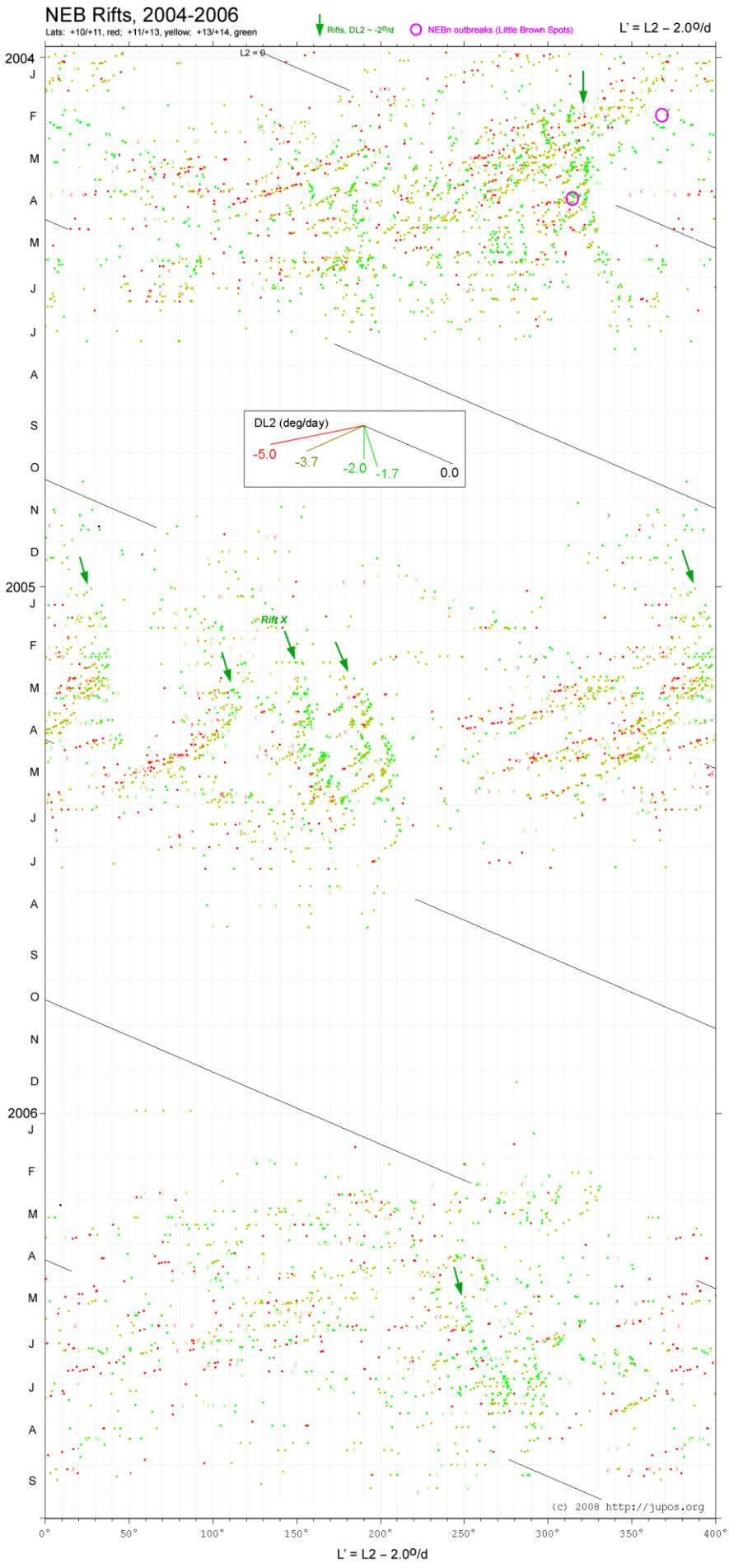

NEB Rifts, 2004-2006
Lats: +10/+11, red; +11/+13, yellow; +13/+14, green
Rifts, DL2 ~ -2°/d
NEBn outbreaks (Little Brown Spots)
L' = L2 – 2.0°/d
L2 = 0
DL2 (deg/day)
-5.0
-3.7
-2.0
-1.7
0.0
Rift X
2004
2005
2006
J F M A M J J A S O N D
0° 50° 100° 150° 200° 250° 300° 350° 400°
L' = L2 – 2.0°/d
(c) 2008 http://jupos.org

Chart J11

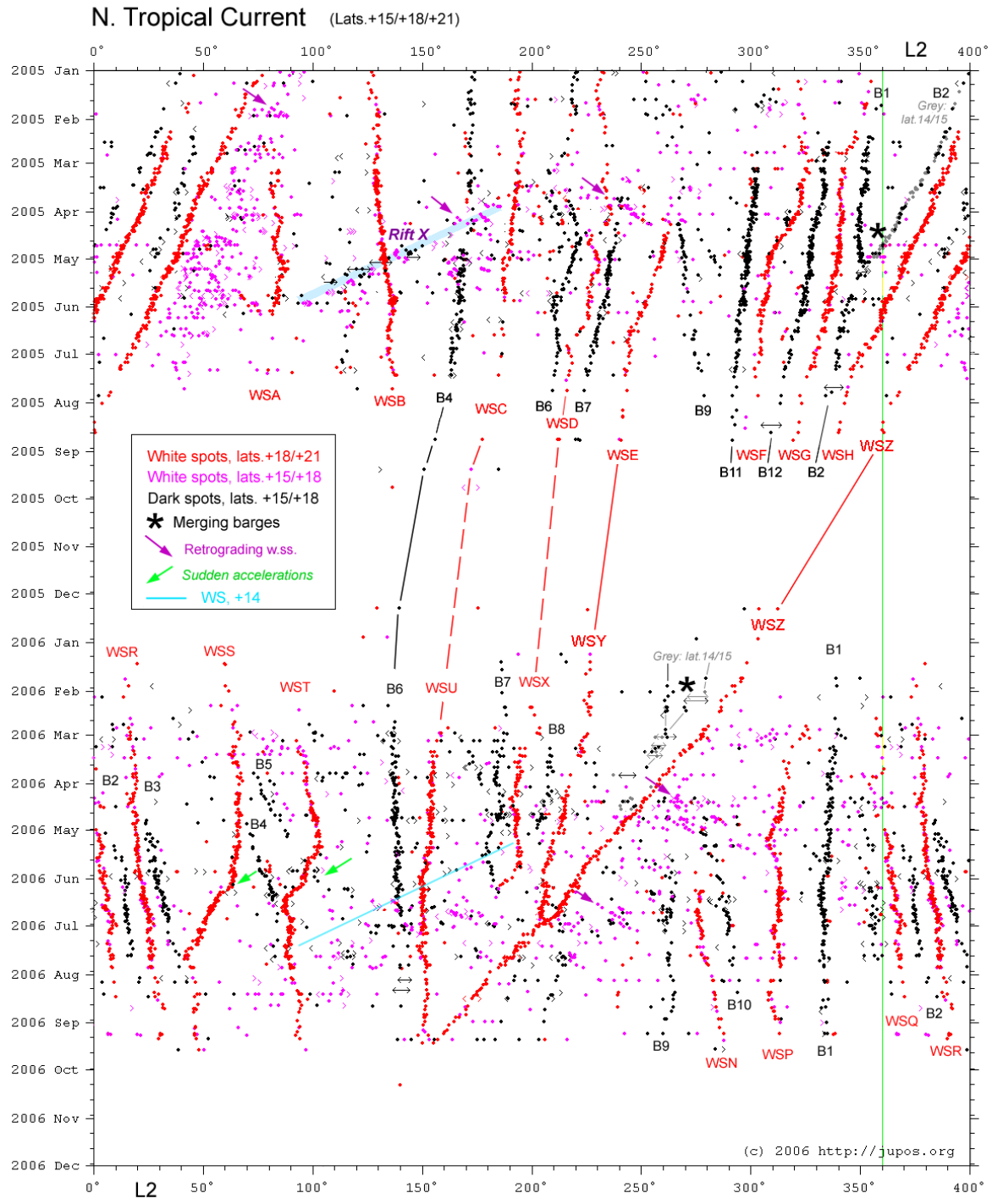

N. Tropical Current (Lats.+15/+18/+21)
0° 50° 100° 150° 200° 250° 300° 350° L2 400°
2005 Jan
2005 Feb
2005 Mar
2005 Apr
2005 May
2005 Jun
2005 Jul
2005 Aug
2005 Sep
2005 Oct
2005 Nov
2005 Dec
2006 Jan
2006 Feb
2006 Mar
2006 Apr
2006 May
2006 Jun
2006 Jul
2006 Aug
2006 Sep
2006 Oct
2006 Nov
2006 Dec
White spots, lats.+18/+21
White spots, lats.+15/+18
Dark spots, lats. +15/+18
Merging barges
Retrograding w.ss.
Sudden accelerations
WS, +14
Rift X
WSA
WSB
WSC
WSD
WSE
WSF
WSG
WSH
WSZ
WSR
WSS
WST
WSU
WSX
WSY
WSQ
WSP
WSN
B1
B2
B3
B4
B5
B6
B7
B8
B9
B10
B11
B12
Grey: lat.14/15
(c) 2006 http://jupos.org

Chart J12

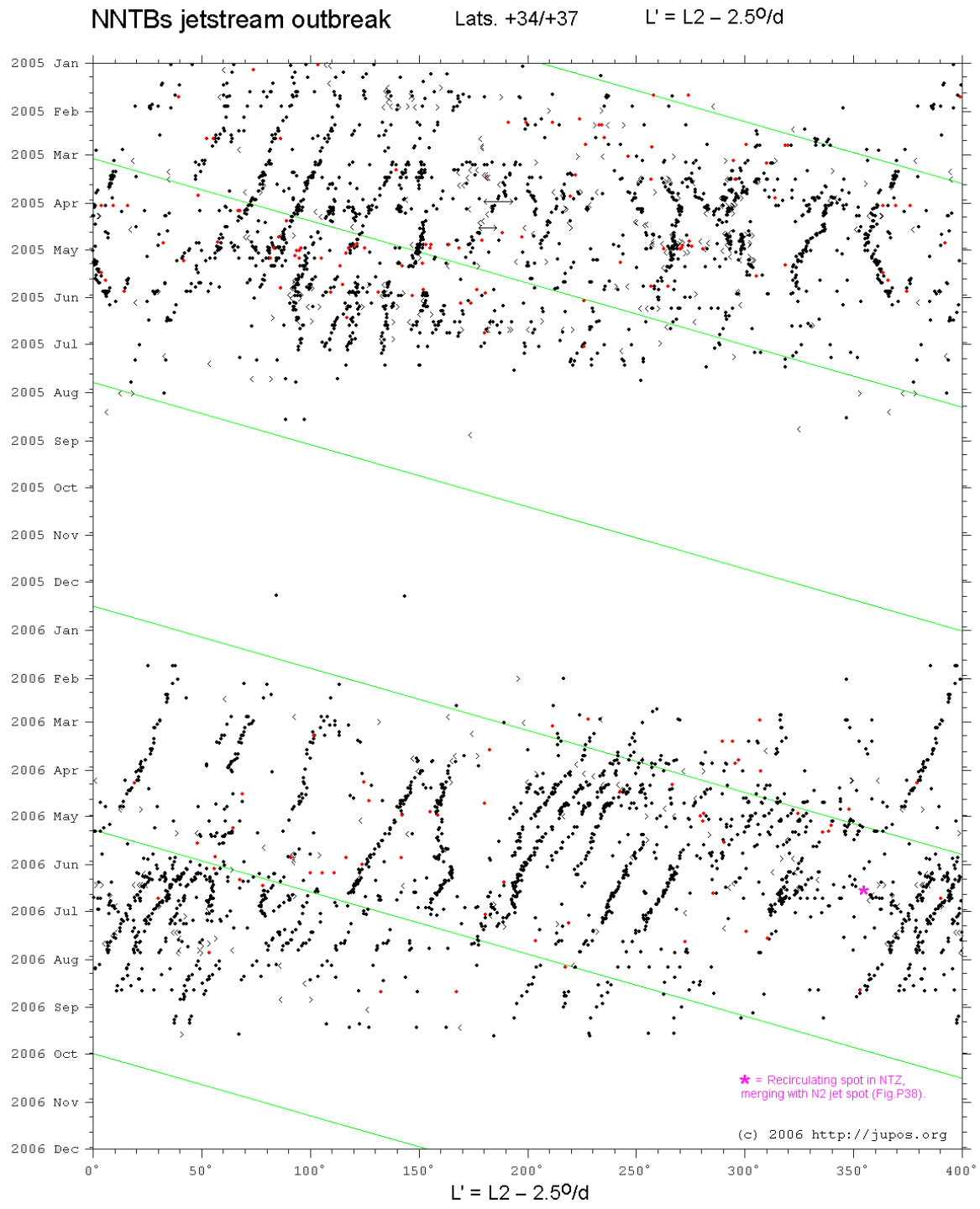

NNTBs jetstream outbreak
Lats. +34/+37
L' = L2 – 2.5°/d
2005 Jan
2005 Feb
2005 Mar
2005 Apr
2005 May
2005 Jun
2005 Jul
2005 Aug
2005 Sep
2005 Oct
2005 Nov
2005 Dec
2006 Jan
2006 Feb
2006 Mar
2006 Apr
2006 May
2006 Jun
2006 Jul
2006 Aug
2006 Sep
2006 Oct
2006 Nov
2006 Dec
0°
50°
100°
150°
200°
250°
300°
350°
400°
L' = L2 – 2.5°/d
* = Recirculating spot in NTZ, merging with N2 jet spot (Fig.P38).
(c) 2006 http://jupos.org

Chart J13

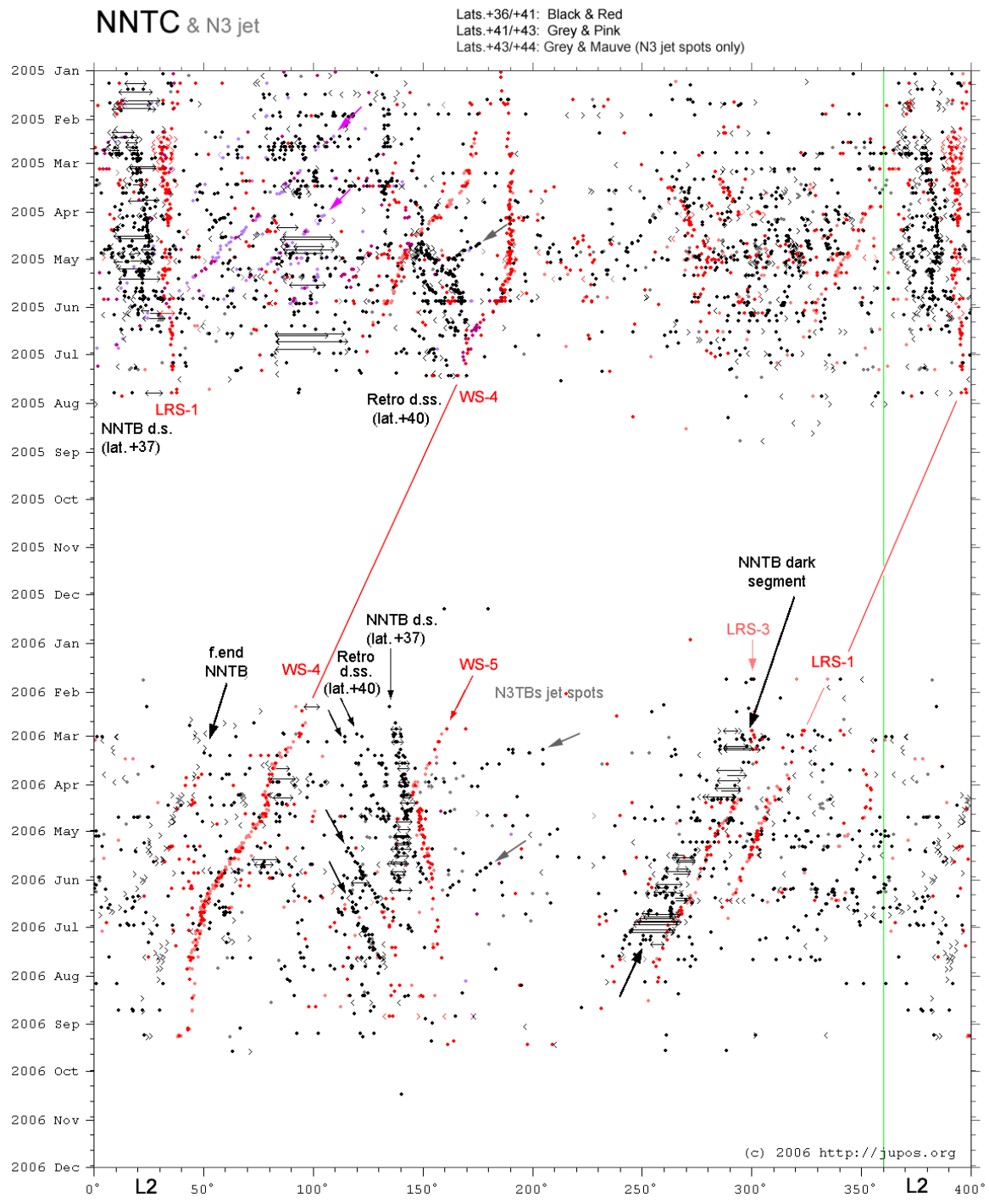

NNTC & N3 jet
Lats.+36/+41: Black & Red
Lats.+41/+43: Grey & Pink
Lats.+43/+44: Grey & Mauve (N3 jet spots only)
2005 Jan
2005 Feb
2005 Mar
2005 Apr
2005 May
2005 Jun
2005 Jul
2005 Aug
2005 Sep
2005 Oct
2005 Nov
2005 Dec
2006 Jan
2006 Feb
2006 Mar
2006 Apr
2006 May
2006 Jun
2006 Jul
2006 Aug
2006 Sep
2006 Oct
2006 Nov
2006 Dec
LRS-1
NNTB d.s.
(lat.+37)
Retro d.ss.
(lat.+40)
WS-4
f.end
NNTB
WS-4
Retro
d.ss.
(lat.+40)
NNTB d.s.
(lat.+37)
WS-5
N3TBs jet-spots
NNTB dark
segment
LRS-3
LRS-1
(c) 2006 http://jupos.org
0°
L2
50°
100°
150°
200°
250°
300°
350°
L2
400°

Chart J14

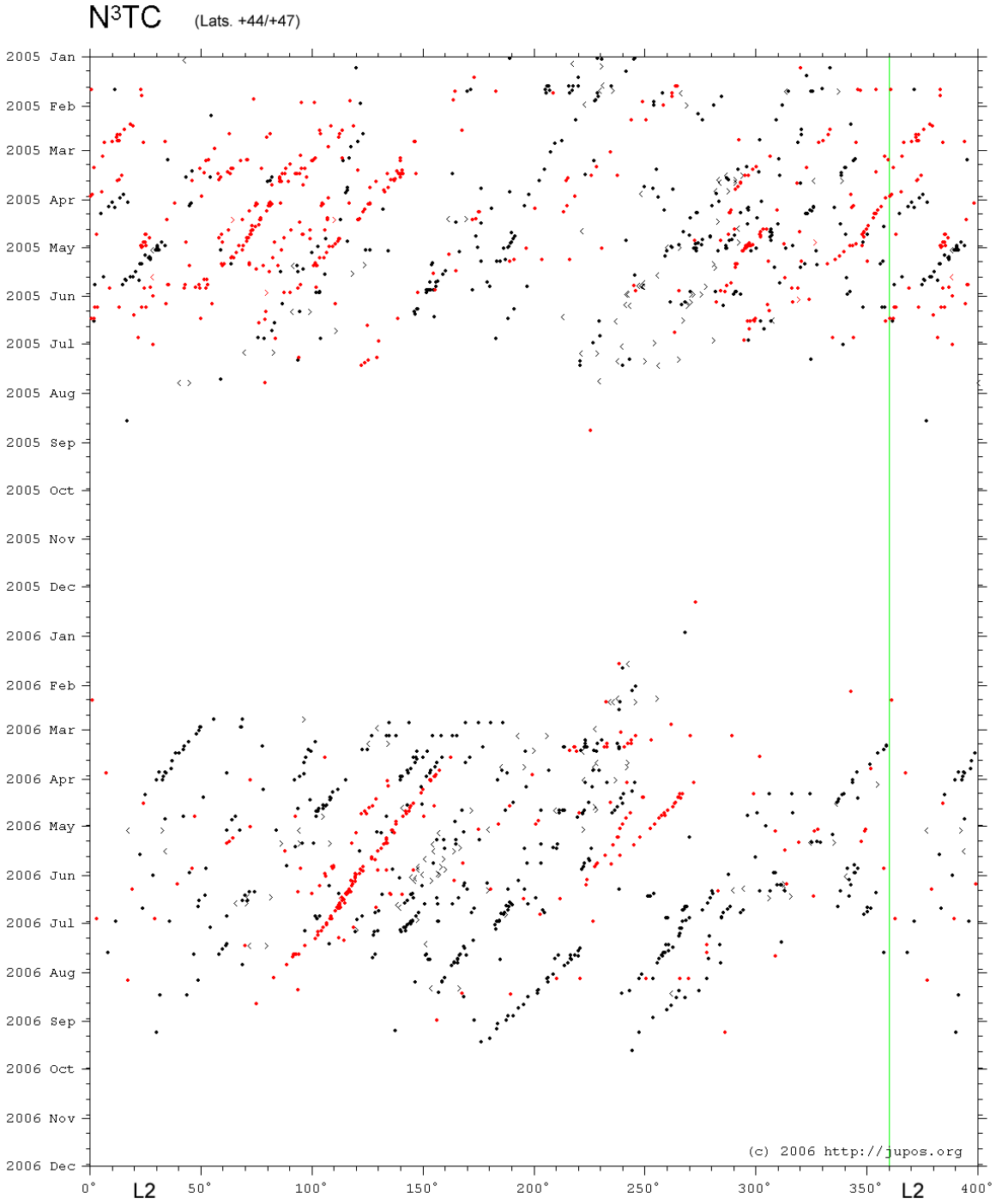
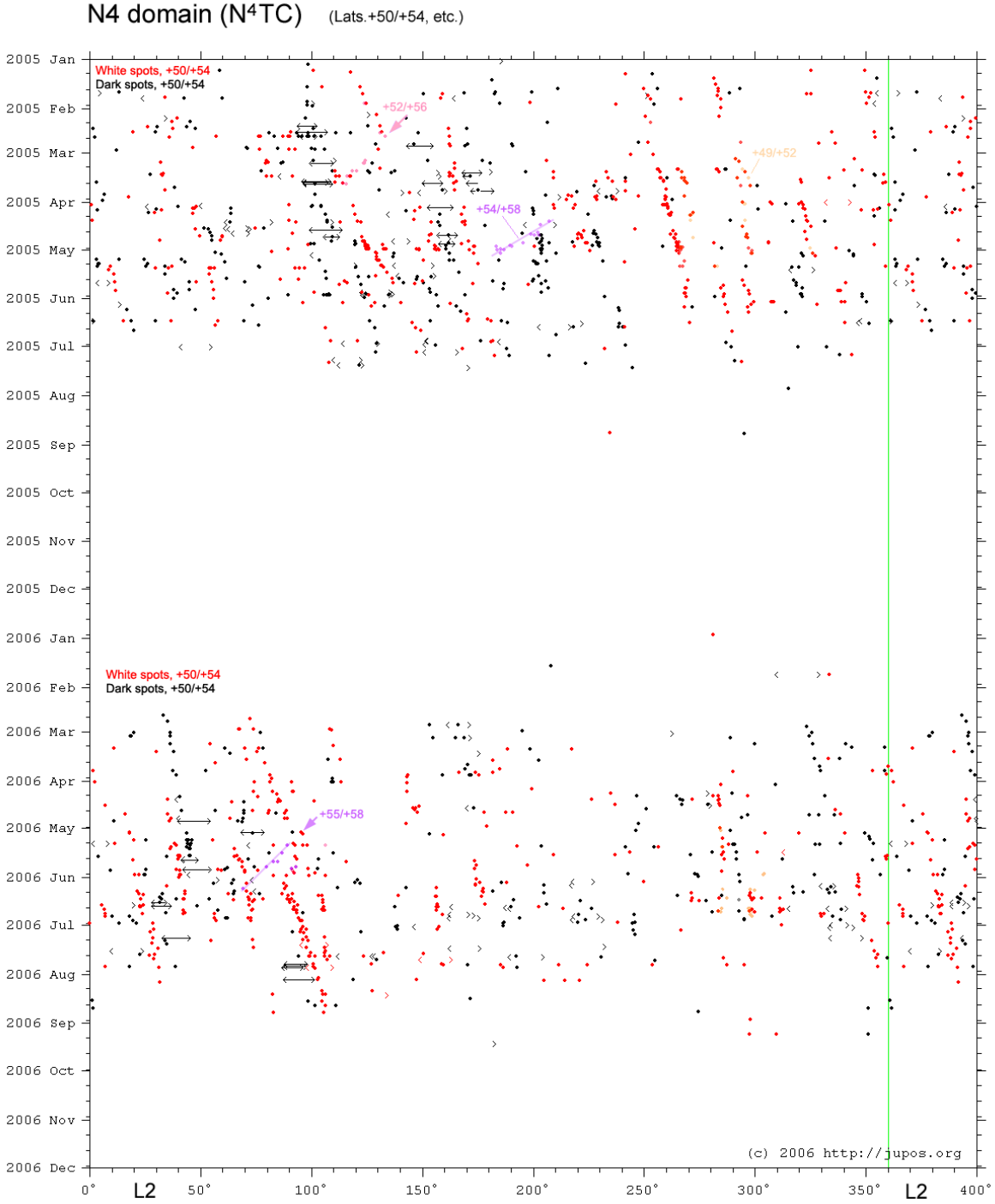

N3TC
(Lats. +44/+47)
2005 Jan
2005 Feb
2005 Mar
2005 Apr
2005 May
2005 Jun
2005 Jul
2005 Aug
2005 Sep
2005 Oct
2005 Nov
2005 Dec
2006 Jan
2006 Feb
2006 Mar
2006 Apr
2006 May
2006 Jun
2006 Jul
2006 Aug
2006 Sep
2006 Oct
2006 Nov
2006 Dec
0°
L2
50°
100°
150°
200°
250°
300°
350°
L2
400°
(c) 2006 http://jupos.org

Chart J15


N4 domain (N⁴TC) (Lats.+50/+54, etc.)
White spots, +50/+54
Dark spots, +50/+54
+52/+56
+49/+52
+54/+58
White spots, +50/+54
Dark spots, +50/+54
+55/+58
2005 Jan
2005 Feb
2005 Mar
2005 Apr
2005 May
2005 Jun
2005 Jul
2005 Aug
2005 Sep
2005 Oct
2005 Nov
2005 Dec
2006 Jan
2006 Feb
2006 Mar
2006 Apr
2006 May
2006 Jun
2006 Jul
2006 Aug
2006 Sep
2006 Oct
2006 Nov
2006 Dec
0° L2 50° 100° 150° 200° 250° 300° 350° L2 400°
(c) 2006 http://jupos.org

2005 longitudes & drifts - N. hemisphere

Table 7

L2(O) = L2 at opposition on 2005 April 3 unless other date is given.
Dates are for measured track segments, not total life.
N = number of spots measured (number of track segments may be larger).

Current	*Description*	*Name*	*Lat.*	*L2(0)*	*DL2 (deg/30d)*	*Dates / N*	*Notes*
NIC	***(fast w. spots)***		**12.2**	**<--- mean -->**	**-106.8**	(N=5)	
(mid-NEB)			0.47	<---SD --->	9.9		
	(slower w. spots)		**13.5**	**<--- mean -->**	**-60.5**	**(N=4)**	
			0.43	<---SD --->	8.5		
NTropC - barges	d. spot	B1	15.8	351	-1	Feb 12 - May 7	(Faster before Feb.)
	d. spot	B2	14.9	8	-12	Jan 2 - May 4	(Slower before Jan.)
	d. spot	B1/B2	15.7	356	-5	May 11 - Jul 27	Result of merging B1 & B2
	d. spot	B3	15.2	35	-9	Feb 25 - May 24	
	d. spot	B4	16.1	170	-2	Nov 21 - Jul 14	Slightly oscillating motion
	d. spot	B6	15.4/16,2	219	+5/-8	Mar 18 - Jul 24	Irregular oscillating track
	d. spot	B7	15.5	240	-4	Mar 23 - Jul 24	
	d. spot	B9	16.0	267	3	Apr 8 - Jul 27	
	d. spot	B11	15.9	301	-2	Feb 22 - Aug 25	
	d. spot	B12	15.7	331	-4	Feb 15 - Aug 20	
			15.6	**<--- mean -->**	**-2.8**	(N=13)	
			0.48	<---SD --->	6.2	(Mean includes minor spots & track segments not listed here)	
NEBn jet	w. spot		17.5	248	+32	Mar 28 - Apr 9	
	d. spot		18.8	156	+19	May 7 - 22	
NTropC - AWOs	AWO	WS-A	18.9	93	-5	May 7 - Jun 5	Oscillations before May (P ~ 1 mth, 2 cycles)
	AWO	WS-B	18.6	130	+2	Jan 22 - Jun 1	Oscillations before & after
	AWO	WS-C	18.8	192	-3	Feb 23 - Apr 21	Slight oscillations before
	AWO	WS-D	18.6	230	(-2)	Nov 24 - Aug 24	Irreg. motion, large oscillations
	AWO	WS-E	19.2	266	-8	Apr 7 - Jun 21	Probably = 2006 WS-Y
			18.6	251	-2	Jun 25 - Aug 25	
	AWO	WS-F	18.5	324	0	Jan 8 - Mar 27	
			19.0	321	-14	Apr 1 - 29	
			18.8	311	-2	May 4 - Jul 27	
	AWO	WS-G	18.6	341	-2 to -6	Jan 8 - Aug 1	
	AWO	WS-H	19.0	20	-10	Dec 26 - Jun 2	Slightly oscillating thereafter
			18.7	**<--- mean -->**	**-3.8**	(N=8)	
			0.21	<---SD --->	4.6	(excluding WSZ)	
	AWO	WS-Z	19.1	45.3	-9.7	Nov 24 - Aug 20	
N1 (NTBs) jet	faint d.ss.		**23.5**	**<--- mean -->**	**-337**	(N=5)	*(published in 'Icarus')*
			0.32	**<---SD --->**	2		
NTC	faint d.ss.		**31.5**	**<--- mean --->**	**22.6**	(N=5)	
			1.07	<--- SD --->	2.3		
NTBn jet	dark spot		31,6	(163)	64	Apr 11 - 23	Decel. from DL2~+75 to ~0
N2 (NNTBs) jet	dark spots		**34.9**	**<--- mean --->**	**-82.1**	(N=27)	
			0.28	<--- SD --->	9.9		
NNTC	NNTB d. spots/streaks		**38.5**	**<--- mean --->**	**4.4**	(N=9)	
			0.59	<--- SD --->	10.2		
	AWO	LRS-1	40.3	40.6	-5.0	Nov 13 - Feb 7	
		LRS-1	40.2	33.5	0.7	Feb 7 - Jul 25	
	AWO	WS-4	40.5	189.7	0.8	Dec 9 - May 10	
		WS-4	41.2	178.6	-17.7	May 27 - Jun 23	
	w. spot	WS-(d)	41.6	157	-21	Mar 12 - Apr 21	
	w. spot	WS-(d)	41.4	140	-8	Apr 21 - Jun 5	
	w. spot	WS-(2005b)	40.3	289	12	Mar 6 - Apr 2	
	w. spot	WS-(2005c)	40.3	284	20	Apr 19 - May 20	
			40.9	**<--- mean --->**	**1.0**	(N=4)	
			0.70	<--- SD --->	18.5		
N3 jet	d. spot		42.3	176 (Apr 21)	-37	Apr 21 - May 1	
N3TC	(w. spots)		**44.4**	**<--- mean --->**	**-19.6**	(N=6)	
			0.80	<--- SD --->	5.2		
	(d. spots)		**45.0**	**<--- mean --->**	**-14.8**	(N=4)	
			0.83	<--- SD --->	4.9		
N4 jet?	w. spot		48.2	7 (Mar 31)	-20	Mar 31 - Apr 12	
N4TC	(d. spots)		**49.4**	**<--- mean --->**	**1.5**	(N=2)	
			0.28	<--- SD --->	3.5		
	(w. spots)		**52.0**	**<--- mean --->**	**6.1**	(N=8)	
			0.68	<--- SD --->	5.1		
(N4TC?)	w. spot		54.8	124 (Mar 5)	-19	Mar 5 - 21	

2006 longitudes and drifts: N. hemisphere

Table 8

Current	*Description*	*Spot no.*	*Lat.*	*L2(0) (May 4)*	*DL2 (deg/30d)*	*Dates*	*Notes*
NEB	w. spot		13.9	(202)	-45	May -Jul	Slightly oscillating motion
NTropC	dark spots	B1	16.0	335	-1	Jan - Sep	
(NEBn barges)		B2	15.9	9	4	May - Aug	
		B3	15.9	25	5	Apr - Jul	
		B4	15.8	72	8	Apr - Jun	
		B5	16.7	89	12	Mar - May	
		B6	15.9	138	1	Feb - Jun	
		B7	15.4	180	+5 to -13	Jan - Jun	Slightly oscillating motion
		B8	15.6	202	+0 --> -6	Mar - Apr	
		B9	16.2	266	~ 0	May - Aug	Slightly oscillating motion
		B10	16.1	283.1	3.4	May - Aug	
		Mean	**16.0**		**1.5**	**(N=10)**	
		SD	0.35		6.5		
NEBn jet		**Mean**	**16.8**		**40.4**	**(N=5)**	
		SD	0.44		3.6		
NTropC	AWOs	N	18.2	277 (Jun 20)	+3 to +11	Jun - Sep	
(NTropZ AWOs)		P	18.3	309	+4 to -7	Apr - Sep	Oscillating motion
		Q	18.4	2	3	Feb - Aug	
		R	18.4	20	3	Jan - Sep	
		S	18.3	66	+2 to -11	Jan - Sep	Variable motion
		T	18.5	103	+10 to -11	Mar - Sep	Variable motion
		U	18.5	154	-5 to +1	Mar - Aug	*[Omitted short slow segments]*
		X	18.6	193	-4 to +2	Mar - May	
		Y	18.9	211	-6	Jan - Jun	Collided with Z at end of June
		Mean	**18.5**		**-0.3**	**(N=9)**	
		SD	0.21		6.8	(excluding WS-Z)	
	AWO	**Z**	19.4		-12	Dec-Feb	
			19.5	237	-18.7	Feb - Oct	Interaction with Y at end of June
NTBn jet	dark spot	ds1	32.1		75	Jun 5-15	
N2 (NNTBs) jet	Pair of d. spots		35.6		-106		
	Other d.spots:	**Mean**	**34.8**		**-84.2**	**(N=20)**	DL2 range -67 to -97
		SD	0.20		7.5		
NNTC	f. e. streak	#1	38.7	32	-10	Mar - Apr	
(NNTB streaks)	p. e. streak	#2	38.0	137	+3 --> -2	Feb - Jun	
	f. e. streak		38.1	144	+3 --> -2	Feb - May	
	p. e. streak	#3	37.6	~ 287 (Feb 25)	-4	Feb - Apr	
	f. e. streak	#4	38.1	37 (Jul 3)	-6	July	
		Mean	**38.1**		**-2.6**	**(N=5)**	
		SD	0.39		4.7		
NNTBn jet		**Mean**	**40.0**		**11.9**	**(N=8)**	
		SD	0.41		4.5		
NNTC	Oval	LRS-1	40.7	304	-9.2	Jan - Jun	
(NNTZ ovals)	AWO	WS-4	41.2	63	-14 to -5	Apr - Jul	Oscillating (irreg.)
	AWO	WS-5	41.2	152	-12	Feb - Apr	
			40.6	151	4	Apr - Jul	
	Oval	LRS-3	+40.8 to +41.3		-16 to -5	Apr - Jul	Oscillating (P ~ 2.3 mth)
		Mean	**41.0**		**-8.2**	**(N=4)**	
		SD	0.3		6.8		
N3 jet	d. spot	1	43.4	177 (Mar 21)	-63	Mar 21 - Apr 2	At peak of jet (few measures)
	d. spot	2	42.2	181 (May 21)	-40	May 21 - Jun 7	
N3TC	d..ss.	**Mean**	**45.2**		**-16.8**	**(N=7)**	*[Omitted one outlier]*
		SD	0.3		3.5		
	w.ss.	**Mean**	**45.7**		**-17.0**	**(N=3)**	*[Omitted one outlier]*
		SD	0.2		3.9		
N4TC		**Mean**	**51.3**		**4.3**	Dark spots (N=4) & white spots (N=17):	
		SD	0.8		3.4		
(N5TC?)	w. spot	(a)	56.9	89 (May 11)	-20	May 11 - 25	very few measures
	w. spot	(b)	58.5	113 (Mar 30)	-5	Mar 30 - Apr 21	very few measures