

Jupiter: Recent Developments and Trends

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Gordon College

Overview

- Introduction
- Oval BA and the GRS
- NEB width
- NEB ovals
- Photoelectric Photometry



JUPITER

February 27, 2006 19:37UT

CM1: 68 CM2: 162 CM3: 284

© Christopher Go (Cebu, Philippines)

Jupiter 23 April 2006



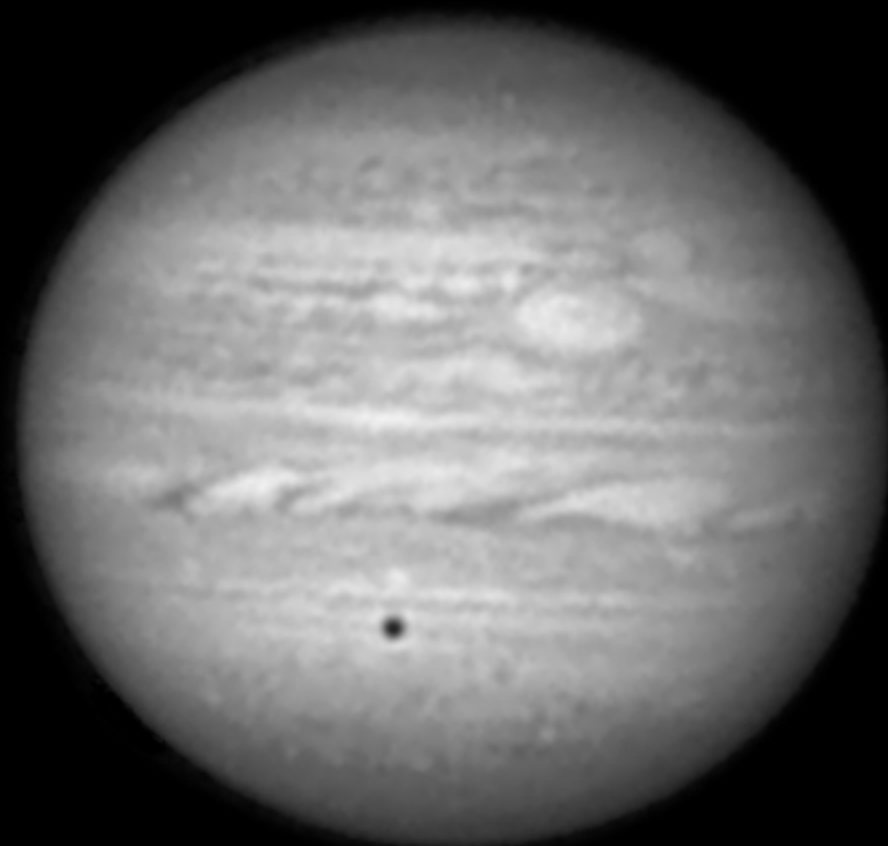
2006/04/23 19:45:24(UT)
l=123.7 ll=158.1 III=294.2
De= -3.6 E.Dia=44.39"
15fps AVI 90sec 1351frames
C-8 @=2 ToUcam II S=6/10 T=2/5

Tomio AKUTSU
Cebu Philippines

JUPITER 20060614 - H. 20:49 UT

Seeing: 5-6/10 Transparency: 3/5 Diam.: 42.3" Alt.: 32°

I: 097.6° II: 094.9° III: 244.9°



EUROPA

IR (715-1000 nm) band and 0,22 arcsec/pixel image (binning 2x2)
1500/4700 frames, 38 msec exposure, 200% resize
Lumenera Infinity 2-1M camera and Gladio 315 Lazzarotti Opt. scope
Paolo R. Lazzarotti, Massa, ITALY

1 - July - 2006

180 mm. MCT f/ 30 Toucam Pro (C & Monochrome) Jesús R. Sánchez

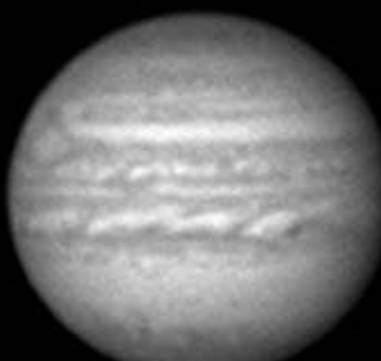
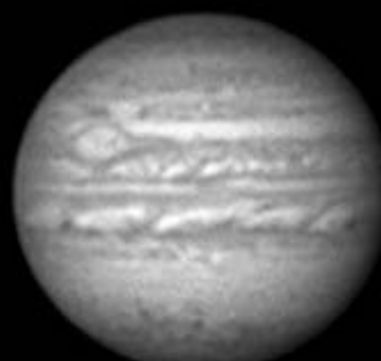


IRB

20:53 UT
CM I 263,8° CM II 131,4° CM III 285,9°

21:00 UT
CM I 268,1° CM II 135,7° CM III 290,1°

21:04.0 UT
CM I 270,5° CM II 138,1° CM III 292,6°



Red 23A

21:14 UT
CM I 276,6° CM II 144,1° CM III 298,6°

21:19 UT
CM I 279,7° CM II 147,1° CM III 301,6°

21:54 UT
CM I 301,0° CM II 168,3° CM III 322,8°

Oval BA

- White color during mid 2005 and earlier
- Dec. 2005: slight brownish color (Einaga)
- Jan. 8 2006: brown color (Einaga)

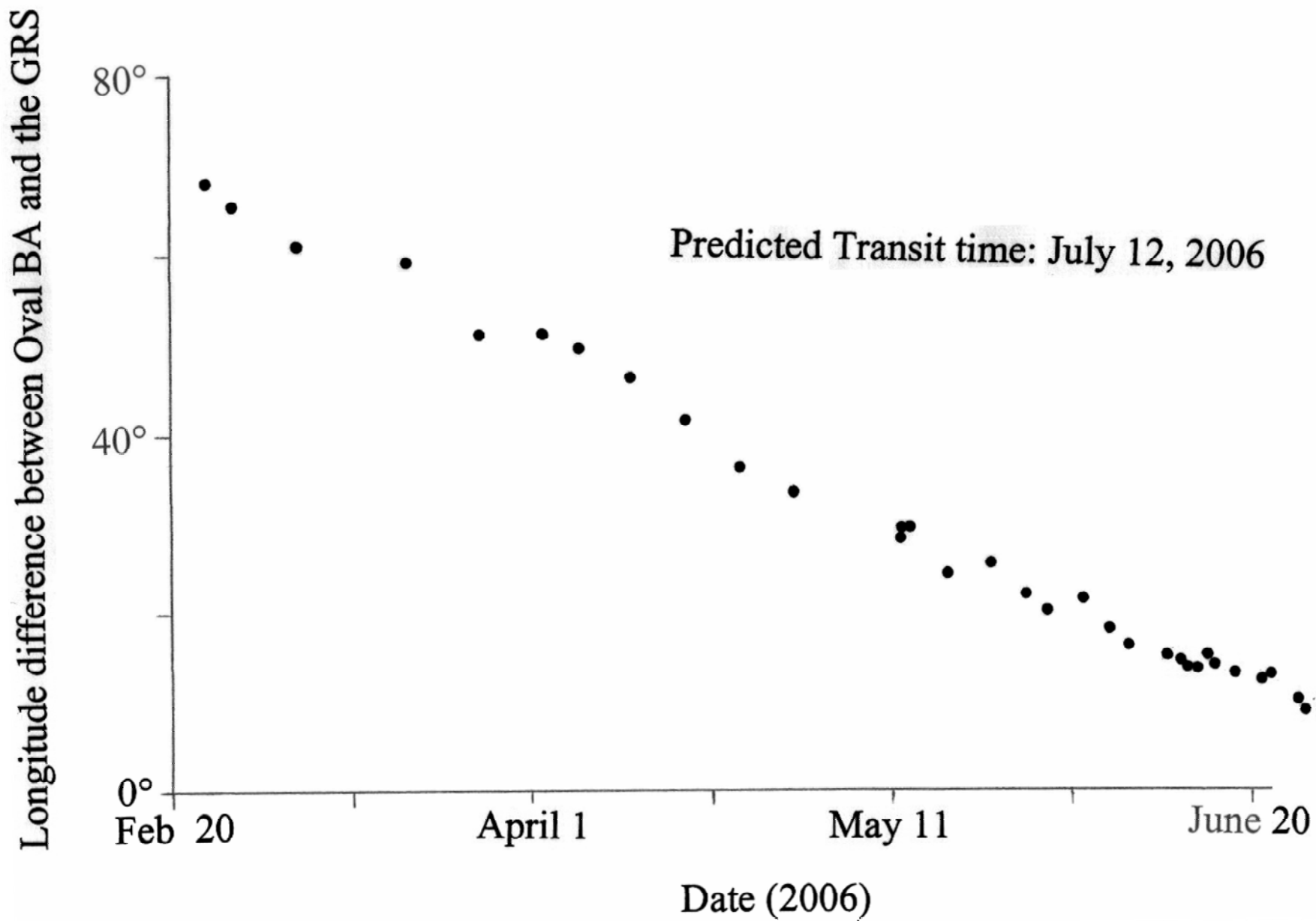
Oval BA

- Jan. 15, 22 2006: Red color (Einaga)
- Feb. 2, 2006: red color (Maxson)
- Feb. 2006: Chris Go brings the red color to our attention.

Oval BA and the GRS

- Oval BA gained on the GRS at:
 - 0.45 degree/day: Jan-June 8
 - 0.15 degree/day: June 12-22
 - 0.45 degree/day June 23-July 1
- Oval BA will transit the GRS on July 18

Longitude difference between Oval BA and the GRS



NEB changing width

- The width of the NEB has changed by about 25% over the past 5 years
- How does this affect other features on Jupiter?

D. Parker
Coral Gables, FL

22 Jan 2005

08:30 UT



CM1=93.6 CM2=10.9 CM3=24.1

09:10 UT



CM1=118.0 CM2=35.1 CM3=48.3

16-in Newt @ f-21.7
ATiK-2C Camera, 1/25 sec; 5&10 fps
800, 600 frames stacked, Registax-2
Images Flat, Dark corrected.

Seeing very poor: 2-3
Trans: 4.5 w sl fog
No wind; Heavy dew
Alt: 51-53

S



P

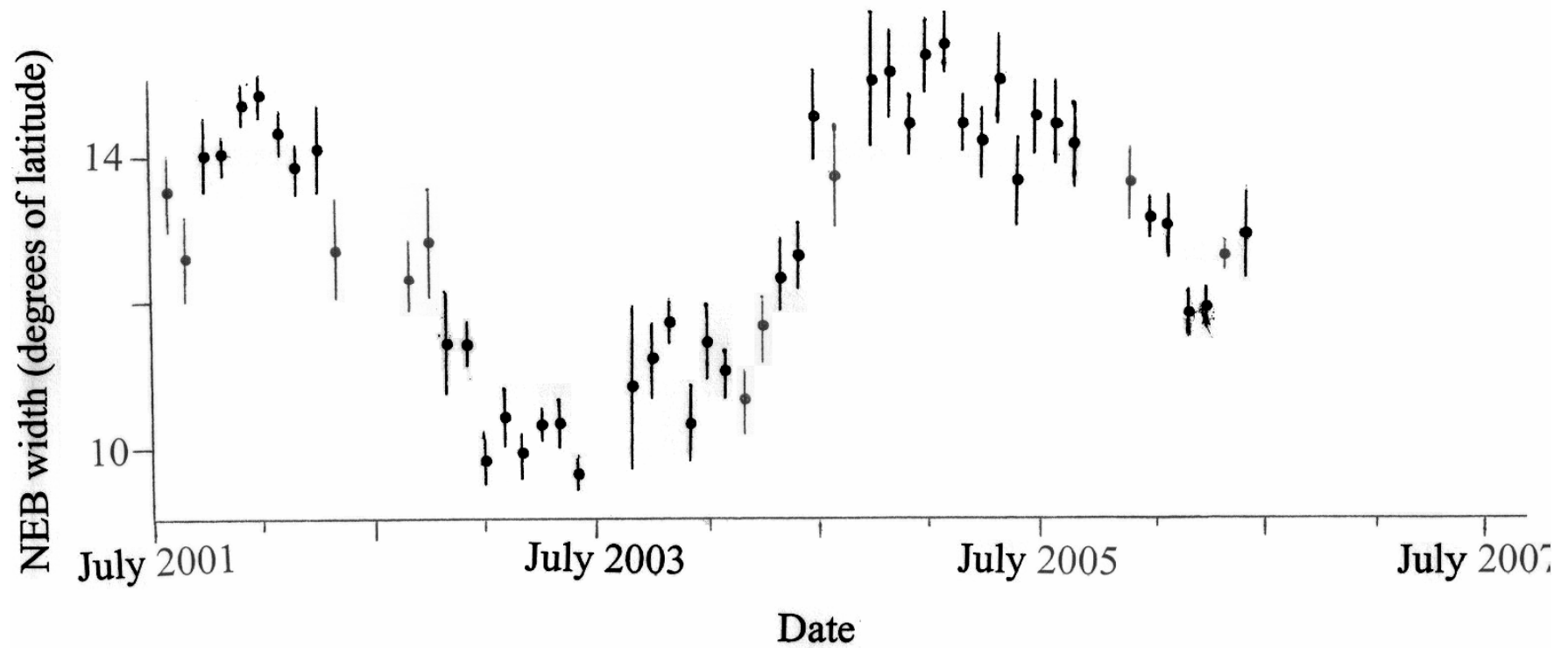
21Sep2003 14:05UT
CM I: 161
CM II: 208

Jupiter 20th-21st September 2003
Seeing: IV/V Antonidi (4/10 ALPO)
Transparency: Daylight observation

Celestron G9.25 235mm SCT with 3x barlow (~ f37) 640x480
Observation in daylight, just after sunrise
Toucam Pro @ 1/25s, Gain ~50%, 10fps, approx 1400 frames per avi
~800 frames selected & stacked in Registax, then wavelet processed
Time is nearest UT to midpoint of 2 minute video
Jason P Hatton, Mill Valley, CA 38.88N, 122.50W, +20m

NEB width

Changing Width of Jupiter's NEB



NEB white ovals

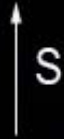
- Two ovals in the NEB merged in late June.
- These ovals are near 220°W longitude (system II)

JUPITER

27th April 2006

dia. 44.6"

14:20 UT



I 197

II 203

III 339

C14 @ f/30 with TeleVue 2.5x barlow

Philips ToUcam Pro + IR block

Processed with IRIS

Maurice Valimberti

Melbourne AUSTRALIA

D. Parker
Coral Gables, FL
Seeing fair: 5
Trans: 5
Wind: E, 3-8
Alt: 50 degs.

2 June 2006
03:31:03 UT

16-in Newt @ f-22
Lumenera 075M camera
Astromik RGB Filters
32 fps



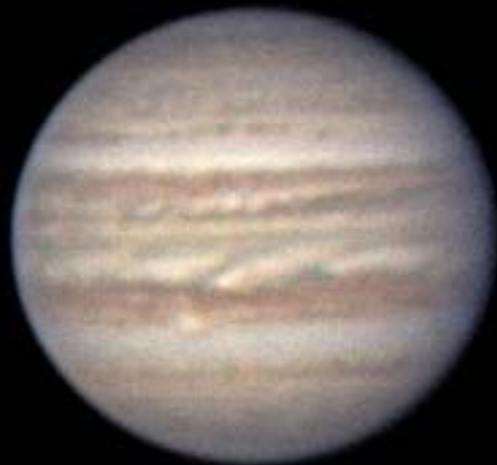
CM1=89.7 CM2=184.1 CM3=330.6

JUPITER

27 JUNE 2006

**Dia 40,9''
B'' - 3,6**

RGB (3 mn)



**20 H 08 : 3 UT
I 325 II 223 III 17**

Christophe PELLIER



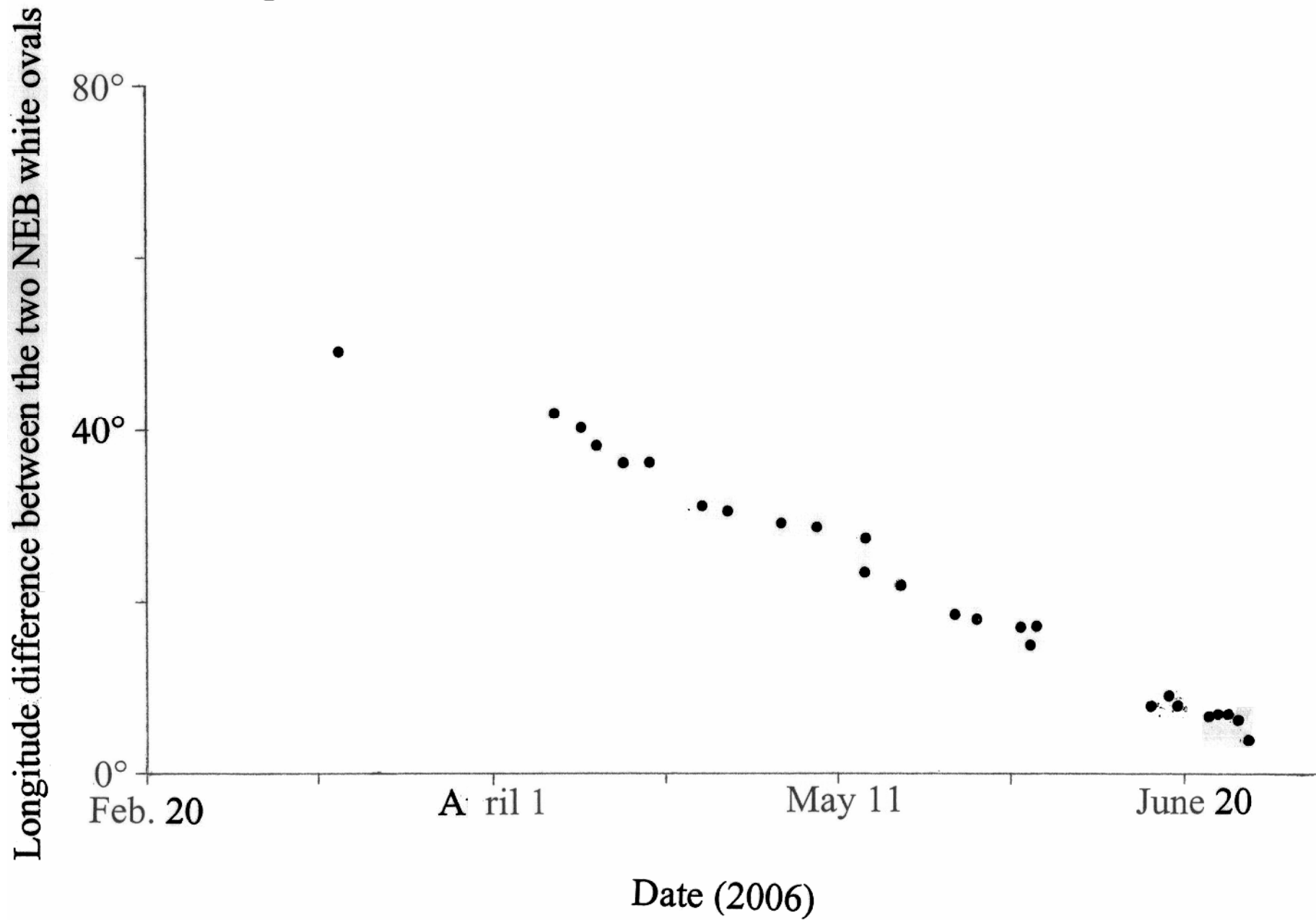
**20 H 33 : 4 UT
I 340 II 239 III 32**



**21 H 01 : 0 UT
I 357 II 255 III 49**

**S 5 / 10 T 5 / 10
Altitude 26-28°
Mewlon 210 F/31 + LU075M**

Longitude difference between the two NEB white ovals

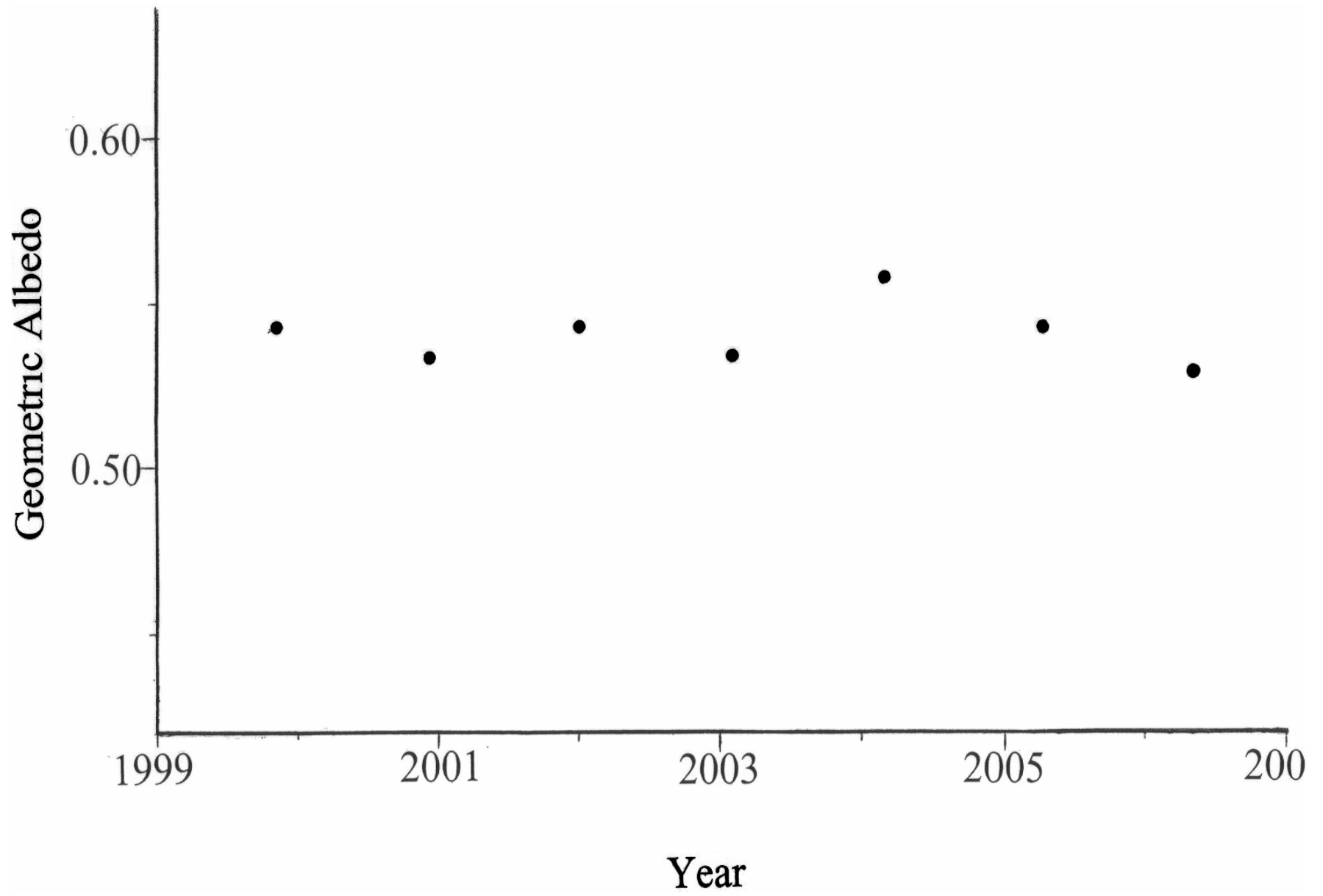


Photoelectric Photometry

- Measurement of brightness
- Factors that affect brightness
 - Jupiter-Sun distance
 - Jupiter-Earth distance
 - Phase angle
 - Clouds
 - Tilt ???????

Geometric Albedo

- Fraction of light than an object reflects
- Coal: low albedo (~ 0.05)
- Fresh snow: high albedo (~ 0.8)

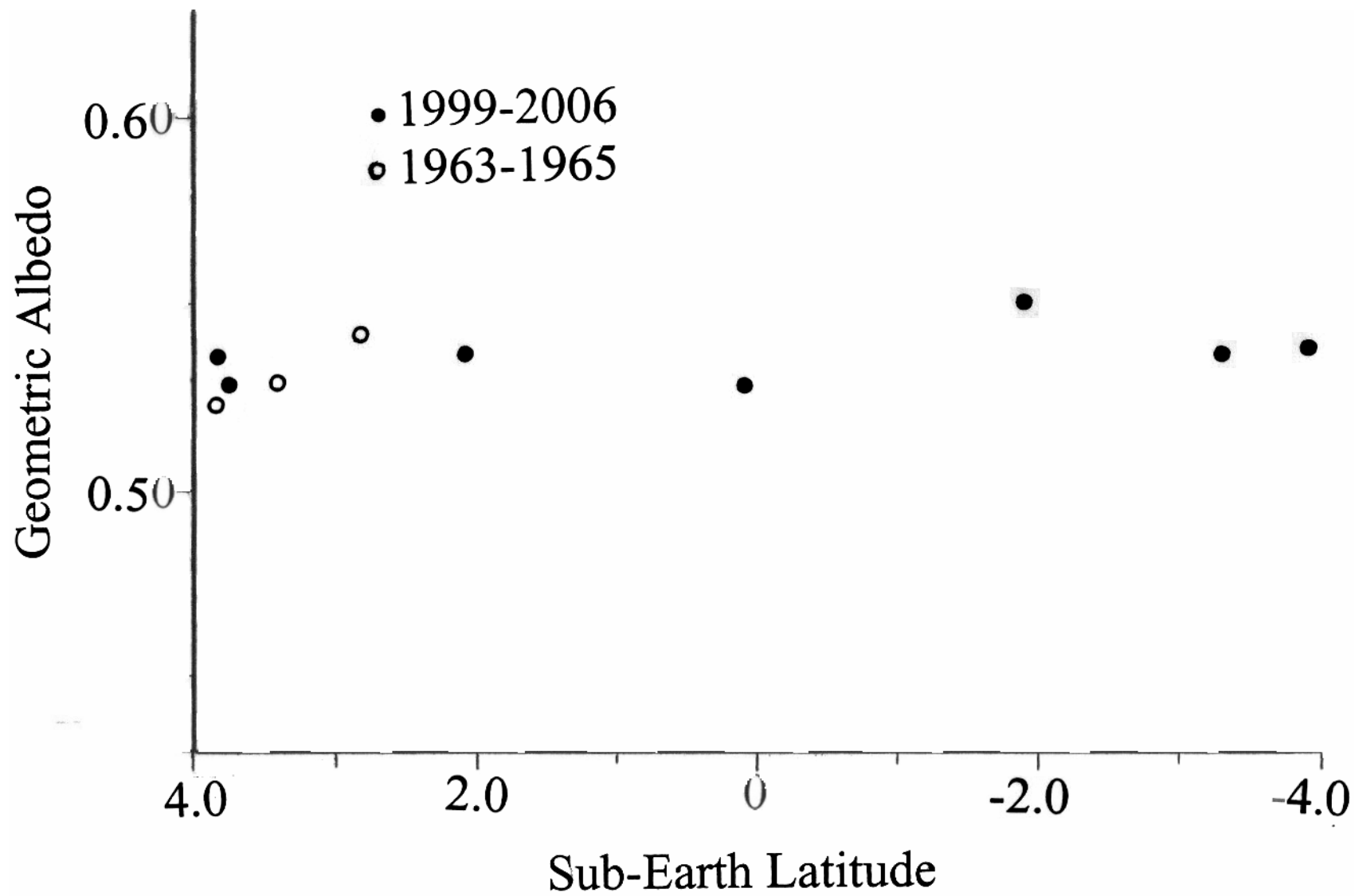


Jupiter's albedo

- Around 0.53
- Has not changed much since 1999
- 1999-2006 values similar to 1963-65 values

Albedo and Jupiter's tilt

- Center of Jupiter (from Earth) ranges from 4°S to 4°N
- Does this affect Jupiter's albedo?



Results

- Albedo = $0.534 - 0.00079 \phi$

where ϕ = the latitude of the center of Jupiter's disc as seen from Earth

Conclusions

- The color of oval BA changed in late 2005 and is now red
- Oval BA will pass the Great Red Spot (GRS) on about July 18, 2006

Conclusions

- The North Equatorial Belt (NEB) periodically gets wide and thin
- Two NEB ovals may merge in July 2006
- Jupiter's albedo has been almost constant since 1999; it may change slightly with tilt.