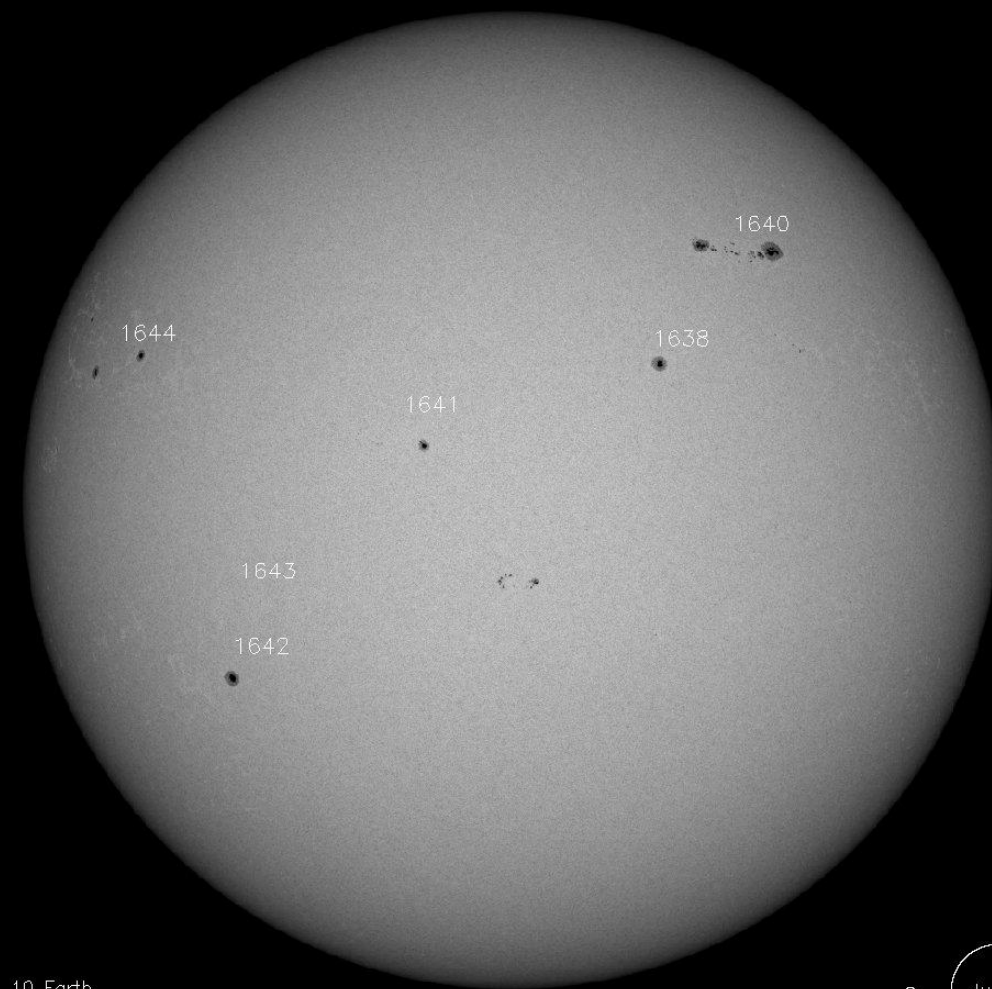


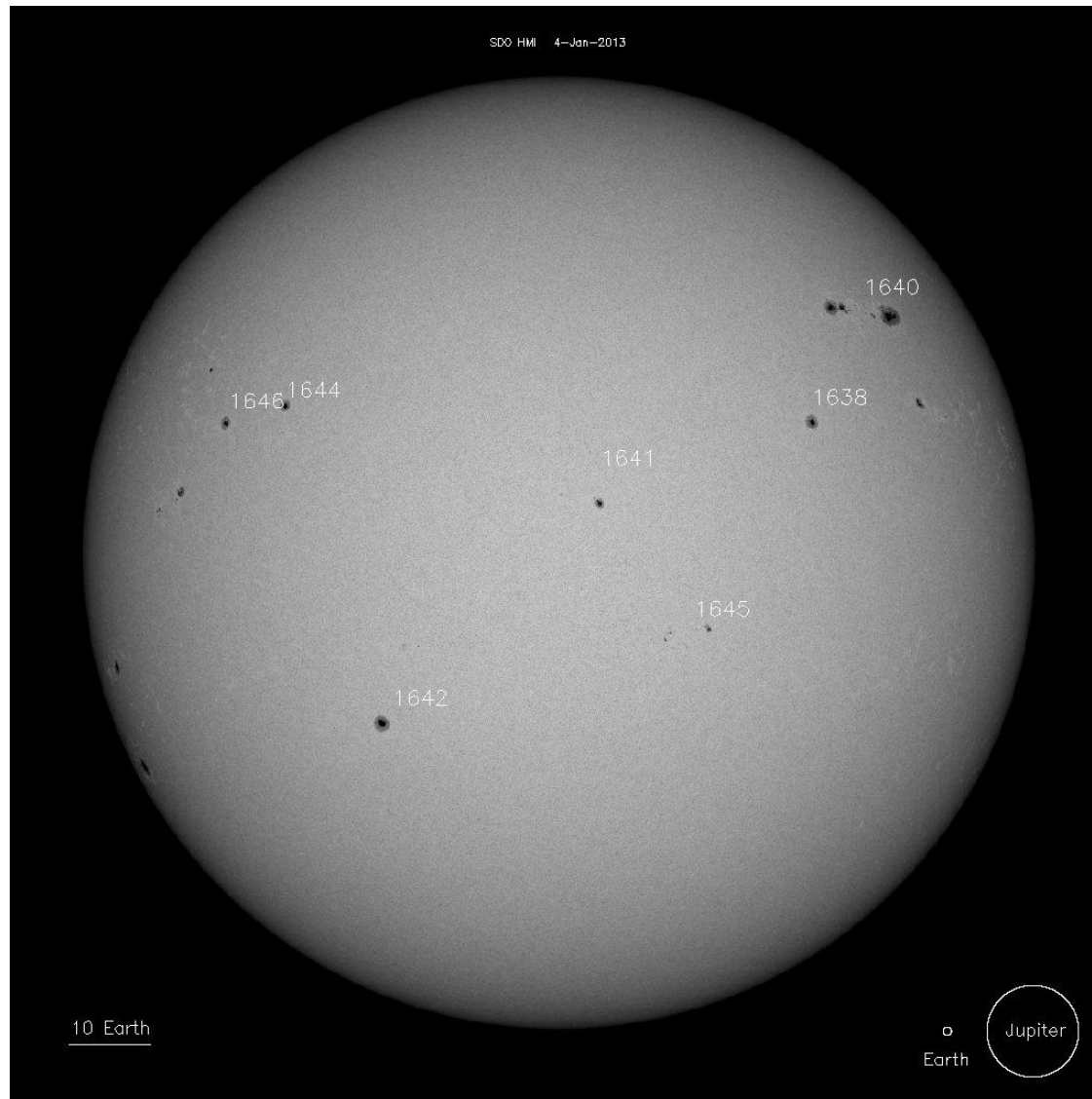
SDO HMI 3-Jan-2013



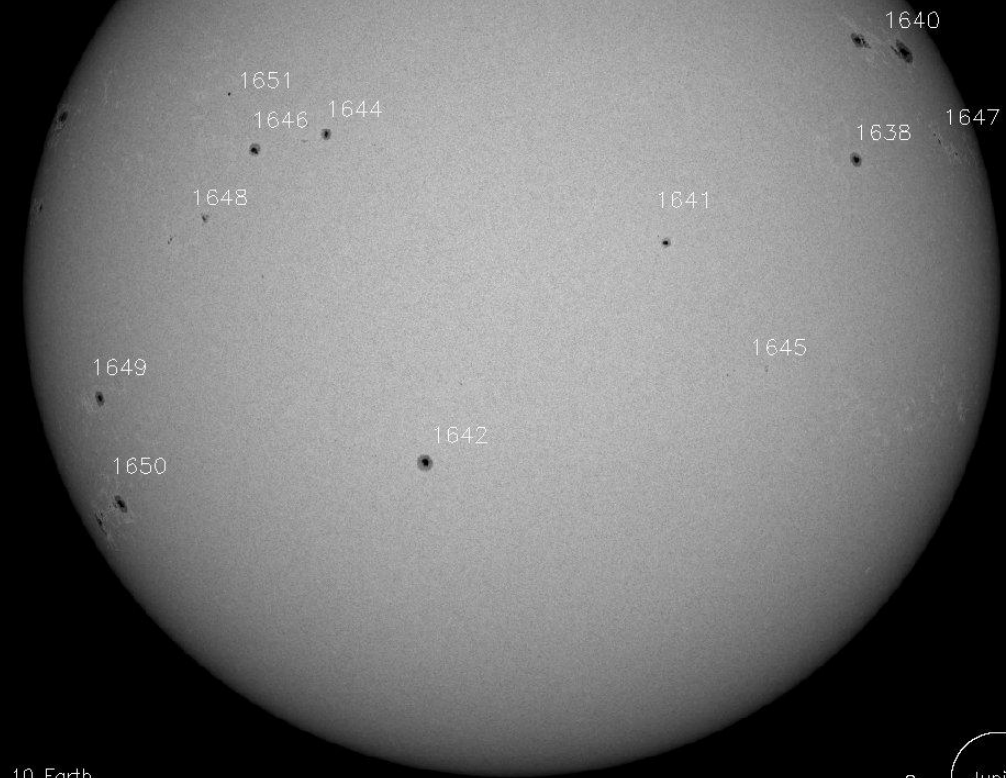
10 Earth



SDO HMI 4-Jan-2013



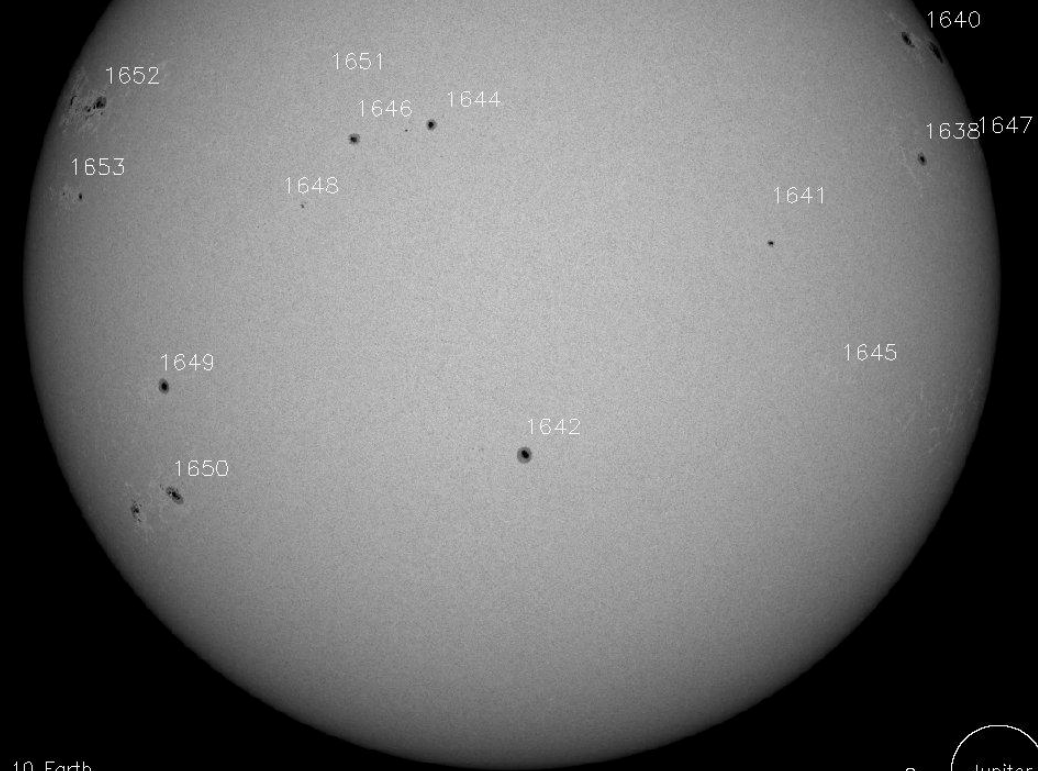
SDO HMI 5-Jan-2013



10 Earth



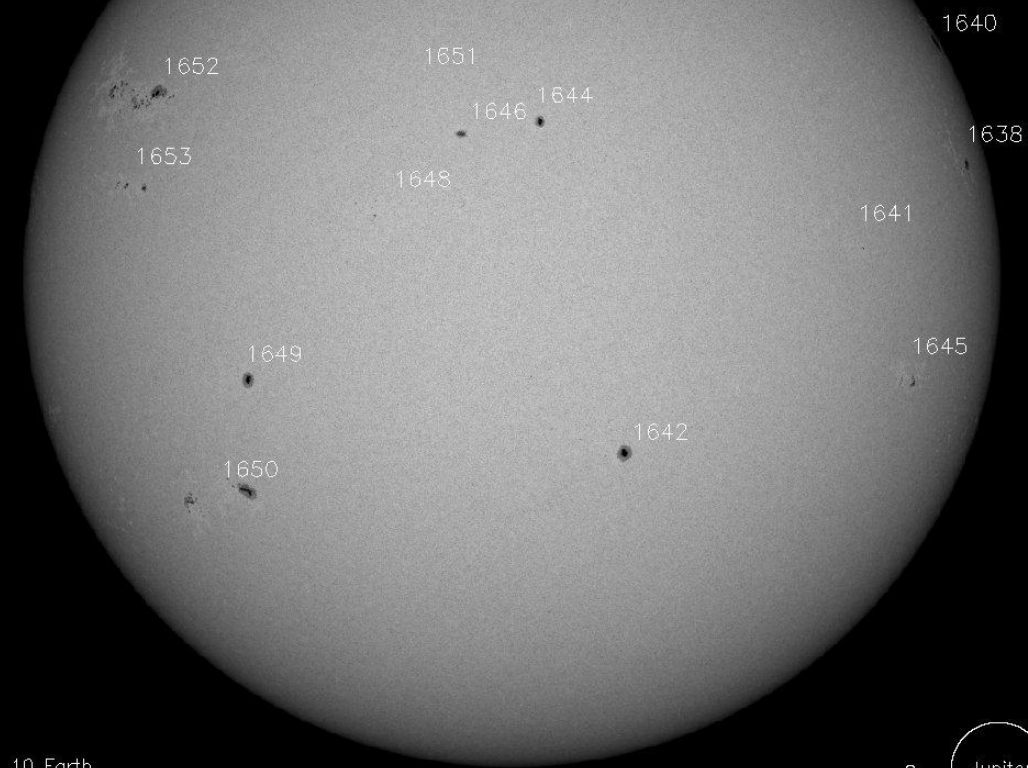
SDO HMI 6-Jan-2013



10 Earth



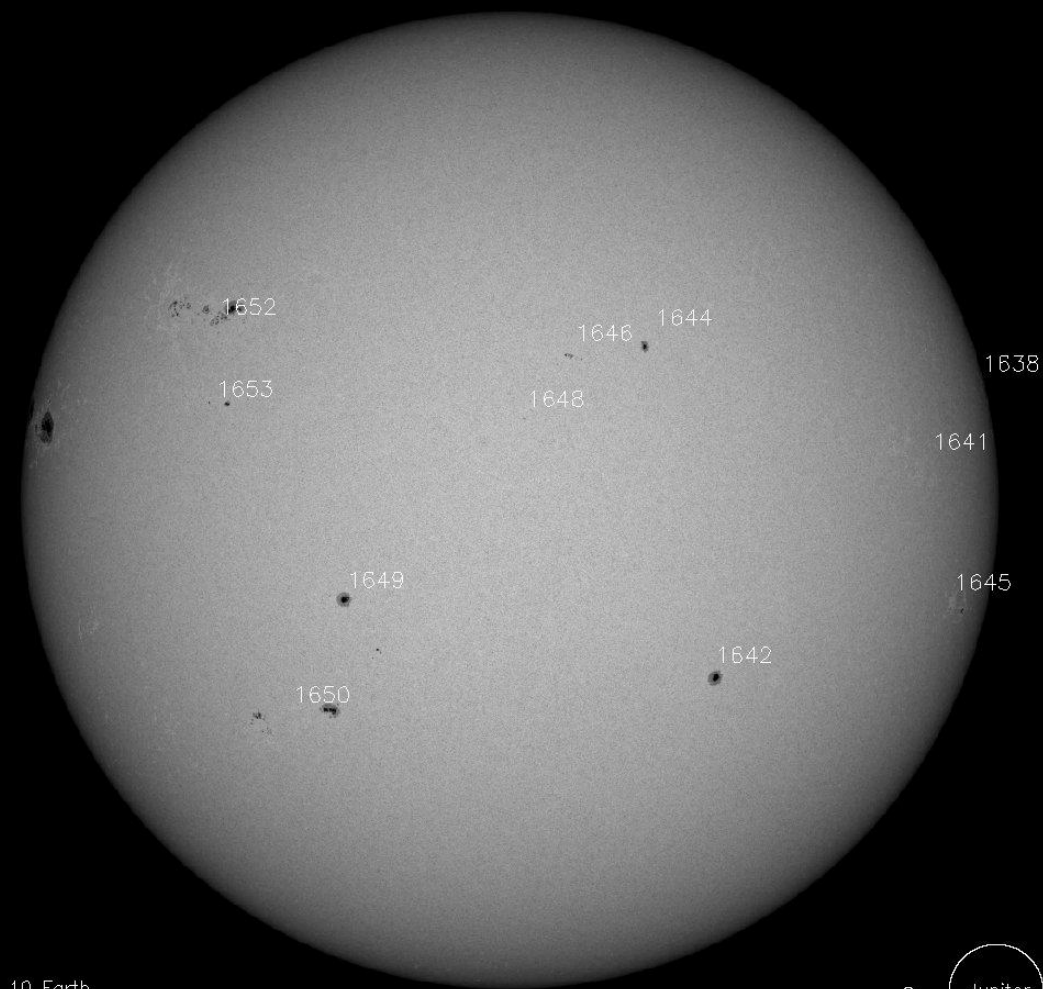
SDO HMI 7-Jan-2013



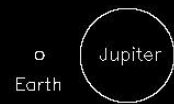
10 Earth



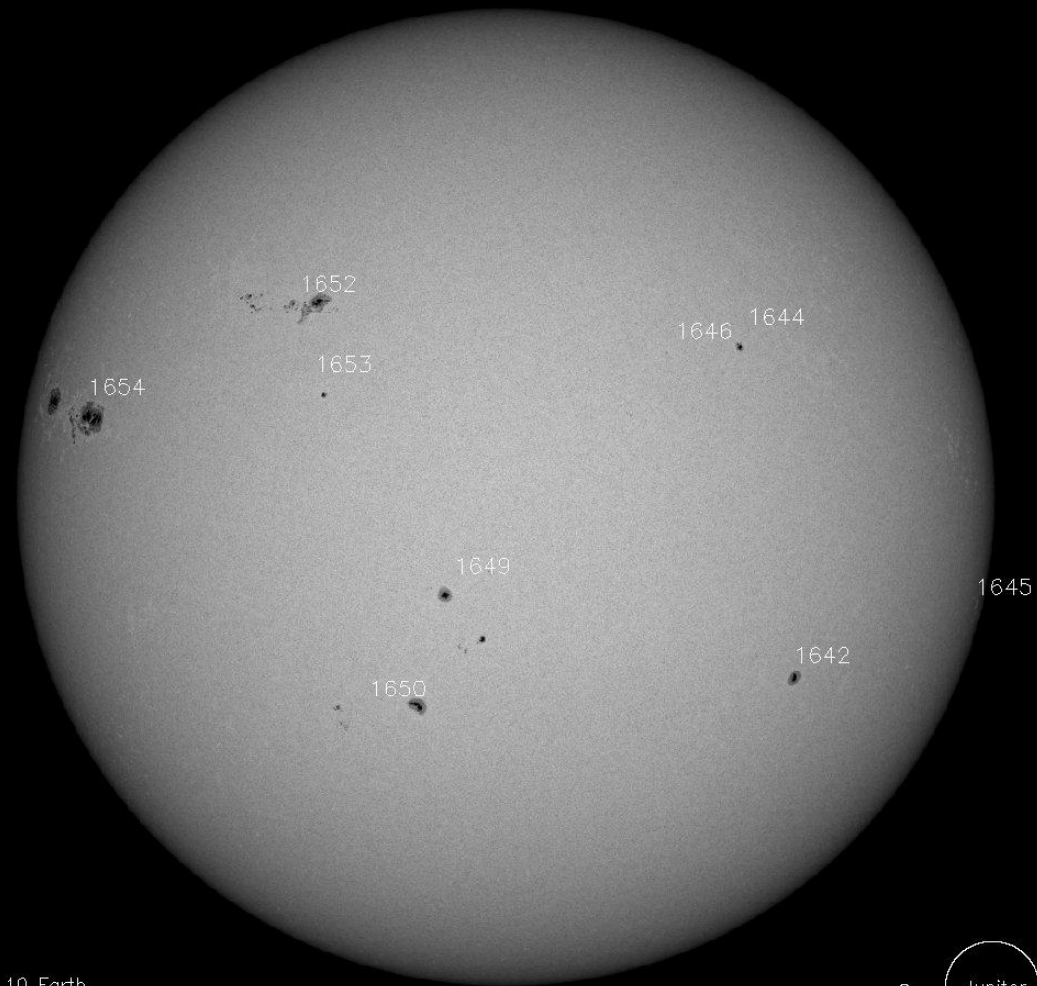
SDO HMI 8-Jan-2013



10 Earth



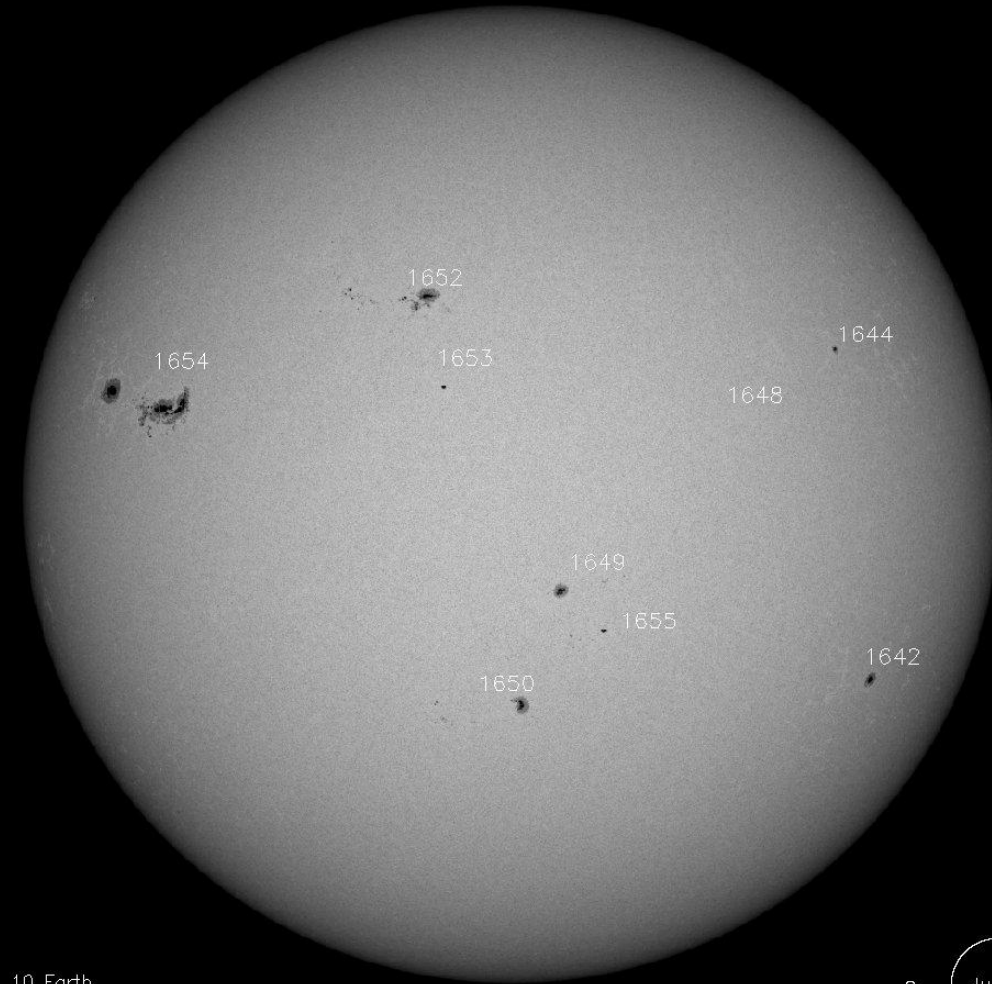
SDO HMI 9-Jan-2013



10 Earth



SDO HMI 10-Jan-2013

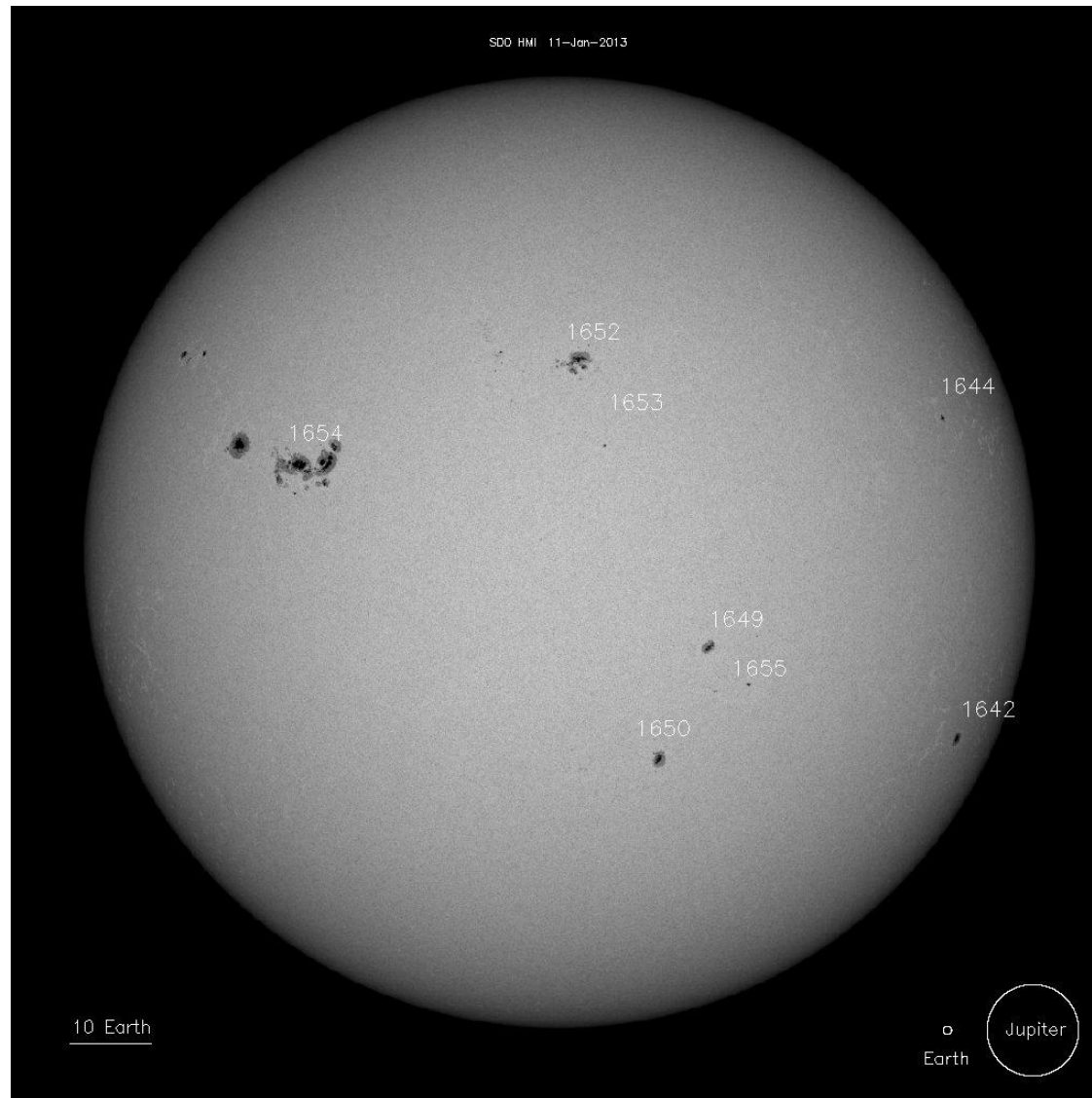


10 Earth

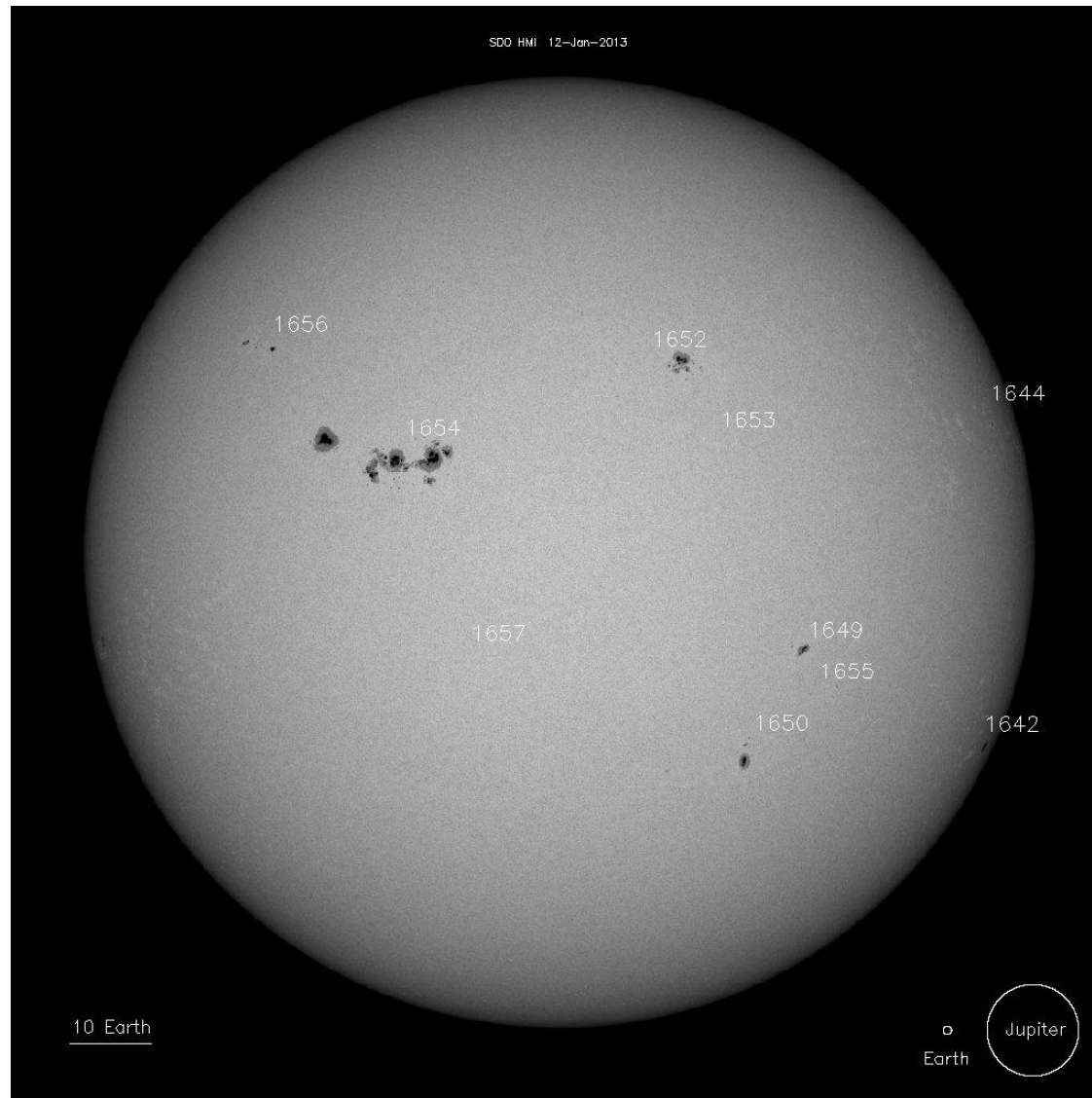




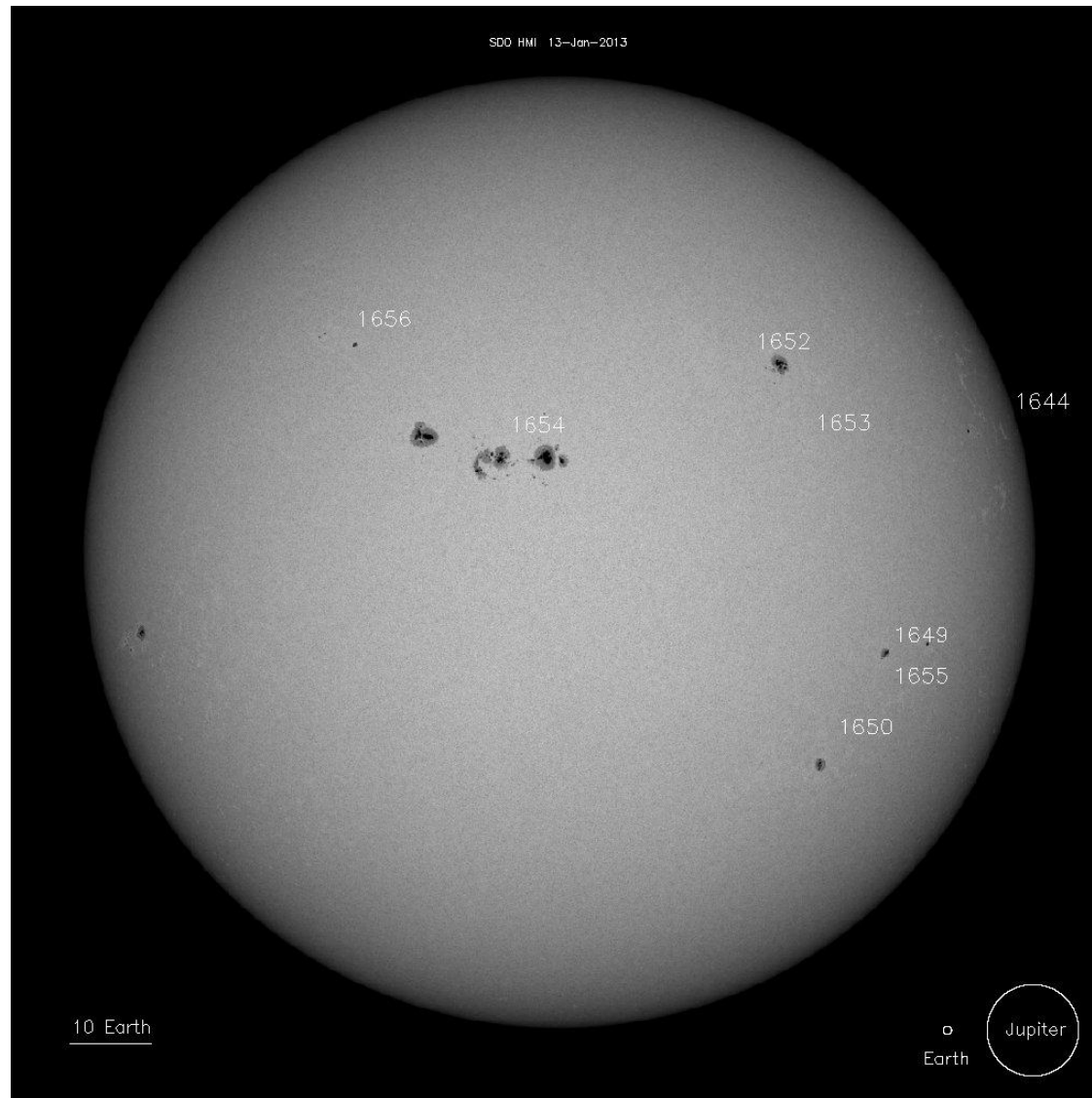
SDO HMI 11-Jan-2013



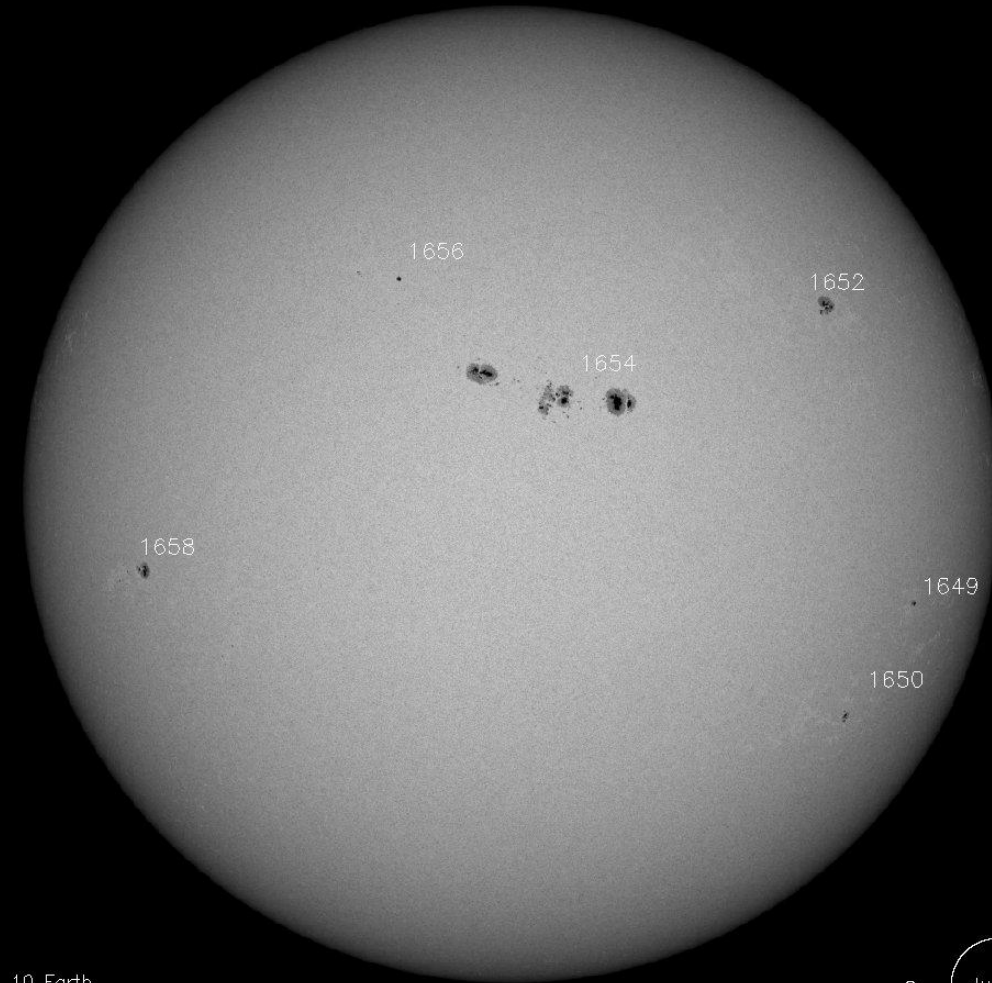
SDO HMI 12-Jan-2013



SDO HMI 13-Jan-2013



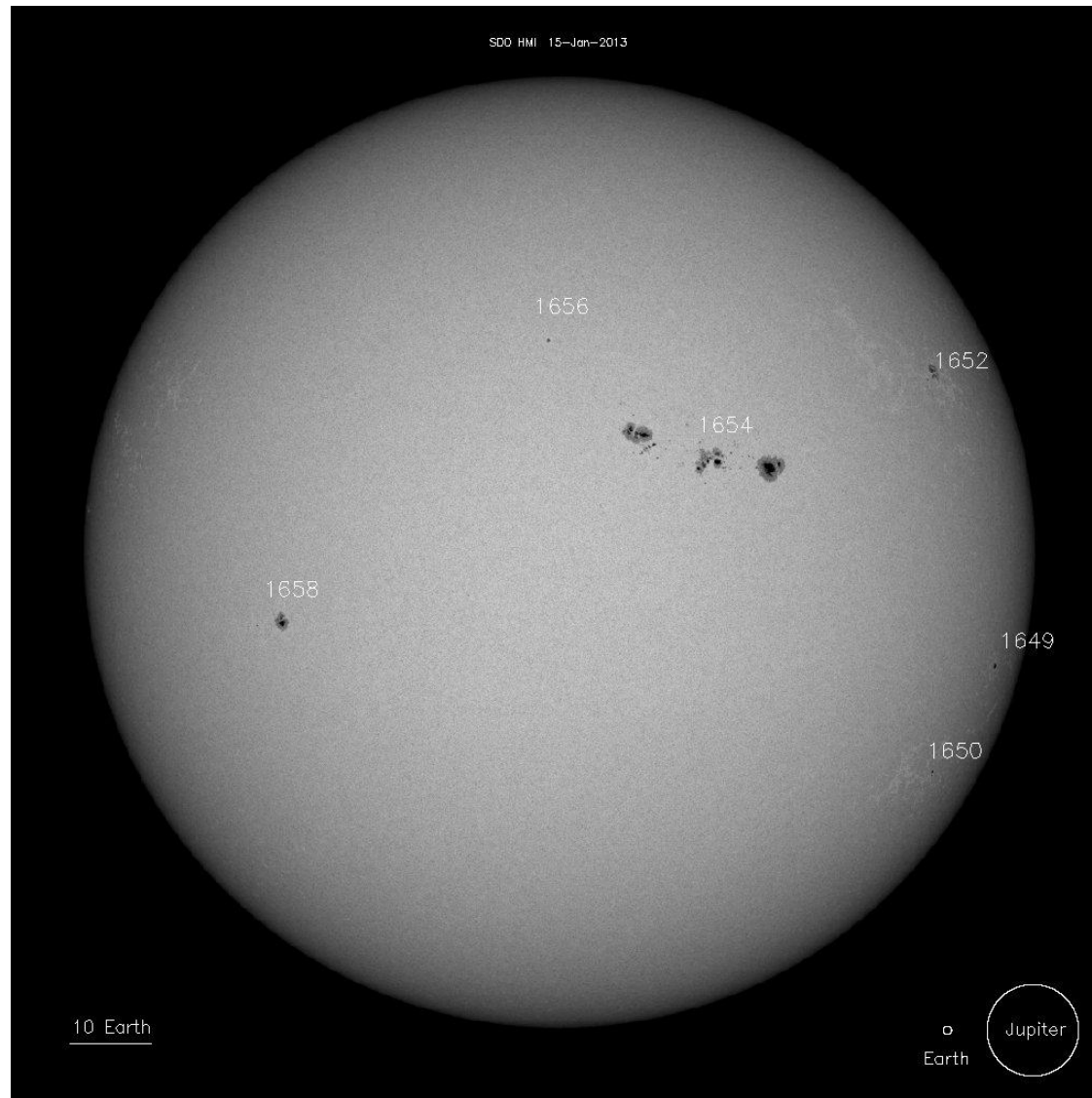
SDO HMI 14-Jan-2013



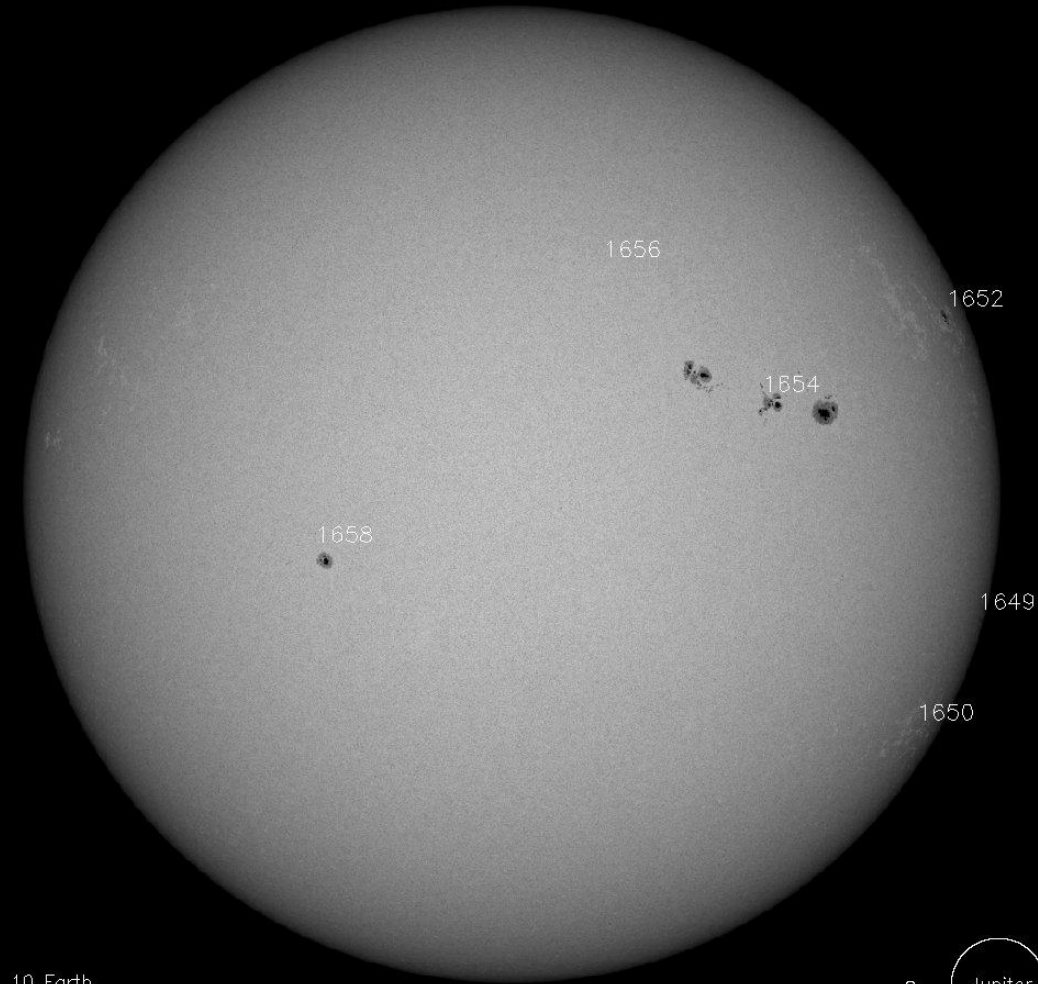
10 Earth



SDO HMI 15-Jan-2013



SDO HMI 16-Jan-2013



10 Earth



SDO HMI 17-Jan-2013

1656

1652

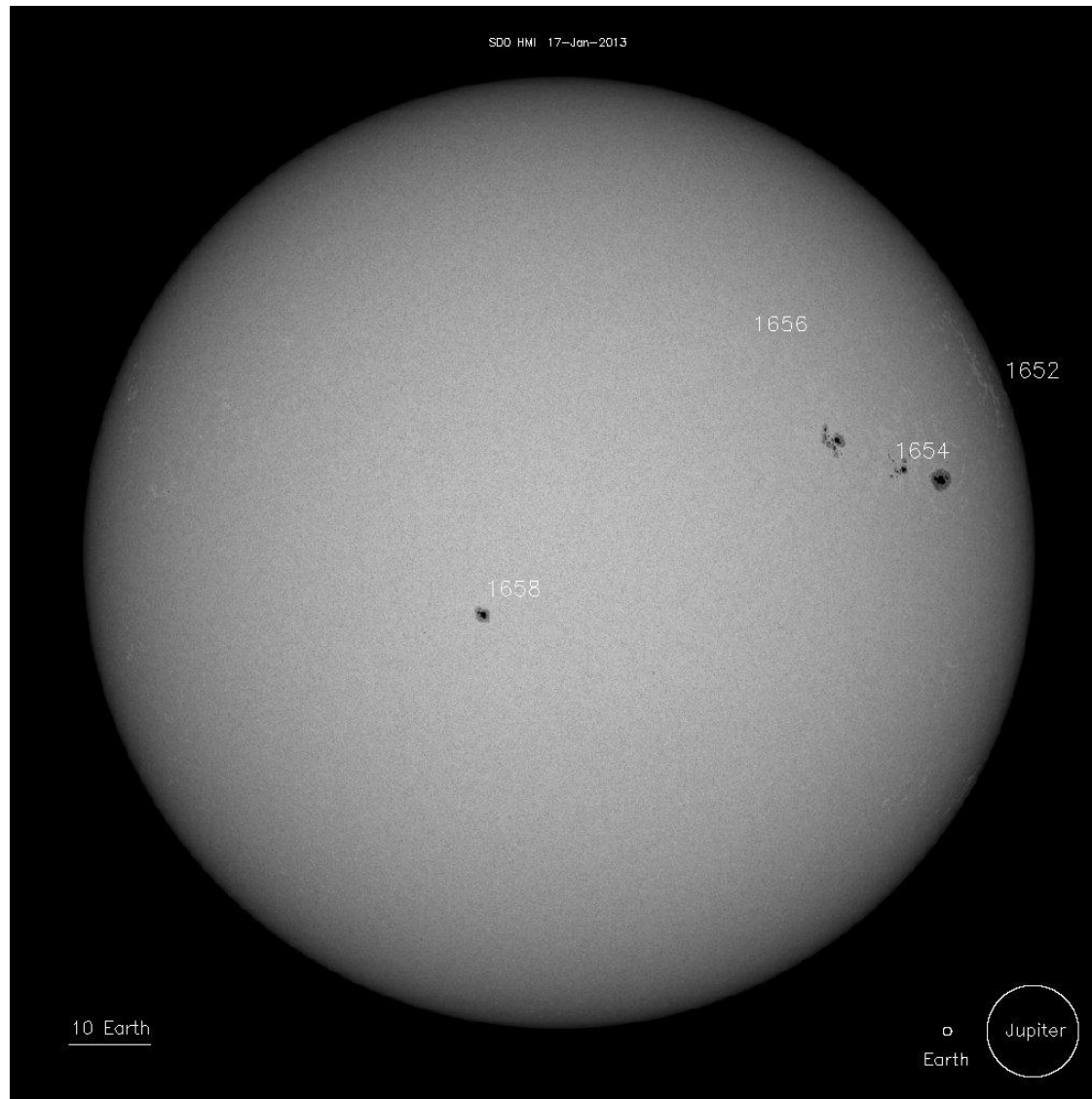
1654

1658

10 Earth

○  
Earth

○ Jupiter



SDO HMI 18-Jan-2013

1659

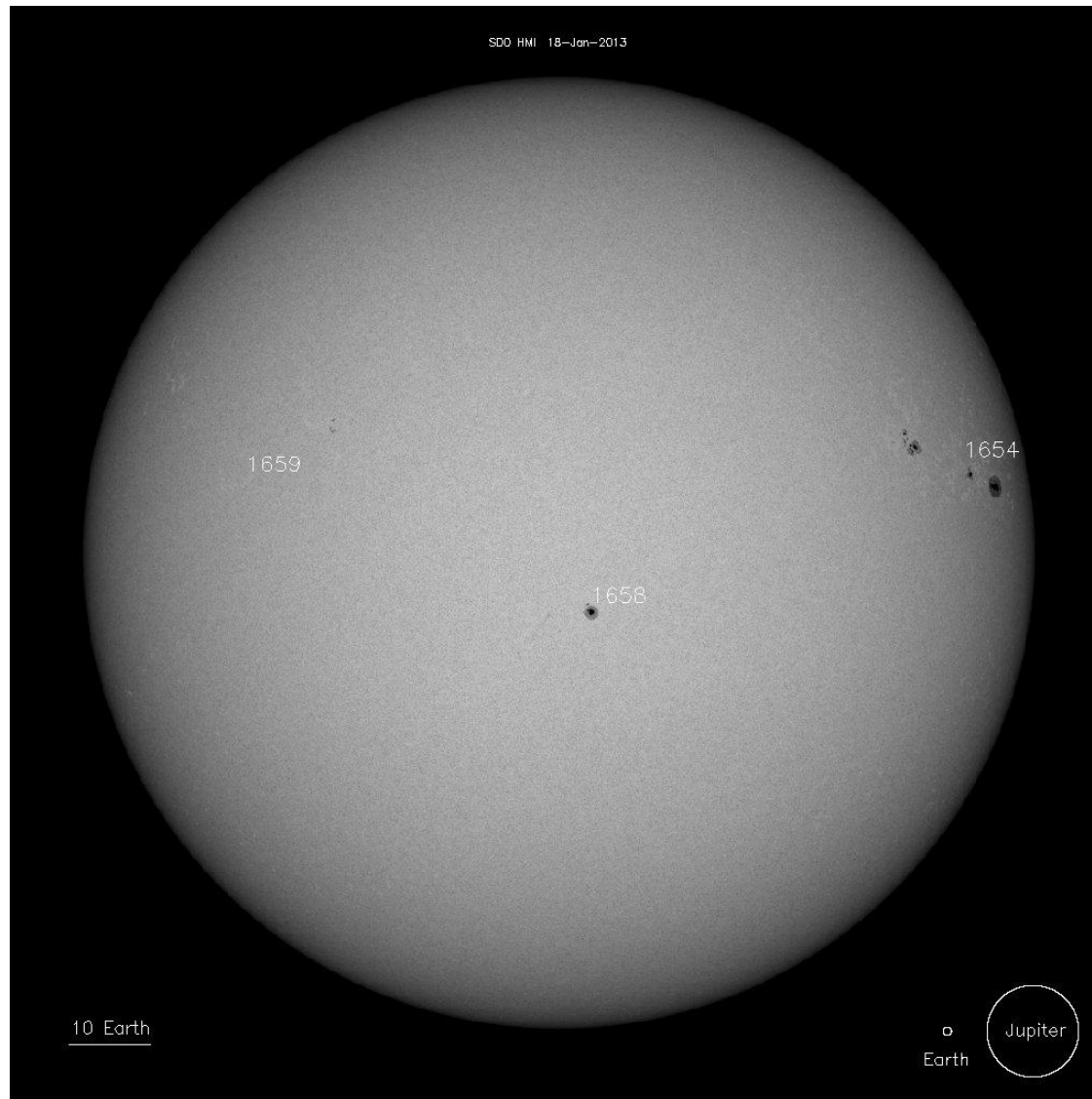
1654

1658

10 Earth

○  
Earth

○ Jupiter





SDO HMI 19-Jan-2013

1659

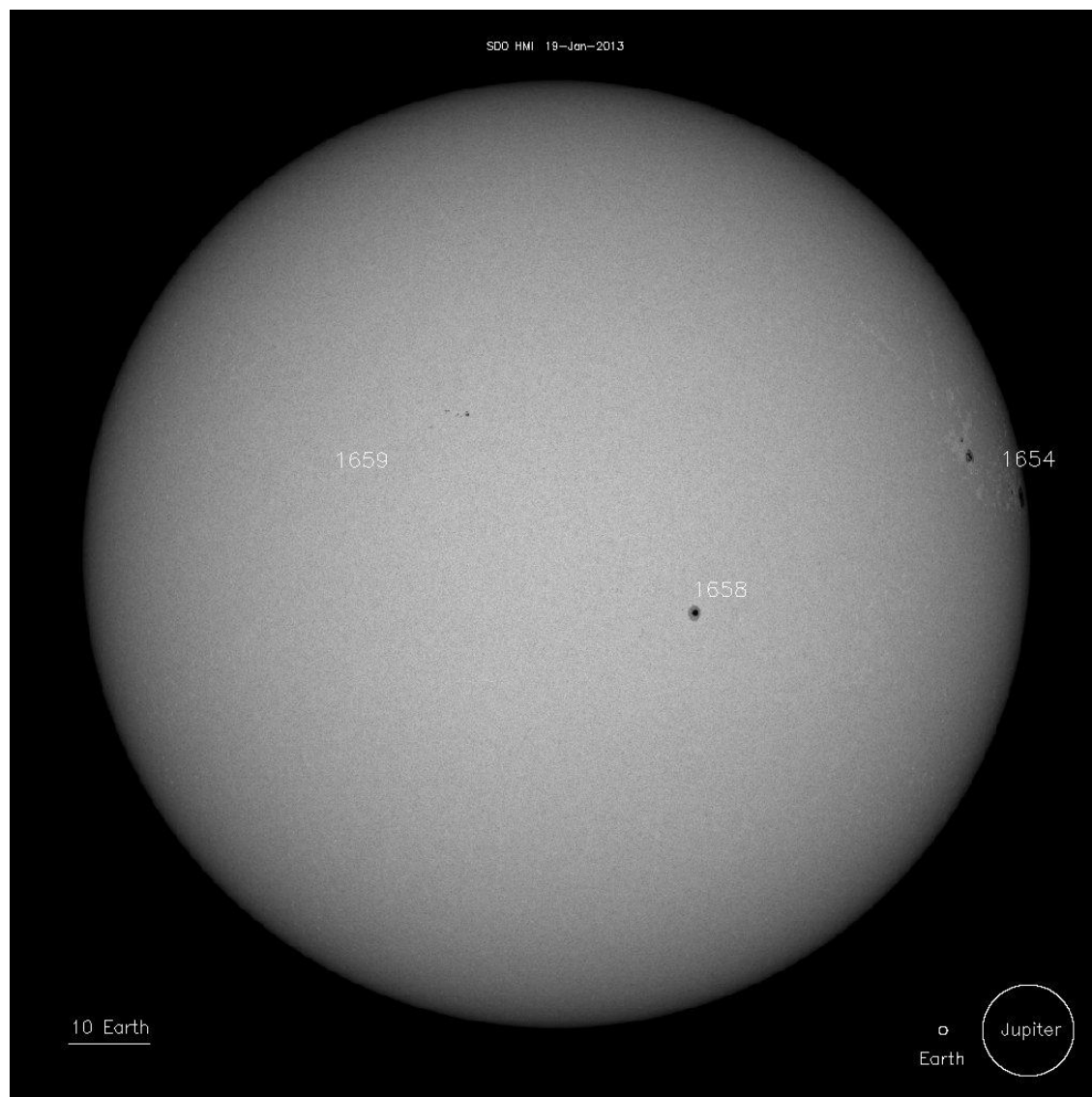
1654

1658

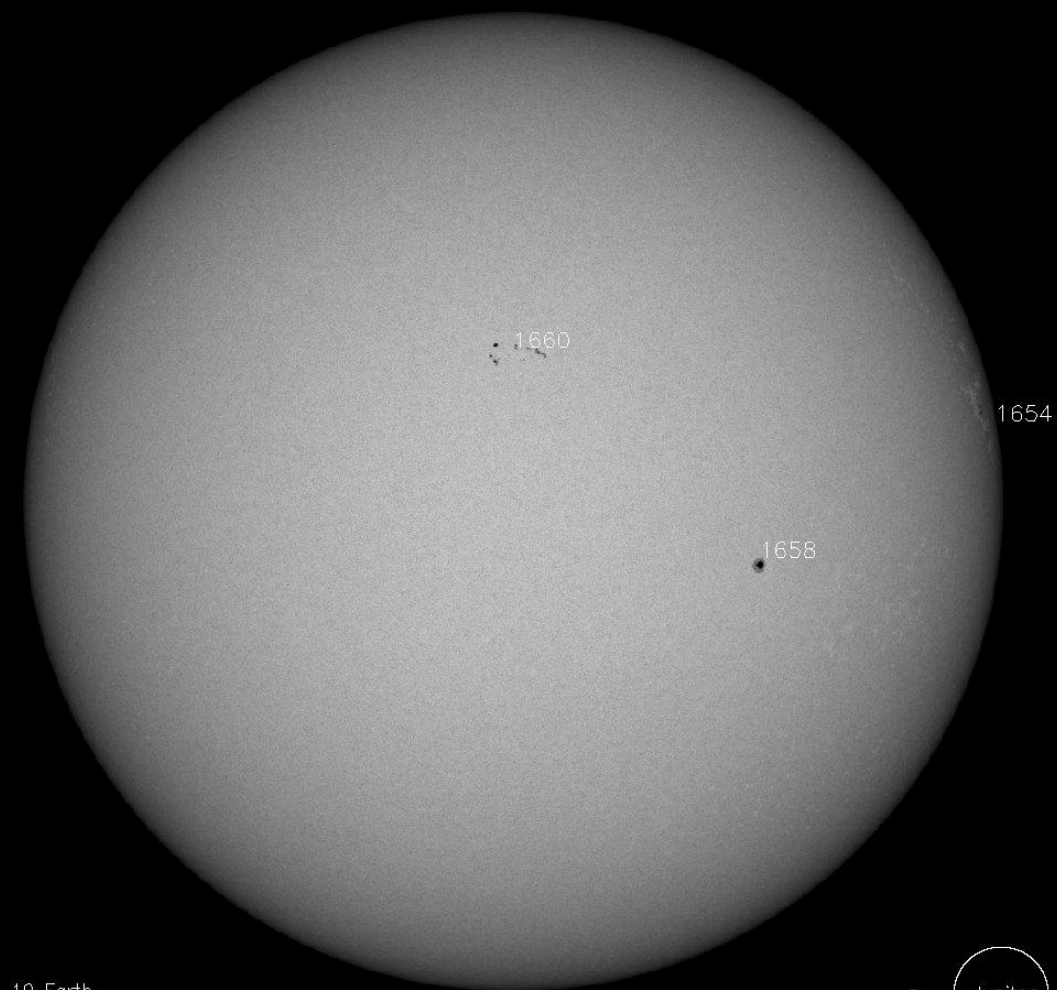
10 Earth

○  
Earth

Jupiter



SDO HMI 20-Jan-2013



10 Earth



SDO HMI 21-Jan-2013

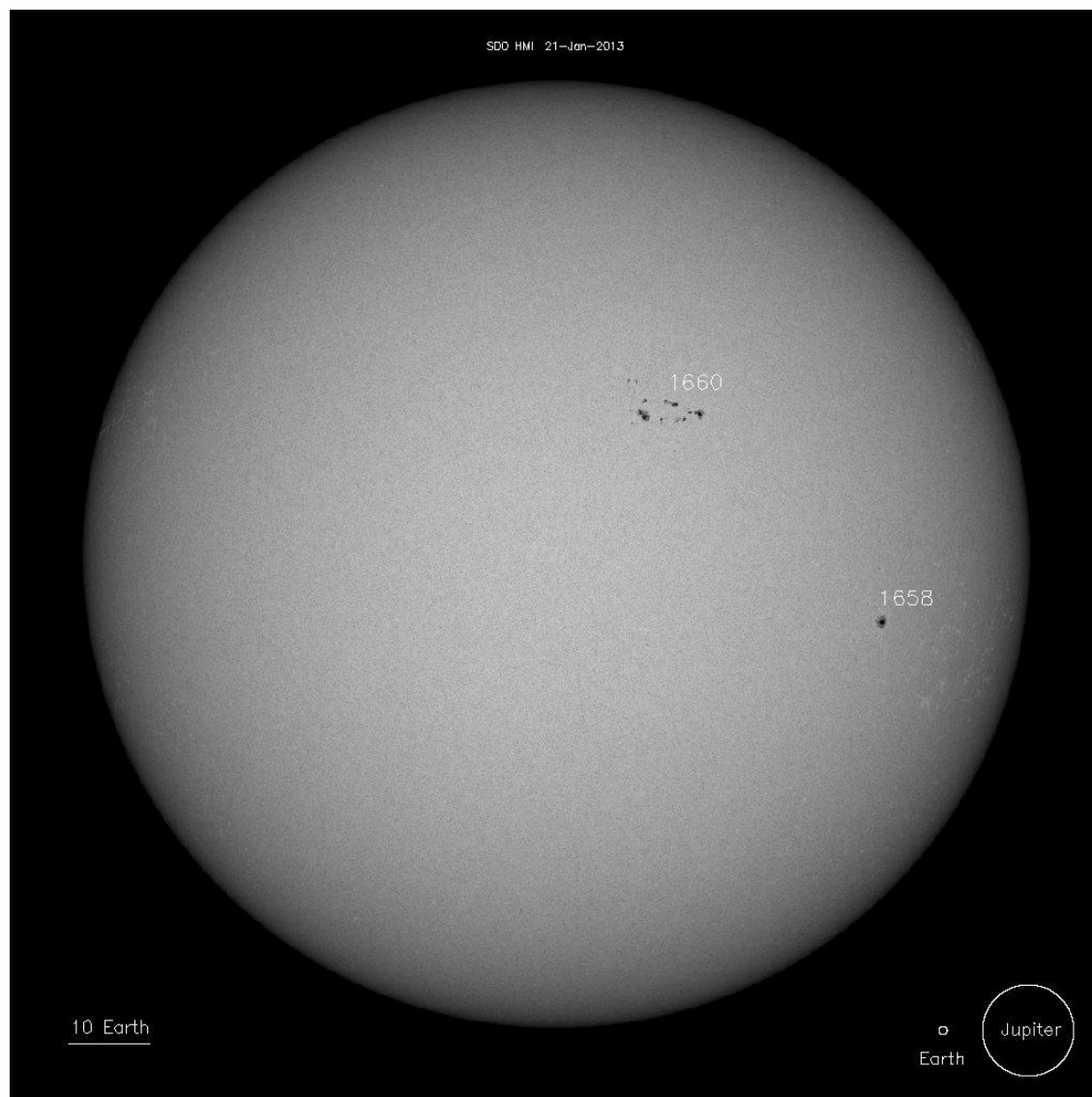
1660

1658

10 Earth

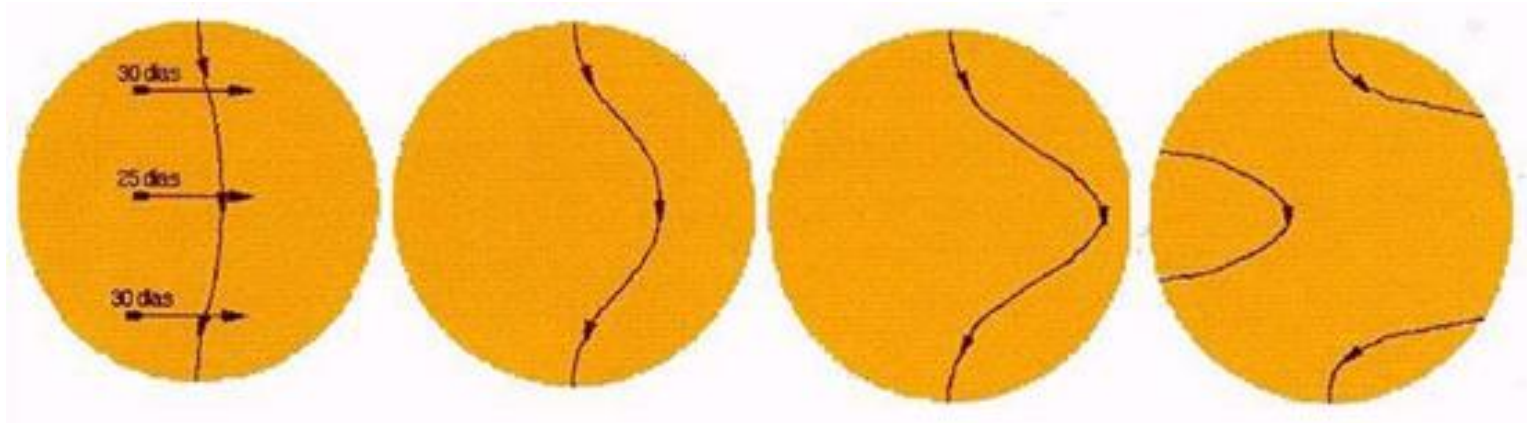
o  
Earth

Jupiter



# rotazione differenziale

Il Sole non ruota come un corpo solido



il periodo di rotazione aumenta andando verso i poli  
dove è di circa 34 giorni,  
mentre in vicinanza dell'equatore è di circa 27 giorni.

Individuare una macchia solare che abbia eseguito più passaggi sul lato del Sole visibile dalla terra, effettuando ricerche sui siti web:

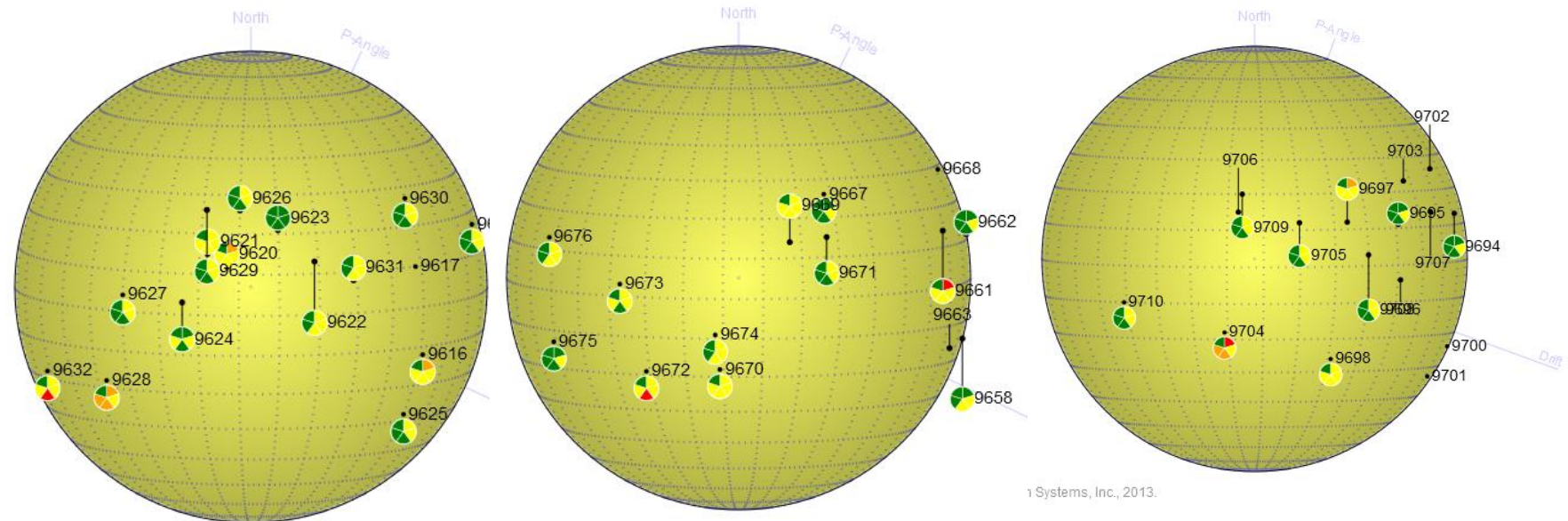
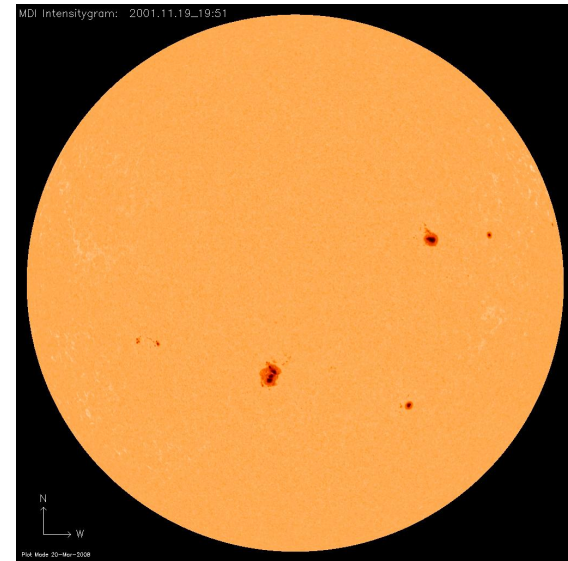
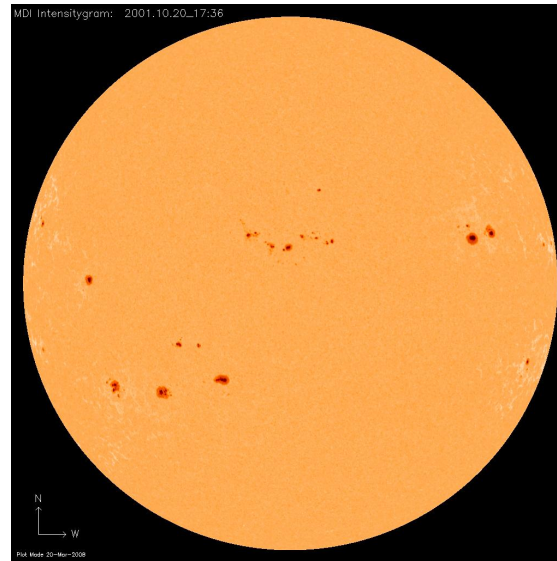
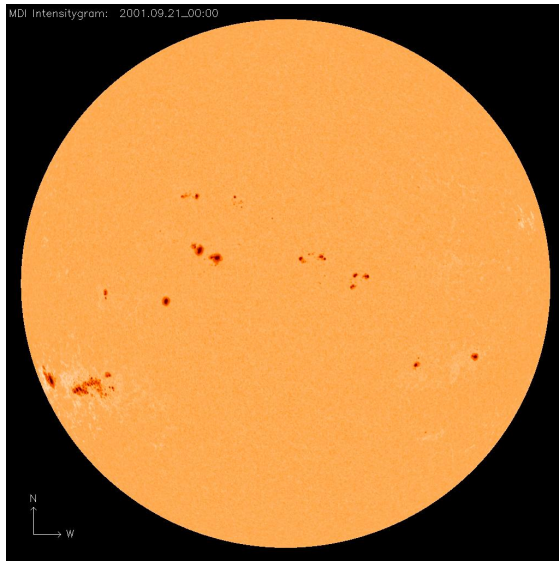
[http://sohowww.nascom.nasa.gov/data/synoptic/sunspots\\_earth/?C=M;O=D](http://sohowww.nascom.nasa.gov/data/synoptic/sunspots_earth/?C=M;O=D)

<http://www.raben.com/maps/date>

[http://soi.stanford.edu/production/int\\_gifs.html](http://soi.stanford.edu/production/int_gifs.html)

Scaricare sul computer le immagini che sono state scattate in quel periodo

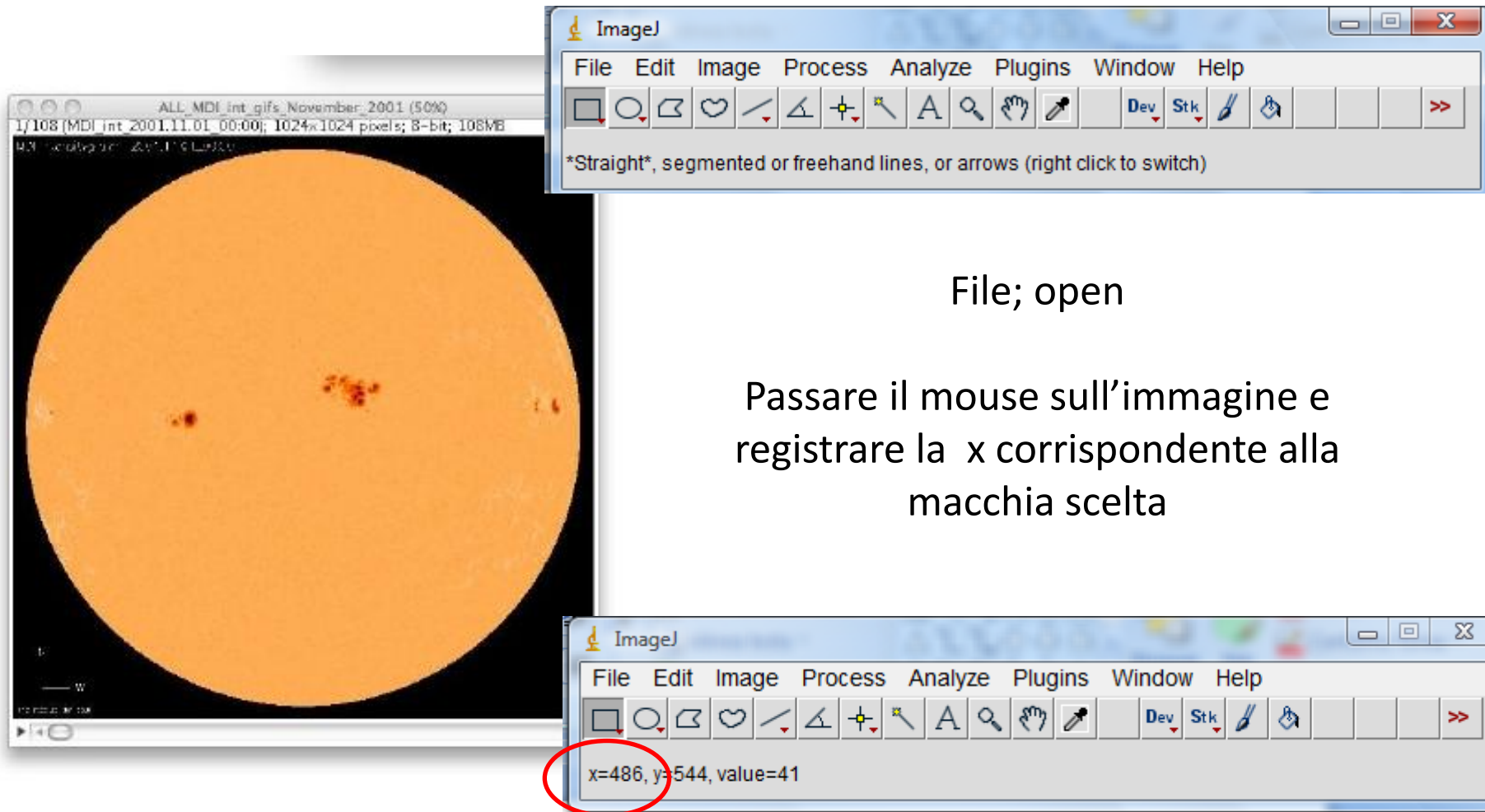
[http://soi.stanford.edu/production/int\\_gifs.html](http://soi.stanford.edu/production/int_gifs.html)



<http://www.raben.com/maps/date>



Su ciascuna immagine determinare con il programma ImageJ (<http://rsbweb.nih.gov/ij/download.html>) le coordinate x e y della macchia (in pixel), ponendo il puntatore del mouse al centro della macchia per ogni fotografia.



File; open

Passare il mouse sull'immagine e registrare la x corrispondente alla macchia scelta

# Convertire le date delle immagini in date giuliane ([http://www.onlineconversion.com/julian\\_date.htm](http://www.onlineconversion.com/julian_date.htm) )

## Welcome to OnlineConversion.com

Julian Date Converter

Convert from calendar date and time to Julian date, and vice versa.

Enter either a Calendar date, or a Julian date and click Calculate.

CE <input checked="" type="radio"/> BCE <input type="radio"/>			Universal Time		
year	month	day	hr	min	sec
2013	May ▾	9 ▾	0	4	3
Julian date			weekday		
2456421.50281			Thursday		
Calendar date to Julian date <input checked="" type="radio"/>					
Julian date to Calendar date <input type="radio"/>					
<input type="button" value="calculate"/>					

### La Data Giuliana

E' l'intervallo di tempo in giorni e frazioni di giorno contato nel calendario giuliano a partire dalle 12:00 (ora di Greenwich) del 1° gennaio 4713 avanti Cristo. Il riferimento a un'epoca fondamentale ben definita facilita il calcolo degli intervalli di tempo.



# Compilare la tabella

aprile

maggio

giugno

Giorno	Data Giuliana (giorni)	x (pixel)
20	2.452.173	56
21	2.452.174	80
22	2.452.175	132
23	2.452.176	196
24	2.452.177	284
25	2.452.178	378
26	2.452.179	474
27	2.452.180	582
28	2.452.181	628
29	2.452.182	774
30	2.452.183	854
1	2.452.184	912
2	2.452.185	952
19	2.452.202	98
20	2.452.203	138
21	2.452.204	208
22	2.452.205	326
23	2.452.206	402
24	2.452.207	536
25	2.452.208	616
26	2.452.209	720
27	2.452.210	814
28	2.452.211	888
29	2.452.212	940
15	2.452.229	72
16	2.452.230	126
17	2.452.231	196
18	2.452.232	282
19	2.452.233	382
20	2.452.234	486
21	2.452.235	622
22	2.452.236	694
23	2.452.237	788
24	2.452.238	882
25	2.452.239	926
26	2.452.240	966

## Consigli:

(Individuare una macchia che dura più di una rotazione solare è complicato ed è complicato anche riconoscerla dopo una rotazione.)

Periodo: Settembre/Novembre 2001

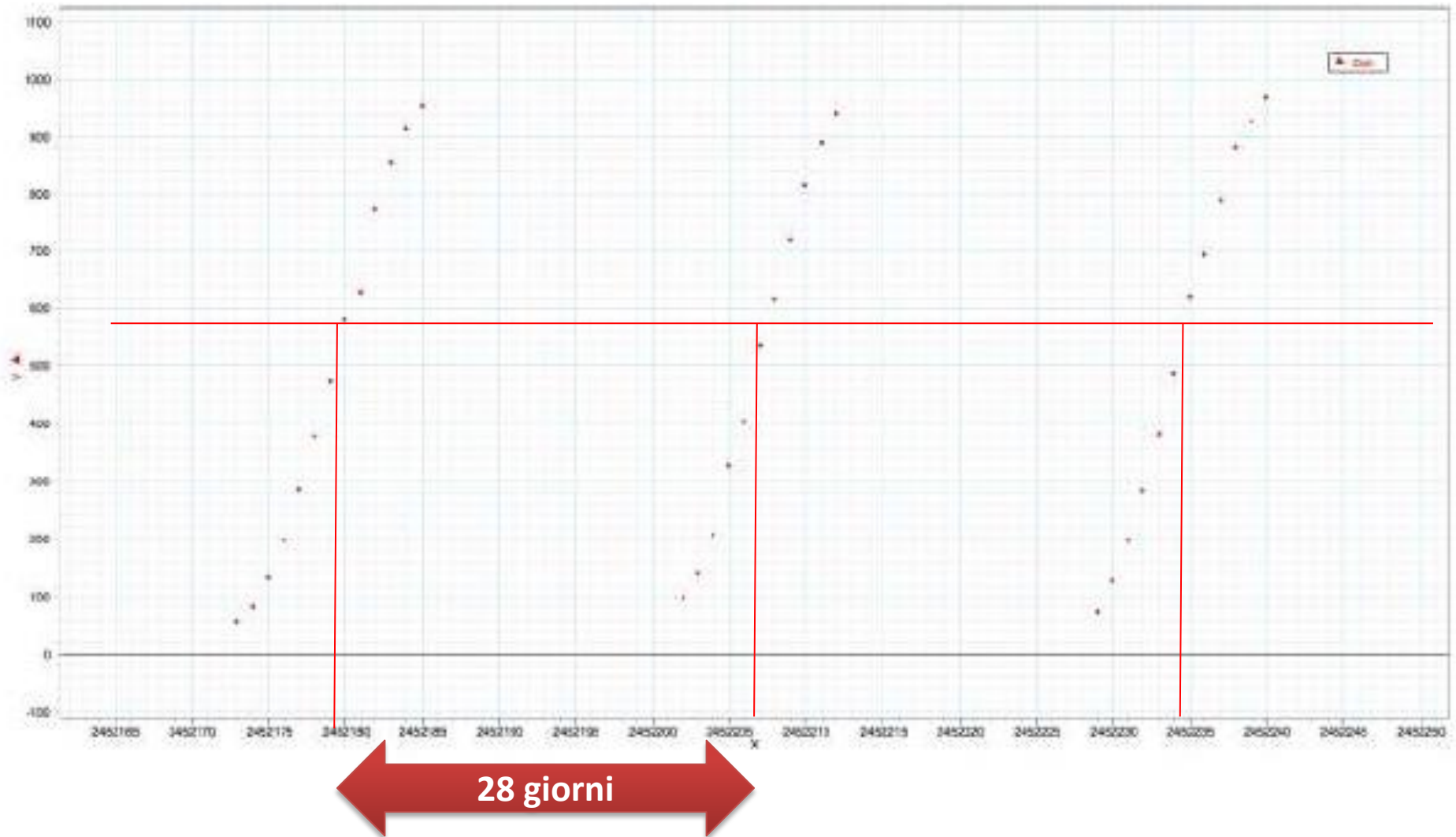
numero macchia da prendere in considerazione:

9632 -> 9672 -> 9704

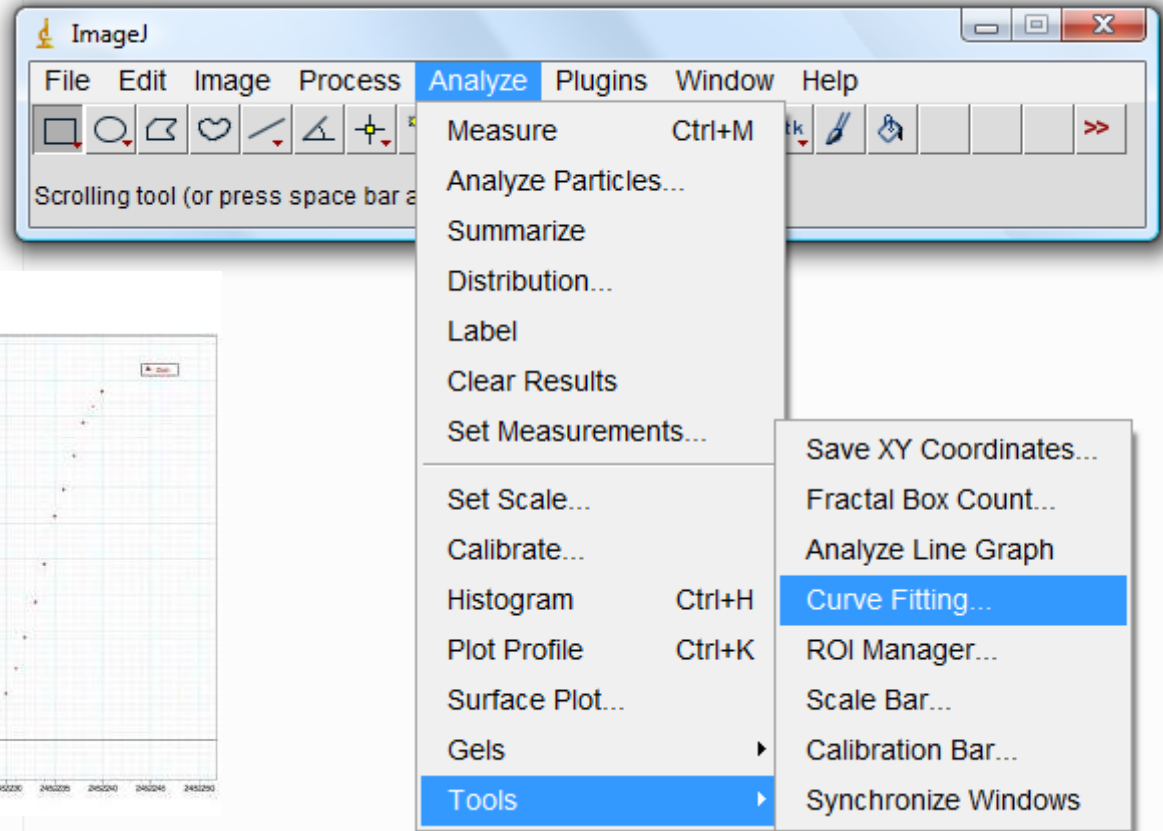
(denominazione della regione attiva nella prima, seconda e terza rotazione)

Asse Y: posizione x della macchia (pixel)  
Asse X: data giuliana (giorni)

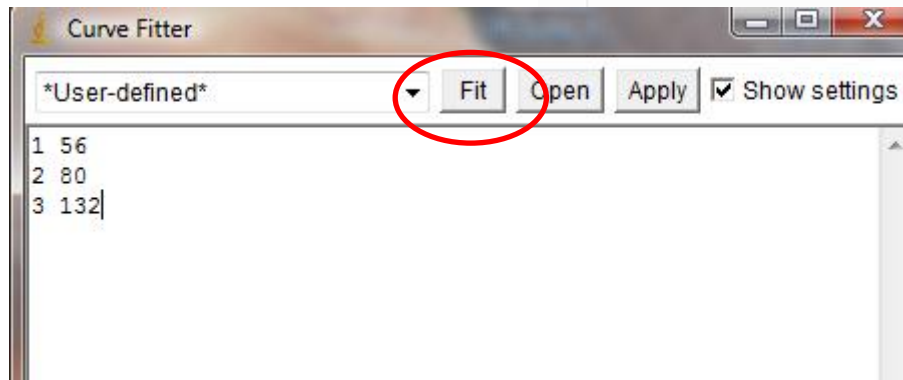
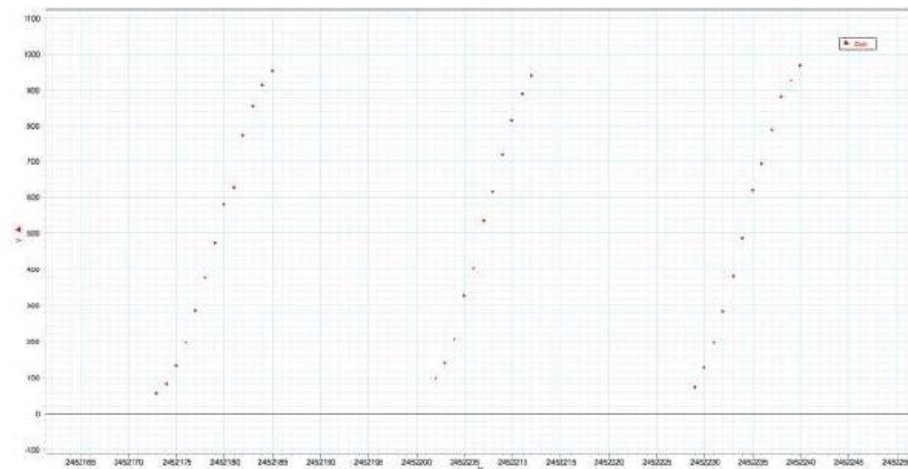
### DATI DELLE TRE ROTAZIONI



Asse Y: posizione x della macchia (pixel) – Asse X: data giuliana (giorni)



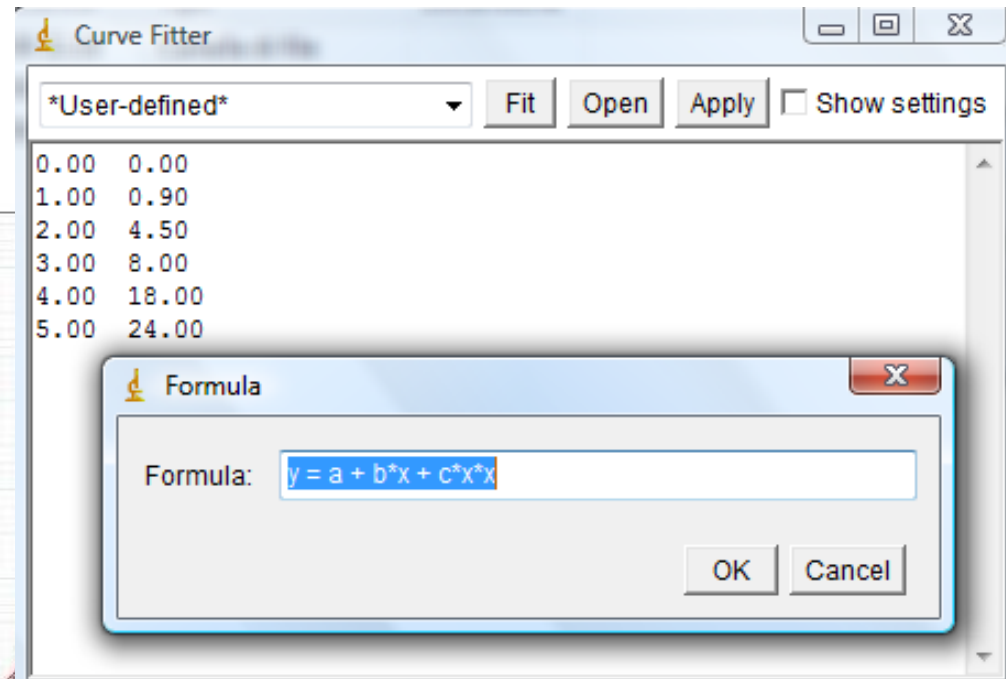
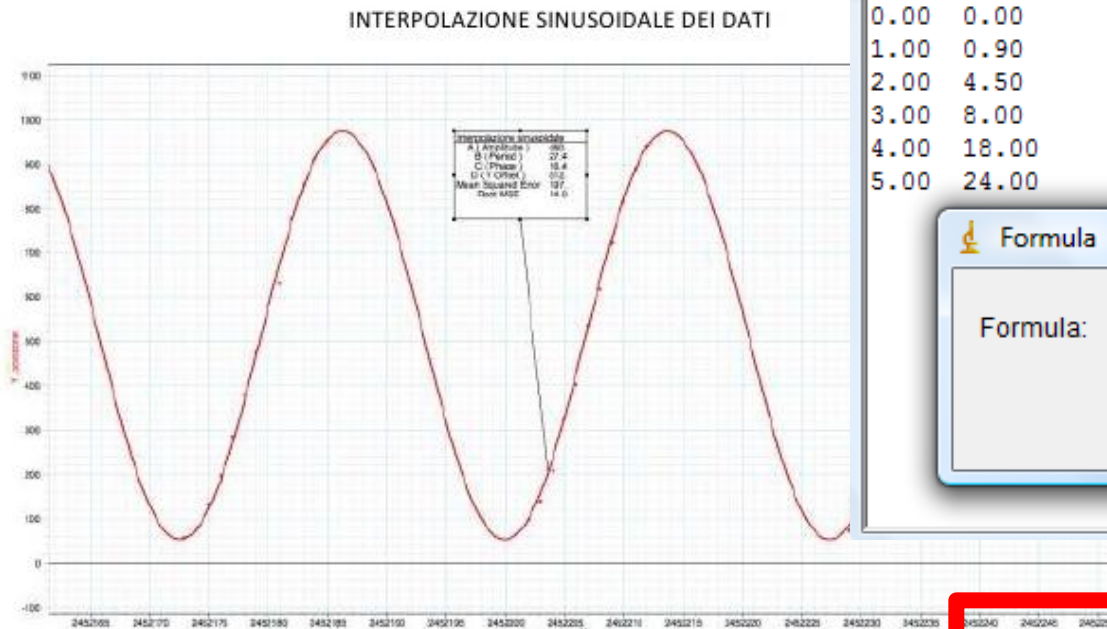
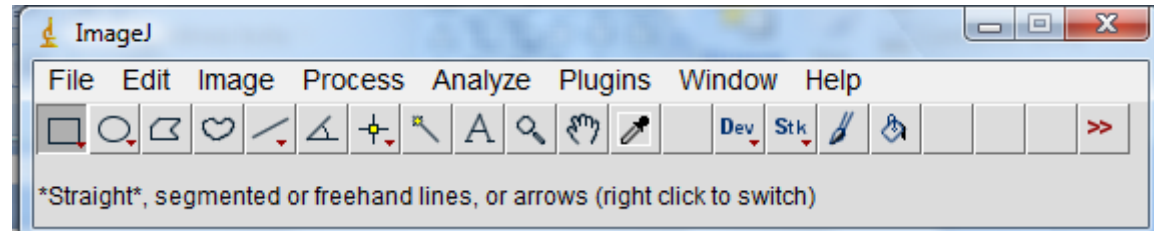
DATI DELLE TRE ROTAZIONI



Analyze;  
tools;  
curve fitting:

Asse Y: posizione x della macchia (pixel) – Asse X: data giuliana (giorni)

## Analyze; tools; curve fitting:



EQUAZIONE DELLA CURVA INTERPOLANTE

$$A \sin \left[ \frac{2\pi(x - C)}{B} \right] + D$$

### PARAMETRI DELL'INTERPOLAZIONE

A (ampiezza) = 460 pixel  
B (periodo) = 27,4 giorni  
C (fase) = 16,4 giorni  
D (offset) = 512 pixel

**Inserire**

**$y = a * \sin(2 * 3,14 * (x - c) / b) + d$**