

Events featuring the natural satellites of Jupiter, April 2025

The satellites (also known as Galilean satellites in honor of the first person to observe them) of Jupiter provide some of the most striking phenomena observable with basic instrumentation. With a good pair of binoculars mounted on a tripod or a small telescope, we may be able to observe eclipses, occultations and transits of the Galilean satellites or their shadows over Jupiter. Similarly, telescopic observation of Jupiter's Great Red Spot (GRS) allows us to enjoy one of the largest storms in the entire Solar System. The following table summarizes all the events featuring Jupiter's satellites and observable from Granada.

- Column 1: Day of the month
- Column 2: Time in Coordinated Universal Time (to transform to local time add one hour in winter time and two in summer time)
- Column 3: Jupiter's altitude above the horizon
- Column 4: Main object: GMR, Great Red Spot; Gan, Ganymede; Cal, Callisto; Io, Io; Eur: Europa.
- Column 5: Event

For those unfamiliar with astronomical language, here we indicate what each of the phenomena tabulated below consists of:

- Transit: This occurs when one of Jupiter's satellites is between us and the planet, i.e. it is (in projection) over Jupiter's disk.

- Transit of the shadow: Based on the previous definition, you can get an idea of what I'm referring to here. Both Jupiter and its satellites are illuminated by the Sun and they all project a shadow in turn. This shadow, if projected by a satellite, can be lost in space or can fall on Jupiter's surface. If this is the case, we will be able to see a dark spot moving across the surface of the planet. For an observer located on Jupiter's surface, it would be a solar eclipse.

- Occultation: If the shadow, instead of being projected by the satellite onto Jupiter's surface, is projected by Jupiter onto the satellite, an eclipse will occur. What we can observe is that a given satellite goes from being visible to not being visible, because it is in the shadow projected by Jupiter and therefore does not receive any light to reflect and be visible. It would be the equivalent phenomenon to a lunar eclipse on Earth.

- Regarding the Great Red Spot (GRS), what we tabulate in this table is the moment when it passes through the central meridian, i.e. when the spot is in front of us.

Day	Time (UT)	Altitude ($^{\circ}$)	Objet	Event
(1)	(2)	(3)	(4)	(5)
02	23:01	12.4	GRS	Crosses central meridian
03	18:53	60.6	GRS	Crosses central meridian
04	22:34	16.0	Io	Transit begins
05	19:48	48.2	Io	Occultation begins
05	20:32	39.4	GRS	Crosses central meridian
05	21:01	33.7	Eur	Transit begins
05	23:10	8.5	Io	Eclipse ends
05	23:17	7.2	Eur	Shadow transit begins
05	23:38	3.5	Eur	Transit ends
06	19:18	53.4	Io	Transit ends
06	20:27	39.7	Io	Shadow transit ends
07	20:47	34.9	Eur	Eclipse ends
07	22:12	18.2	GRS	Crosses central meridian
09	21:21	26.6	Gan	Shadow transit ends
10	19:42	45.5	GRS	Crosses central meridian
12	21:22	24.1	GRS	Crosses central meridian
12	21:47	19.0	Io	Occultation begins
13	19:04	50.8	Io	Transit begins
13	20:09	37.7	Io	Shadow transit begins
13	21:19	23.9	Io	Transit ends
13	22:23	11.4	Io	Shadow transit ends
14	19:35	43.8	Io	Eclipse ends
14	23:01	3.7	GRS	Crosses central meridian
16	21:07	23.9	Gan	Transit ends
16	22:46	4.9	Gan	Shadow transit begins
17	20:32	30.0	GRS	Crosses central meridian
19	22:11	9.3	GRS	Crosses central meridian
20	21:04	21.3	Io	Transit begins
20	22:04	9.8	Io	Shadow transit begins
21	21:22	17.1	Eur	Occultation begins
21	21:28	15.9	Io	Eclipse ends
22	19:42	36.1	GRS	Crosses central meridian
23	20:25	26.8	Eur	Shadow transit ends
24	21:21	15.0	GRS	Crosses central meridian
28	20:17	24.4	Io	Occultation begins
29	19:50	29.0	Io	Transit ends
29	20:31	20.8	GRS	Crosses central meridian
29	20:44	18.4	Io	Shadow transit ends
30	20:20	22.2	Eur	Shadow transit begins
30	21:16	11.4	Eur	Transit ends

Table 1: Phenomena Featuring Jupiter’s Satellites and the Great Red Spot (GRS)