Events featuring the natural satellites of Jupiter, December 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 (^{o})	Objet	Event
(1)	(2)	(3)	(4)	(5)
01	20:39	8.0	Eur	Eclipse begins
02	01:15	62.2	Eur	Occultation ends
02	05:34	54.4	GRS	Crosses central meridian
02	06:10	47.3	Gan	Shadow transit begins
03	01:25	64.7	GRS	Crosses central meridian
03	20:14	4.8	Eur	Transit ends
03	21:17	16.6	GRS	Crosses central meridian
05	03:03	75.1	GRS	Crosses central meridian
05	05:20	54.9	Io	Shadow transit begins
05	06:10	44.9	Io	Transit begins
05	20:01	3.9	Gan	Eclipse begins
05	22:54	37.6	GRS	Crosses central meridian
05	23:14	41.5	Gan	Eclipse ends
05	23:19	42.6	Gan	Occultation begins
06	02:38	75.1	Io	Eclipse begins
06	02:39	75.1	Gan	Occultation ends
06	05:45	49.1	Io	Occultation ends
06	23:48	49.2	Io	Shadow transit begins
07	00:36	58.5	Io	Transit begins
07	02:04	72.8	Io	Shadow transit ends
07	02:53	75.2	Io	Transit ends
07	04:41	60.8	GRS	Crosses central meridian
07	04:55	58.2	Eur	Shadow transit begins
07	06:32	39.0	Eur	Transit begins
07	21:07	17.8	Io	Eclipse begins
07	22:44	37.0	Cal	Shadow transit ends
08	00:11	54.4	Io	Occultation ends
08	00:32	58.6	GRS	Crosses central meridian
08	02:20	74.6	Cal	Transit begins
08	06:18	41.1	Cal	Transit ends
08	20:24	10.2	GRS	Crosses central meridian
08	20:33	12.0	Io	Shadow transit ends
08	21:20	21.1	Io	Transit ends
08	23:13	43.7	Eur	Eclipse begins
09	03:34	70.8	Eur	Occultation ends
09	06:19	40.0	GRS	Crosses central meridian
10	02:10	74.5	GRS	Crosses central meridian
10	19:41	3.9	Eur	Transit begins
10	21:04	19.4	Eur	Shadow transit ends
10	22:02	30.9	GRS	Crosses central meridian
10	22:33	37.3	Eur	Transit ends
12	03:48	66.7	GRS	Crosses central meridian
12	23:39	52.1	GRS	Crosses central meridian
13	00:00	56.1	Gan	Eclipse begins
13	04:32	58.0	Io	Eclipse begins

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Day	Time (TU)	Altitude (^{o})	Objet	Event
(1)	(2)	(3)	(4)	(5)
13	06:03	40.1	Gan	Occultation ends
13	19:31	4.0	GRS	Crosses central meridian
14	01:42	73.4	Io	Shadow transit begins
14	02:21	75.3	Io	Transit begins
14	03:58	63.7	Io	Shadow transit ends
14	04:38	56.1	Io	Transit ends
14	05:26	46.7	GRS	Crosses central meridian
14	23:01	46.1	Io	Eclipse begins
15	01:17	70.9	GRS	Crosses central meridian
15	01:56	74.8	Io	Occultation ends
15	20:10	12.9	Io	Shadow transit begins
15	20:47	20.1	Io	Transit begins
15	21:09	24.3	GRS	Crosses central meridian
15	22:27	40.0	Io	Shadow transit ends
15	23:04	47.5	Io	Transit ends
16	01:47	74.5	Eur	Eclipse begins
16	02:15	75.2	Cal	Eclipse begins
16	05:50	40.3	Eur	Occultation ends
16	05:57	38.9	Cal	Eclipse ends
16	07:04	25.5	GRS	Crosses central meridian
16	19:49	9.7	Gan	Transit ends
16	20:23	16.2	Io	Occultation ends
17	02:55	71.7	GRS	Crosses central meridian
17	20:49	22.0	Eur	Shadow transit begins
17	21:59	35.9	Eur	Transit begins
17	22:46	45.5	GRS	Crosses central meridian
17	23:40	56.1	Eur	Shadow transit ends
18	00:51	68.7	Eur	Transit ends
19	04:33	53.3	GRS	Crosses central meridian
20	00:24	65.7	GRS	Crosses central meridian
20	03:59	59.1	Gan	Eclipse begins
20	06:27	29.8	Io	Eclipse begins
20	20:15	17.7	GRS	Crosses central meridian
21	03:35	62.8	Io	Shadow transit begins
21	04:05	57.2	Io	Transit begins
21	05:52	36.0	Io	Shadow transit ends
21	06:11	32.1	GRS	Crosses central meridian
21	06:23	29.8	Io	Transit ends
22	00:55	71.7	Io	Eclipse begins
22	02:02	74.9	GRS	Crosses central meridian
22	03:41	61.0	Io	Occultation ends
22	21:53	38.8	GRS	Crosses central meridian
22	22:04	40.9	Io	Shadow transit begins
22	22:32	46.4	Io	Transit begins
23	00:21	67.1	Io	Shadow transit ends

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Day	Time (TU)	Altitude (^{o})	Objet	Event
(1)	(2)	(3)	(4)	(5)
23	00:49	71.3	Io	Transit ends
23	04:21	52.5	Eur	Eclipse begins
23	19:23	10.0	Io	Eclipse begins
23	19:49	15.0	Gan	Transit begins
23	21:20	32.8	Gan	Shadow transit ends
23	22:08	42.4	Io	Occultation ends
23	23:08	54.3	Gan	Transit ends
24	03:40	59.7	GRS	Crosses central meridian
24	18:48	4.1	Io	Shadow transit ends
24	19:14	9.0	Io	Transit ends
24	20:53	28.2	Cal	Transit ends
24	23:26	58.6	Eur	Shadow transit begins
24	23:31	59.6	GRS	Crosses central meridian
25	00:15	67.4	Eur	Transit begins
25	02:16	72.7	Eur	Shadow transit ends
25	03:07	65.1	Eur	Transit ends
25	19:22	11.3	GRS	Crosses central meridian
26	05:18	38.8	GRS	Crosses central meridian
26	21:13	33.7	Eur	Occultation ends
27	01:09	74.8	GRS	Crosses central meridian
27	21:00	32.0	GRS	Crosses central meridian
28	05:29	35.0	Io	Shadow transit begins
28	05:49	31.0	Io	Transit begins
28	06:56	17.8	GRS	Crosses central meridian
29	02:47	65.8	GRS	Crosses central meridian
29	02:49	65.4	Io	Eclipse begins
29	05:25	35.0	Io	Occultation ends
29	22:38	53.2	GRS	Crosses central meridian
29	23:58	67.8	Io	Shadow transit begins
30	00:15	70.5	Io	Transit begins
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30	06:56	16.3	Eur	Eclipse begins
30	18:29	5.1	GRS	Crosses central meridian
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30	23:06	59.3	Gan	Transit begins
30	23:51	67.4	Io	Occultation ends
31	01:19	75.2	Gan	Shadow transit ends
31	02:24	68.3	Gan	Transit ends
31	04:25	45.5	GRS	Crosses central meridian
31	18:27	5.3	Io	Shadow transit begins
31	18:41	8.0	Io	Transit begins
31	20:42	31.6	Io	Shadow transit ends
31	20:57	34.6	Io	Transit ends

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Day	Time (TU)	Altitude (^{o})	Objet	Event
(1)	(2)	(3)	(4)	(5)

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