# Events featuring the natural satellites of Jupiter, February 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 | 00:15 | 36.8 | Eur | Transit ends |
| 01 | 02:33 | 9.7 | Eur | Shadow transit ends |
| 01 | 02:33 | 9.7 | Io | Occultation begins |
| 01 | 23:12 | 48.6 | GRS | Crosses central meridian |
| 01 | 23:42 | 42.7 | Io | Transit begins |
| 02 | 00:51 | 28.7 | Io | Shadow transit begins |
| 02 | 01:55 | 16.2 | Io | Transit ends |
| 02 | 19:04 | 69.4 | GRS | Crosses central meridian |
| 02 | 20:57 | 71.9 | Eur | Eclipse ends |
| 02 | 21:00 | 71.6 | Io | Occultation begins |
| 03 | 00:22 | 33.8 | Io | Eclipse ends |
| 03 | 18:10 | 60.9 | Io | Transit begins |
| 03 | 19:21 | 72.3 | Io | Shadow transit begins |
| 03 | 20:22 | 74.8 | Io | Transit ends |
| 03 | 21:33 | 66.0 | Io | Shadow transit ends |
| 04 | 00:51 | 27.3 | GRS | Crosses central meridian |
| 04 | 01:56 | 14.6 | Gan | Transit begins |
| 04 | 18:52 | 68.8 | Io | Eclipse ends |
| 04 | 20:42 | 72.8 | GRS | Crosses central meridian |
| 06 | 02:29 | 6.7 | GRS | Crosses central meridian |
| 06 | 22:21 | 54.8 | GRS | Crosses central meridian |
| 07 | 18:12 | 64.2 | GRS | Crosses central meridian |
| 07 | 20:29 | 72.9 | Gan | Eclipse begins |
| 07 | 22:52 | 48.0 | Gan | Eclipse ends |
| 08 | 00:10 | 32.3 | Eur | Transit begins |
| 08 | 02:34 | 4.5 | Eur | Shadow transit begins |
| 08 | 24:00 | 33.6 | GRS | Crosses central meridian |
| 09 | 01:33 | 15.1 | Io | Transit begins |
| 09 | 18:28 | 68.2 | Eur | Occultation begins |
| 09 | 19:51 | 75.1 | GRS | Crosses central meridian |
| 09 | 22:51 | 46.5 | Io | Occultation begins |
| 09 | 23:36 | 37.5 | Eur | Eclipse ends |
| 10 | 02:18 | 5.9 | Io | Eclipse ends |
| 10 | 20:02 | 74.3 | Io | Transit begins |
| 10 | 21:16 | 64.0 | Io | Shadow transit begins |
| 10 | 22:14 | 53.2 | Io | Transit ends |
| 10 | 23:29 | 38.2 | Io | Shadow transit ends |
| 11 | 01:38 | 12.6 | GRS | Crosses central meridian |
| 11 | 18:27 | 69.3 | Eur | Shadow transit ends |
| 11 | 20:47 | 68.3 | Io | Eclipse ends |
| 11 | 21:30 | 60.8 | GRS | Crosses central meridian |
| 13 | 23:09 | 39.9 | GRS | Crosses central meridian |
| 14 | 19:00 | 74.4 | GRS | Crosses central meridian |
| 14 | 19:23 | 75.2 | Gan | Occultation begins |
| 14 | 21:41 | 56.5 | Gan | Occultation ends |

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| Day | Time (TU) | Altitude ($^o$) | Objet | Event |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| 15 | 00:29 | 23.0 | Gan | Eclipse begins |
| 16 | 00:47 | 18.7 | GRS | Crosses central meridian |
| 16 | 20:39 | 66.4 | GRS | Crosses central meridian |
| 16 | 21:01 | 62.6 | Eur | Occultation begins |
| 16 | 23:36 | 32.0 | Eur | Occultation ends |
| 16 | 23:37 | 31.8 | Eur | Eclipse begins |
| 17 | 00:44 | 18.6 | Io | Occultation begins |
| 17 | 21:54 | 51.6 | Io | Transit begins |
| 17 | 23:12 | 36.1 | Io | Shadow transit begins |
| 18 | 00:08 | 25.0 | Io | Transit ends |
| 18 | 01:25 | 9.9 | Io | Shadow transit ends |
| 18 | 18:27 | 72.9 | Eur | Shadow transit begins |
| 18 | 18:28 | 73.0 | Eur | Transit ends |
| 18 | 19:12 | 75.2 | Io | Occultation begins |
| 18 | 21:03 | 60.7 | Eur | Shadow transit ends |
| 18 | 22:18 | 46.2 | GRS | Crosses central meridian |
| 18 | 22:42 | 41.3 | Io | Eclipse ends |
| 19 | 18:36 | 74.2 | Io | Transit ends |
| 19 | 19:55 | 71.3 | Io | Shadow transit ends |
| 20 | 23:57 | 24.8 | GRS | Crosses central meridian |
| 21 | 19:48 | 71.2 | GRS | Crosses central meridian |
| 21 | 23:15 | 32.3 | Gan | Occultation begins |
| 22 | 01:35 | 5.1 | Gan | Occultation ends |
| 23 | 01:35 | 4.3 | GRS | Crosses central meridian |
| 23 | 21:27 | 52.3 | GRS | Crosses central meridian |
| 23 | 23:36 | 26.6 | Eur | Occultation begins |
| 24 | 23:48 | 23.3 | Io | Transit begins |
| 25 | 01:08 | 8.0 | Io | Shadow transit begins |
| 25 | 18:28 | 75.0 | Eur | Transit begins |
| 25 | 18:42 | 75.2 | Gan | Shadow transit begins |
| 25 | 21:02 | 55.7 | Eur | Transit ends |
| 25 | 21:02 | 55.6 | Eur | Shadow transit begins |
| 25 | 21:06 | 54.9 | Io | Occultation begins |
| 25 | 21:08 | 54.4 | Gan | Shadow transit ends |
| 25 | 23:06 | 31.0 | GRS | Crosses central meridian |
| 25 | 23:39 | 24.4 | Eur | Shadow transit ends |
| 26 | 00:36 | 13.3 | Io | Eclipse ends |
| 26 | 18:57 | 74.4 | GRS | Crosses central meridian |
| 26 | 19:37 | 70.0 | Io | Shadow transit begins |
| 26 | 20:31 | 60.8 | Io | Transit ends |
| 26 | 21:51 | 45.2 | Io | Shadow transit ends |
| 27 | 19:05 | 73.4 | Io | Eclipse ends |
| 28 | 00:45 | 10.1 | GRS | Crosses central meridian |
| 28 | 20:36 | 58.3 | GRS | Crosses central meridian |

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