



**SAAO**

South African  
Astronomical Observatory

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### What's Up – December 2023

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##### Sun and Moon

The Last Quarter Moon falls on the 5<sup>th</sup> of December at 07h49 and the New Moon occurs on the 13<sup>th</sup> of December at 01h32. The First Quarter Moon falls on the 19<sup>th</sup> of December at 20h39 and the Full Moon occurs on the 27<sup>th</sup> of December at 02h33.

The Moon will be at apogee (furthest from Earth) at a distance of about 404 346 km on the 4<sup>th</sup> of December at 20h41. The Moon will be at perigee (closest approach to Earth) at a distance of about 367 901 km on the 16<sup>th</sup> of December at 20h52.

The Summer Solstice will occur on the 22<sup>nd</sup> of December at 05h27.

##### Planetary and Other Events – Morning and Evening

The two big gas giant planets, Jupiter and Saturn, are still visible from after sunset and can be observed throughout this month. Saturn can be seen in the west, while Jupiter shines brightly in the north.

Jupiter is located near the stars of the constellation Pisces. Jupiter will be near the Moon on the 22<sup>nd</sup> of December. Saturn is located in the west near the stars of the constellation Aquarius. Saturn will be near the Moon on the 16<sup>th</sup> of December.

Venus, located near the stars of the constellation Virgo, still dazzles the morning sky as the brilliant and bright morning star. Venus will be near the Moon on the 9<sup>th</sup> of December.

Three meteor showers are active in December, the December Phoenicids (active 28 November to 9 December, peaking on the 2<sup>nd</sup>), the Puppis-Velids (active 1 December to 15 December, peaking on the 7<sup>th</sup>) and the Geminids. The Geminids are active from the 4<sup>th</sup> to the 20<sup>th</sup> of December, peaking early morning on the 14<sup>th</sup>. Observations of the Geminids, which are one of the strongest meteor showers, can be done from 23h30 to 03h00 on the night of the 13<sup>th</sup>/14<sup>th</sup>, and the radiant is located towards the Gemini constellation in a NNE direction. Observing prospects for the Puppis-Velids are good and they are best viewed between 22h30 and 03h30 looking towards the constellations of Puppis and Vela.

##### The Evening Sky Stars

The stars of the Great Square of Pegasus and of Andromeda can still be seen low in the north, with the Andromeda Galaxy visible as a faint fuzzy spot below the star Beta Andromedae. It is believed that in another few billion years, this galaxy will collide with our own Milky Way. Gas and dust clouds will collide, producing large numbers of new stars, but the odds are that not even one star will collide with another. There's just too much empty space. If the Sun was a 10 cm ball, the nearest star system (Alpha Centauri) would be about 3000 km away.

Much of the sky on December evenings is dominated by 'watery constellations' and birds. Above Pegasus and Andromeda are the dim stars of the Fishes tied together at their tails with a knot, and above the Fishes is Cetus, the Whale, representing the sea monster coming to devour Andromeda. The most famous star in Cetus is one that's not usually visible. Named 'Mira', i.e. 'wonderful', it was first recognised as a periodic variable by the Dutchman Jan Holwarda, who found that this star (discovered in 1596 by Fabricius) reached peak brightness roughly every

11 months, when it would typically be visible as a fairly dim star. In-between this mysterious object would disappear. We now know of many similar stars, all of them cool 'red giants' hundreds of times the diameter of our own Sun. If Mira was placed at the centre of our solar system, Earth would be inside it!

West of Cetus in the early evening sky is Aquarius the water carrier, while south of Aquarius are the stars of the Southern Fish, headlined by the bright-ish star Fomalhaut. West of the Southern Fish is the large dim triangle made by the stars of the Sea Goat.

High in the south is the bright star Achernar, with the stars of the Phoenix (the Fire Bird) just above it and the stars of the Toucan and the Crane to the right. The Peacock is moderately low in the SW, below and to the right of the Toucan. Continuing the birds-and-water theme, we find the Water Snake (which looks like a triangle!) directly below Achernar, while the celestial river Eridanus runs its course from Achernar to the knee of Orion, whose stars are rising in the east.

Below Achernar and to the right, among the stars of the Toucan, is the dim glow of the Small Magellanic Cloud. The Large Cloud, below Achernar and to the left, is a bit easier to see, and was imagined by some South African groups to be a hunting plain for the gods. The two brightest stars in the night sky, Sirius and Canopus, are rising in the east and southeast, respectively, with Orion shouldering his way into the summer skies in the northeast, preceded by Taurus the Bull. The small cluster of stars on the Bull's shoulder, the Pleiades, were used all over Africa to keep track of the seasons. In isiXhosa, the Pleiades are called isiLimela. Rising in the east as well is the Milky Way, dimmer than the brilliant Milky Way of winter, but still very impressive on a dark Karoo night.

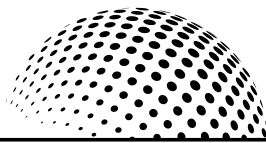
##### The Morning Sky Stars

The Cross and the Pointers (the two brightest stars in Centaurus) are rising higher in the southeast this month. Just above the Southern Cross and the Housefly are the stars of the great ship Argo as it sails along the Milky Way, accompanied by the dim stars of the Flying Fish. The Milky Way still stretches across the predawn sky from the southeast to the northwest as it did last month, running from Scorpio in the ESE through the Wolf and the Centaur to Argo, then west through the stars of the Unicorn, Orion and the Twins. The southern part is much brighter with obvious dark patches, but all of it will reward a scanner with binoculars, revealing beautiful clumps and clustering of stars. Away from the Milky Way, bright Arcturus glows orange in the NE, with blue-white Spica rising in the E and lonely Alpheratz, heart of the great Water Serpent, above Regulus high in the north.

If you look carefully at where most of the bright stars are, you'll notice that they are concentrated near the Milky Way, but offset a bit. These local bright stars are part of a 'spur' sticking out at a bit of an angle from the local spiral arm in the great pinwheel of stars that is our Milky Way Galaxy. Ironically, although most of the stars visible in the night sky are brighter than our Sun, most of the stars in the Milky Way Galaxy are much dimmer than the Sun. The common red dwarf stars that make up most of the population are too dim to see unless they are extremely close, while the rare super giants are visible thousands of light years away.

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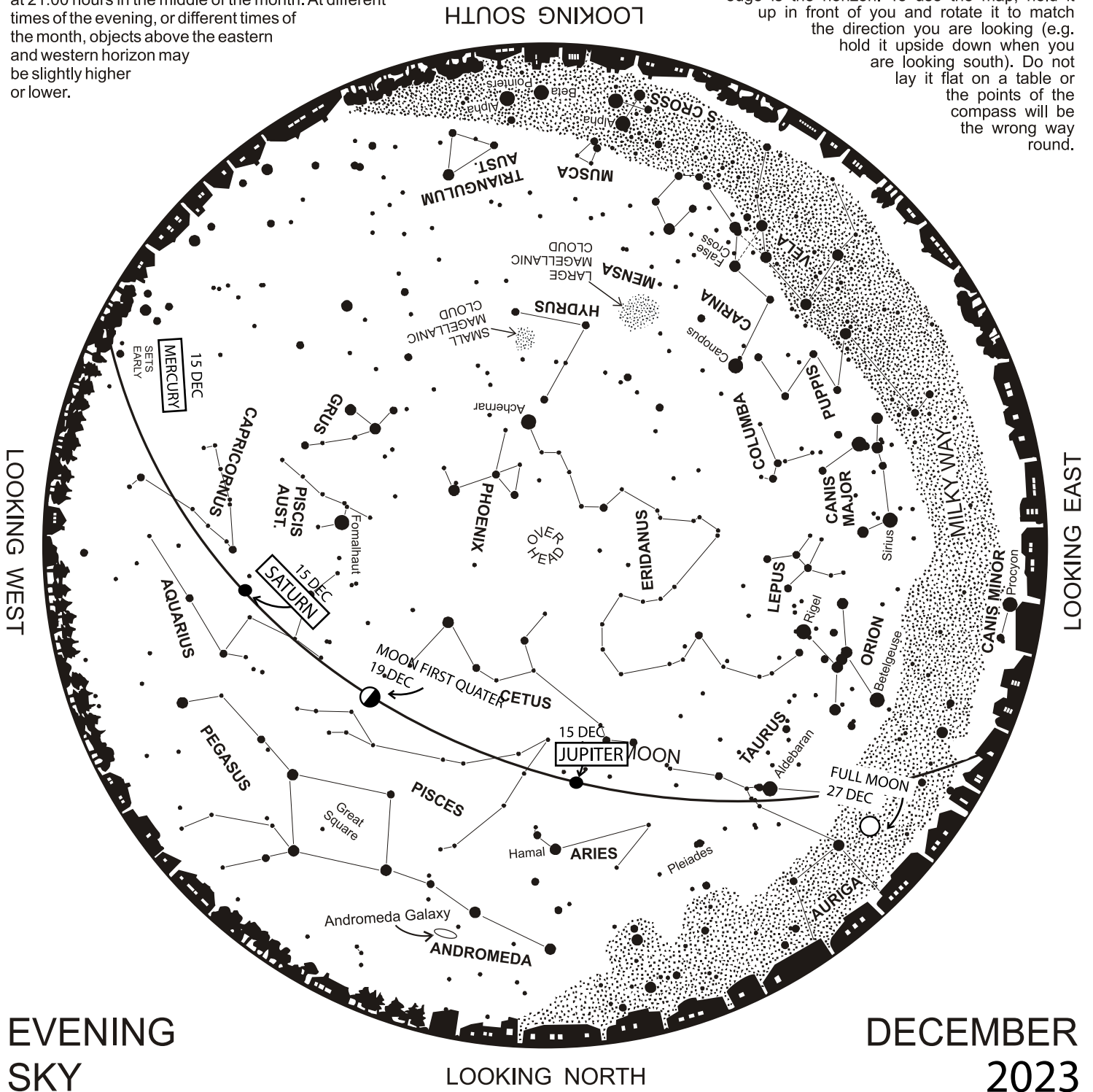
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# IZIKO PLANETARIUM AND DIGITAL DOME

The map shows the night sky visible above the Cape at 21:00 hours in the middle of the month. At different times of the evening, or different times of the month, objects above the eastern and western horizon may be slightly higher or lower.

The centre of the map is the overhead point, the edge is the horizon. To use the map, hold it up in front of you and rotate it to match the direction you are looking (e.g. hold it upside down when you are looking south). Do not lay it flat on a table or the points of the compass will be the wrong way round.



As we move towards South Africa's Summer Solstice (longest day) on 22 December, keep an eye out for the impressive 'open cluster' of stars; the Pleiades (isiLimela) in the north-east just below Aries (ram). Although only a few of the cluster's stars are visible to the naked eye, binoculars reveal hundreds more, all formed from the same giant molecular cloud with roughly the same age. The summer constellations Taurus (bull) and Orion (hunter) return to our evening skies, followed closely by the Milky Way as it stretches across our eastern horizon. Sirius, the brightest star in the night sky, lies within Canis Major (big dog) in the east. The second brightest star, Canopus, is in the south-east in Carina (ship's keel). Since Sirius rises later than Canopus, in Xam Bushman starlore,

Sirius was considered the 'grandmother of Canopus', trailing behind the more agile Canopus. The Moon will be in the evening sky from 13 December (New Moon) with Full Moon (the 'Springbok Moon') on 27 December. Keep an eye out for the Geminids meteor shower, which peaks on the 14 December. Best observed after 23:30 towards the north north-east, the favourable dark observing conditions and high rate of meteors predicted (~120 per hour) make this an astronomical event not to miss.