NEWSLETTER OF ASSA PRETORIA CENTRE JUNE 2026

https://www.pretoria-astronomy.co.za

https://assa.saao.ac.za/

EVENTS: ***All are welcome to join these events.***

NEXT OBSERVING EVENING: June 19th 2026

From sunset onwards at Christian Brothers College. Turn left immediately after entering the main gate. Carry straight on through the car park and proceed straight down the tarred road. About 50 to 100 metres after the last row of studs there is a cricket sightscreen on the right. Observing will be on the cricket pitch just past the sightscreen.
Please do not drive onto the grass.

MONTHLY MEETING : June 24th 2026

The meeting is held on-line. The web link to join the meeting is:
https://meet.jit.si/ASSAPretoriaMonthlyMeeting
If you are on our invitation list you will receive an e-mail from Johan Smit on the day of the meeting, which has the link included. If you are not on the Invitation list and wish to be included, send your mail address to johanchsmit@gmail.com

Michelle Ferreira will be Chairman for the evening and present What's Up for June 2026.

Main Topic for June: The speaker and subject will be advised before the Meeting.

EDITORIAL / POINT OF VIEW : Out of date Articles. Michael Poll

Probably like any producer of a Newsletter, there is always a shortage of "copy" as they say. That is, there are not many contributions. At present very few are contributing although one must acknowledge those people who have done so. For the time I have been doing the Newsletter (since October 2025) I have used articles that I wrote for the Newsletter in the quite distant past. You will have noticed the dates of the references given at the end of the articles.

I have tried to update the articles here and there, but for me they are often not as far up to date as I would like. The critical reader will maybe note that new findings have left some ideas obsolete or that some statements have been disproven. Anyone who feels strongly that the record must be put straight is very welcome to do the updating and submit the update for publication.

PS Ever since whenever the Newsletter included a summary of "What's Up" from the previous monthly meeting. As of this newsletter, I am going to stop including a report of the What's Up that was presented at previous meeting because most of the events have already occurred and are no longer relevant.

What would be better would be to include the summary of What's Up that is to be presented for the following month in the Newsletter (i.e the June Newsletter would carry the What's Up summary for July). I need the summary by the 10th of the month of publication. Alternatively, if the What's Up summary cannot be provided tin time, it can be submitted to Johan Smit who can circulate the summary with the invitation to the Meeting.

REMINDER – SUBSCRIPTIONS DUE

The Centre's financial year runs from July 1st until June 30th the following year, so that subscriptions for 2026 – 2027 are now due. The cost is R200.00 per year for individuals or a family, and the subscription includes a copy of Sky Guide Africa South for the following year.

The Application / Renewal form has been updated and is available on the Centre website at https://www.pretoria-astronomy.co.za

REPORTS

Observing Evening Report May 22nd 2026 Michael Poll

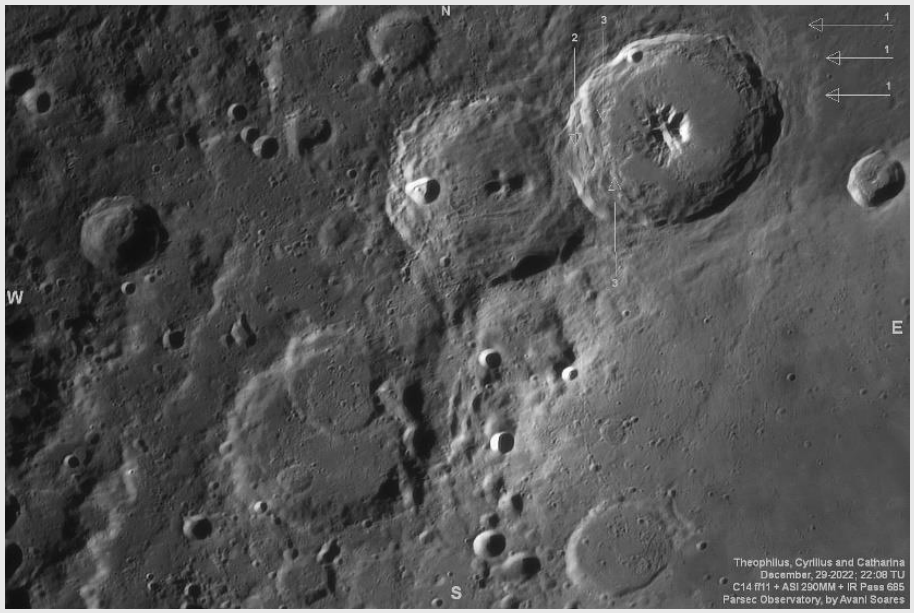
We had a great turnout of 40 or so people. After a not too promising start in the morning the sky had cleared during the day and was mostly cloud free when we started. We were able to have a good naked eye evening, as many of the people had not been before, and were learning names for the first time. The Skymap chart was very useful and attracted a great deal of interest. We were able to point out and name practically all of the bright stars visible.

Jupiter and Venus were highlights in the north west, as were the telescopic views of the Moon. The two planets were about 20° apart with Venus the lower of the two. People were encouraged to observe them carefully over the next couple of weeks and note that the gap between them would get smaller, until they were close to each other around June 9th and then to see that they would have changed places after that date.

Jupiter is in Gemini, and in the fading light, even Castor and Pollux could be seen. One newcomer soon made the observation that Venus Jupiter and the Moon were in a (more or less) straight line. Regulus could be seen next to the Moon, and Gamma Leonis (double star) was found and looked at in the telescope.

The Moon was 5 days old, and the most prominent craters seen were the trio of Theophilus, Cyrillus and Catharina, which are on edge of Mare Nectaris. Also on the southern edge of Nectaris we identified Fracastorius, whose wall to the north is missing, so that the floor is continuous with that of Nectaris. Theophilus and Cyrillus show dramatic central peaks. Theophilus, Cyrillus and Catharina are all about 100 km in diameter, Fracastorius is 124 km in diameter.

We looked at Procyon, Sirius and Canopus in a row from north west to south west, and the three Southern Crosses in the south. Later we saw Scorpius rising and noted that a line drawn from Alpha Crucis through Beta Centauri intersects with Scorpius. Amongst the telescopic object we looked at were NGC 3532 (the Wishing Well) Omega Centauri and the Jewel Box.



Lunar Craters: from top right to bottom left- Theophilus, Cyrillus and Catharina
The prominent crater to the left is Tacitus, and the infilled one at bottom right is Beaumont
Photographer: Avani Soares Location of Photo: Parsec Observatory, Canoas, Brazil

Meeting Report: May 27th 2026 Michael Poll

What's Up for June 2026 was presented by Johan Jordaan.

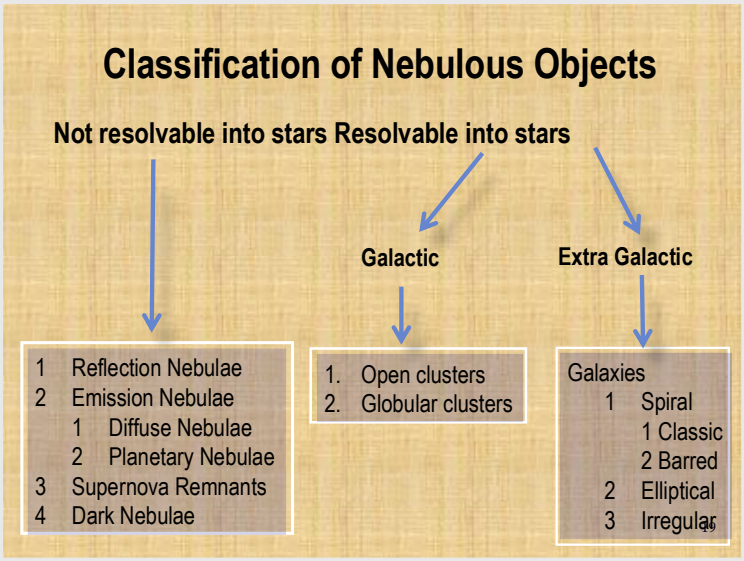
Johan detailed the dates of the Moon's phases. He highlighted three occultation dates and noted dates on which the Moon would be near bright objects. Venus and Jupiter are in the evening sky, being close together on June 9th and 10th. Mercury joins these two during the month but is lower down although Jupiter will be near it around June 25th. Mars, Saturn and Neptune are all in the morning sky. Johan mentioned the double stars Algieba (Gamms Leonis), Alpha Centauri (with a comment about Proxima) and also Mu Scorpii and Zeta Scorpii. Globular clusters to note were NGC 5139 (Caldwell 80 - Omega Centauri); NGC 6541 (Caldwell 78 in Corona Australis;); NGC 3201 (Caldwell 79 in Vela); and NGC 6352 (Caldwell 81 in Ara)

Michael Poll was the main speaker and the title of the presentation was:

"Nebulae : Catalogues and Classification"

The catalogues discussed were those of Charles Messier; William Herschel; John Herschel; John Louis Emil Dreyer who, as well as listing discoveries of his own, consolidated the catalogues of Messier and the Herschels into the New General Catalogue, and later published the two Index Catalogues. Edward Emerson Barnard published a "Catalogue of Dark Markings in the Sky". Then were listed the "Caldwell Catalogue" published by Patrick Caldwell Moore ("The Best of the Non-Messier); the Bennett Catalogue of "130 objects South of the Celestial Equator" published by Jack Bennett, and the "ASSA Top 100 Deep Sky Objects" compiled by Auke Slotegraaf & Magda Streicher. Finally mentioned was a catalogue of "Admirable Objects of the Sky" made by Giovanni Batista Hodierna in Sicily 1654. This catalogue was only 'rediscovered' in 1985. Nine of the objects in the catalogue were original discoveries.

Michael then presented a classification chart for nebulous objects and gave examples of each citing the discoverer and some details of each.



ARTICLE Planetary Oceans Michael Poll

The solar system is flooded with water, but the water exists mostly in the very cold outer regions, in particular in the solid bodies beyond the asteroid belt. Ganymede, Callisto and Titan are about half water by mass. Europa, Triton and Pluto all have proportionately more water than the Earth. The non- gaseous portion of the giant planets is probably more water than anything else.

By comparison the inner solar system is a desert. Venus has practically no water, the runaway greenhouse effect has seen it all off. Mars has proof of ancient surface flows of water, and evidence of geologically recent but short lived flows. It probably also has subsurface ice but it has no liquid water. Water covers two thirds of the Earth's surface, and yet the abundance of water on Earth is very low by cosmic standards - only 0.03% of its mass is water.

If the Earth were substantially closer to or further from the sun, it too would have no liquid oceans, but the Earth lies in what is known as a "Habitable Zone" which is the range of distance from the Sun that an Earth like planet can exist. The habitable zone seems to be rather narrow, so Earth like planets could be rare. However it is possible that planets with water oceans are more common than previously thought, which would make habitable zones larger.

The rationale for broadening planetary ocean expectations considers that any body, including moons, that has an energy source in a lower layer which lies beneath an upper layer that inhibits the outward flow of thermal energy might be able to sustain an ocean in a middle layer, even though the top of the upper layer may be cold.

The Earth maintains liquid oceans due to a mild greenhouse effect. The main greenhouse gases are water vapour (H_2O) and carbon dioxide (CO_2), which prevent the escape of heat received from the Sun. Solar energy thus dominates the near surface conditions. Because the heat is retained, the Earth's surface is warm enough to allow water to exist as a liquid, even though the upper parts of the Earth's atmosphere are cold. Even in the in the case of Venus, the top of the cloud deck is at a temperature below the freezing point of water, yet the surface temperature of Venus, only 65 km below, is more than 400°C – the heat is trapped.

With the greenhouse effect the heat source is external. The internal heat sources that can maintain warmth in a middle layer of other bodies include tidal flexing of the core and radioactivity of underlying rock and, in these cases, because the heat source is internal the distance from the parent star would not be a factor in determining whether a body has an ocean.

Planetary oceans can be of different types:

Naked ocean: With a naked ocean, the sea is visible and exposed and can be seen from space. This is the type of ocean found on the Earth, although it is not truly naked in that it is covered by an atmosphere.

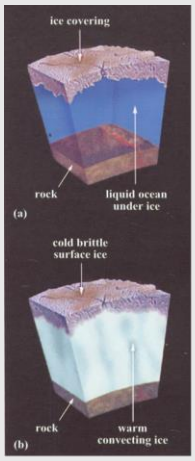
Capped ocean: This is an ocean buried beneath a layer of ice or rock. If the overlying layer is ice, the ice naturally floats on top of the liquid water. The heat source is internal, with the upper layer of ice or rock acting as a natural insulator preventing the escape of heat. The ocean lies between the upper layer and the core.

Blanketed ocean: Is an ocean that is preserved because of an overlying dense atmosphere. It may not be possible to see through such an atmosphere.

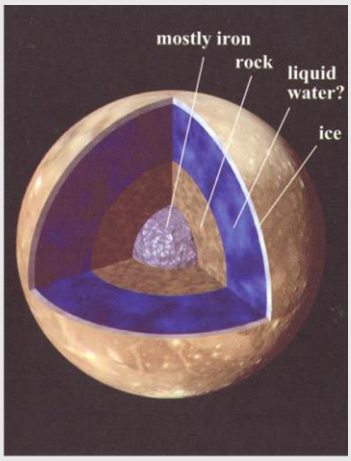
***Selected* Solar System Candidates for the Possession of Oceans**

- **Jupiter's Moons :**

Europa: Europa is mostly rock, but its mean density suggests that 10 % of its mass is water. The water ice surface is very mobile and extensively fractured with upwelling, suggesting the possibility of an ocean beneath an ice crust. The proposal is that Europa has a capped ocean. The thickness of the ice layer is estimated at 10 - 40 km, overlying an ocean more than 100 km deep, resting on a rocky floor. The layer of water is maintained by heat from tidal flexing of the core, and pressure of ice above. The flexing is caused by the fact that Europa is in a mean motion orbital resonance of 1:2:4 with Io and Ganymede in the order Io-Europa-Ganymede.



Possibilities for Europa.



Callisto

Callisto: The magnetometer readings from the Galileo Orbiter suggested that Callisto could have a subterranean ocean. The heat source would be radioactivity in the core. It was previously thought that Callisto was too small to form an ocean if radioactivity was the only heat source, but current understanding of ice flows and efficiency of convection suggests that an ocean is possible, especially if the rocks contained the cosmic abundance of radioactive potassium. The ocean would be about 150 - 200 km below the surface because at this depth the ice is easier to melt due to the high pressure (2000 atmospheres) exerted by the overlying ice.

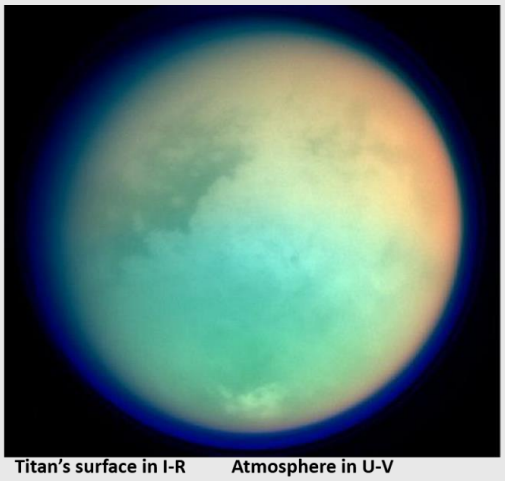
- **Saturn's Moons**

Titan: Titan a has a dense opaque atmosphere overlying a surface with numerous lakes of liquid methane (CH_3) and liquid ethane (C_2H_6) These qualify as blanketed oceans. Titan is also believed to have a massive, capped, subsurface ocean, though recent studies suggest it may be more of a slushy, ice-water mixture rather than a liquid ocean The outer ice shell is thought to be about 170 km thick, covering layers of ice, slush and water. Computer models suggest these layers of extend to a depth of more than 550 km.

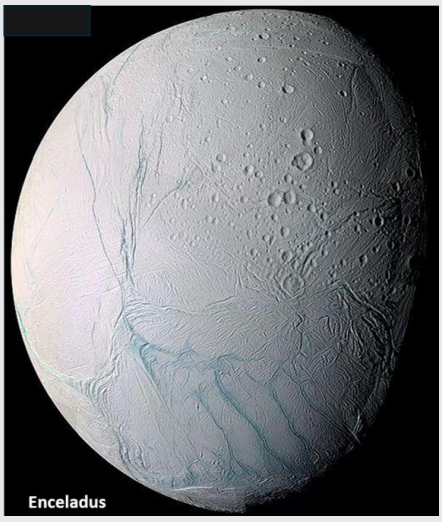
Enceladus: Enceladus is very small but has lots of heat, because it is in a mean motion orbital resonance of 2:1 resonance with Dione, the next satellite out. The resonance causes tidal flexing of Enceladus, which provides a heating source for its geologic activity.

In 2006 the Cassini Orbiter found jets of water & ice spurting from vents (sulci) in the Moon's south polar region. The water jets come from relatively warm fractures in the crust. Scientists determined that the jets were being supplied by a global ocean inside the Moon. It is thought that the Moon's ice shell may be as thin as 1 to 5 kilometres at the south pole. The average global thickness of the ice is thought to be about 20 to 25 kilometres.

Reference for Enceladus: https://science.nasa.gov › saturn › moons › Enceladus



Titan's surface in I-R Atmosphere in U-V
Cassini Image



Reference: "Planetary Oceans" David J Stevenson : Sky & Telescope November 2002 p 39

OBSERVERS CORNER by Magda Streicher NGC 6093

A Heavyweight : In the Constellation of Scorpius

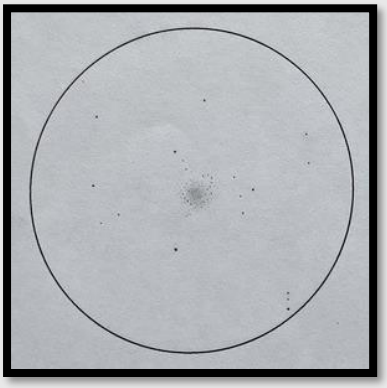
Globular clusters situated on the outskirts of our Milky Way are, in most cases, masses of very dense star clusters. They are strung together by gravitation and move together as a cluster through space. It is believed that some of the most massive globular clusters could even contain black holes.

Charles Messier (1730-1817) set his sights on discovering comets and compiled a catalogue to eliminate any potential confusion. During an observation session in January 1781 Messier documented the nebula without stars as Messier 80 also known

as NGC 6093. Further remarks indicated a round shape with a very bright centre that could be confused with the nucleus of a comet. Messier 80 is one of the densest globular clusters in our Milky Way, extremely rich in thousands of stars probably packed tightly together especially in the core section. It is also one of the objects that are very intensively studied by astronomers.

This splendid globular is situated only 4 degrees north-west of alpha Scorpii, also known Antares. According to my humble impressions it is a bright outstanding globular cluster with an unresolved exceptional core that grows about two-thirds in size if compare the globular as a whole. What caught and held my attention was the slightly yellow hue of the core, but it is still very difficult to resolve core stars even with high magnification. Faint star outliers become noticeably prominent in the thinner outer third of the globular edge and mingle well with the scattered framed star field. A beautiful magnitude 8.4 white star is situated just 3′ to the north-east. However, high magnification is needed to explore the beauty and bring to the fore the real density of this heavyweight globular cluster.

OBJECT	TYPE	RA	DEC	MAG	SIZE
NGC 6093	Globular Cluster	16h17m.0	-22°58′.5	7.3	8.9′



Telescope Sketch by Magda

FROM THE ARCHIVES

Visit to Tswaing March 14th 2009

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Public Veiwing : Wonderboom Junction : June 26th 2015

Michael Poll setting up the Centre Banner on the left. His telescope at the centre rear. Danie Barnardo's telescope in the foreground.
(I am not sure if anyone else was there. Michael)

Joke :
Two atoms were walking down the street. One said "Uh-Oh, I have lost an electron". The other said "Are you sure?" and the reply was "Yes, I'm positive"