ANTELOPE VALLEY ASTRONOMY CLUB, INC.

Desert Sky Observer

Volume 38 *Antelope Valley Astronomy Club Newsletter* **January 2018**

Up-Coming Events

January 6: Prime Desert Woodland Moon Walk
January 12: Club Meeting*
January 31: Total Lunar Eclipse

* Monthly meetings are held at the S.A.G.E. Planetarium in Palmdale, the second Friday of each month. The meeting location is at the northeast corner of Avenue R and 20th Street East. Meetings start at 7 p.m. and are open to the public. *Please note that food and drink are not allowed in the planetarium*

President

Frank Moore

Happy New Year AVAC members. Welcome to 2018. I hope you all had a great holiday season with family and friends and that you're all ready for a great year of astronomy education, observing and outreach.

As is our custom, we did not have a December meeting at the SAGE Planetarium as we instead had our annual Christmas Party at Gino's Italian Restaurant. I think everyone who attended would agree that it was a great event with great food and wonderful fellowship. We also had some great raffle prizes with the winner taking home 10" Sky-Watcher Collapsible Dobsonian telescope. On top of it all, they let us divvy up the leftovers from our Italian buffet. How much better does it get than that?

On December 9, the Saturday following our banquet, we supported Jeremy Amarant at the monthly Prime Desert Woodland Moonwalk. With high clouds, smoke from wildfires on the western horizon, and dust from traffic through the parking lot conditions were a bit challenging but we still managed to share some views of deep sky objects with the public. Members who shared views of celestial wonders with the public included Kevin Reilly, Chris Cardon, Ellen Mahler, Rod Girard and Frank Moore. Noticeably missing, and terribly missed, was our usual outreach stalwart Darrell Bennett who had heart bypass surgery on November 29 and will be missing from events for a while.

Weather permitting, our next event at Prime Desert Woodland will be on Saturday, January 6, at 5:30 PM. It's still over a week off but weather forecasts call for a change in the weather, and a good chance of precipitation that weekend, so stay tuned for updates on the event.

The next monthly meeting will be held at the SAGE Planetarium on Friday, January 12, at 7:00 pm. Our Guest Speaker will be Geovanni Somoza giving a presentation on the history, facilities and programs at the Griffith Observatory. You might want to ask him about the hiking trails in Griffith Park as well since I know he hikes them on a regular basis. Geo is a fixture in the Southern California astronomy outreach community and is currently the President of the Los Angeles Astronomical Society, the Regional Outreach Coordinator at the Planetary Society, a Telescope Demonstrator at the Griffith Observatory and Telescope Operator at the Mount Wilson Observatory. Year before last he was our Telescope Operator on the 100" telescope at Mount Wilson.

Remember, we have a Total Lunar Eclipse in the early morning hours of Wednesday January 31 and, WEATHER PERMITTING, we will be having an event in the parking lot of the SAGE Planetarium. The Penumbral Eclipse begins at 2:51 AM local time, the Partial Eclipse begins at 3:48, the Full Eclipse begins at 4:51 with the Maximum Eclipse at 5:59 and Totality ending at 6:07. The moon will still be partially eclipsed when it sets at 6:56 am. By the way, if you haven't seen it, a setting moon that is still partially eclipsed as it descends below the horizon is a beautiful site. Setup will be begin approximately one hour before the beginning of the penumbral eclipse and we will have coffee, cocoa, donuts and other snacks for those in attendance. The event will be open to the public.

We'll be posting more 2018 dates after the first board meeting of the year where we flesh out the calendar. Stay tuned. Fun, frivolity, friendship and far out astronomy on the horizon.

Also, Annual Membership Renewals are due. The full renewal procedure, with payment methods and links to the PayPal site, are noted elsewhere in this newsletter. If you dawdle too long you fall off the email list and miss out on some announcements so take care of it right away.

I wish us all CLEAR SKIES (but not so clear that we don't get some badly needed rain).

Secretary

Rose Moore

I would like to thank all those that came to the Christmas party at Gino's!! We had 43 members come out and had a great time, and the food was excellent! Thank you to all that came early to help set things up! Congratulations to Rod Girard, recipient of the Keith Lawson Award, and to Kevin Reilly, the Holland Fountain Award!

Coming up in January is a Prime Desert Moon Walk with Jeremy on Saturday January 6th at 5:30pm. Set up time is 1 hour prior to start time. We'll need members with telescopes. Weather permitting!

At our January meeting we will have a speaker, Geo Somoza. Please see Frank's note above. He has come to speak at our meetings before and in January will speak about the Griffith Observatory. We encourage members to come out and enjoy this presentation!

On Friday February 9th at our club meeting, we will have Dr. Rahul I. Patel come to speak to us about exoplanets! He is an astrophysics postdoctoral researcher at Caltech. More info to follow.

February's Prime Desert Moon Walk is on Saturday the 10th at 6pm. Set up time is 1 hour prior to start time. Weather permitting!

Wishing everyone a very healthy and Happy New Year!

Space Place

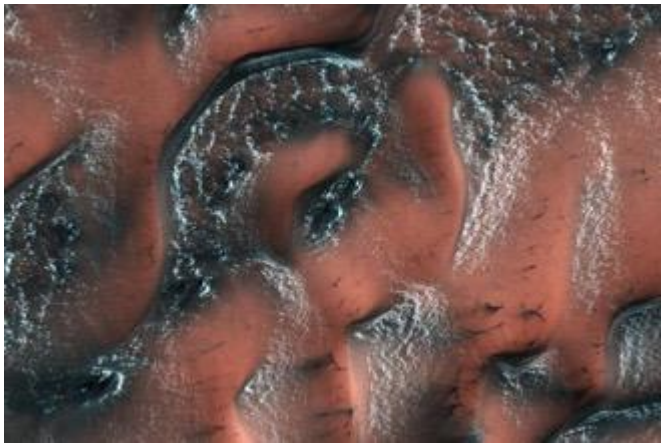
Snowy Worlds Beyond Earth

By Linda Hermans-Killiam

There are many places on Earth where it snows, but did you know it snows on other worlds, too? Here are just a few of the places where you might find snow beyond Earth:

Mars

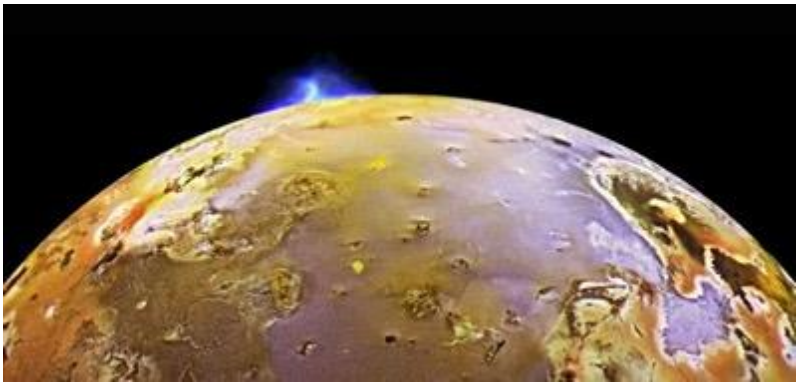
The north pole and south pole of Mars have ice caps that grow and shrink with the seasons. These ice caps are made mainly of water ice—the same kind of ice you'd find on Earth. However, the snow that falls there is made of carbon dioxide—the same ingredient used to make dry ice here on Earth. Carbon dioxide is in the Martian atmosphere and it freezes and falls to the surface of the planet as snow. In 2017, NASA's Mars Reconnaissance Orbiter took photos of the sand dunes around Mars' north pole. The slopes of these dunes were covered with carbon dioxide snow and ice.



NASA's Mars Reconnaissance Orbiter captured this image of carbon dioxide snow covering dunes on Mars. Credit: NASA/JPL/University of Arizona

A Moon of Jupiter: Io

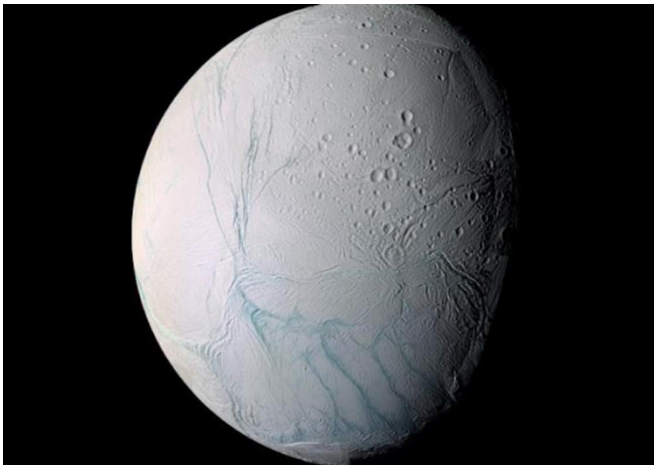
There are dozens of moons that orbit Jupiter and one of them, called Io, has snowflakes made out of sulfur. In 2001, NASA's Galileo spacecraft detected these sulfur snowflakes just above Io's south pole. The sulfur shoots into space from a volcano on Io's surface. In space, the sulfur quickly freezes to form snowflakes that fall back down to the surface.



A volcano shooting molten sulfur out from the surface of Io. Credit: NASA/JPL-Caltech

A Moon of Saturn: Enceladus

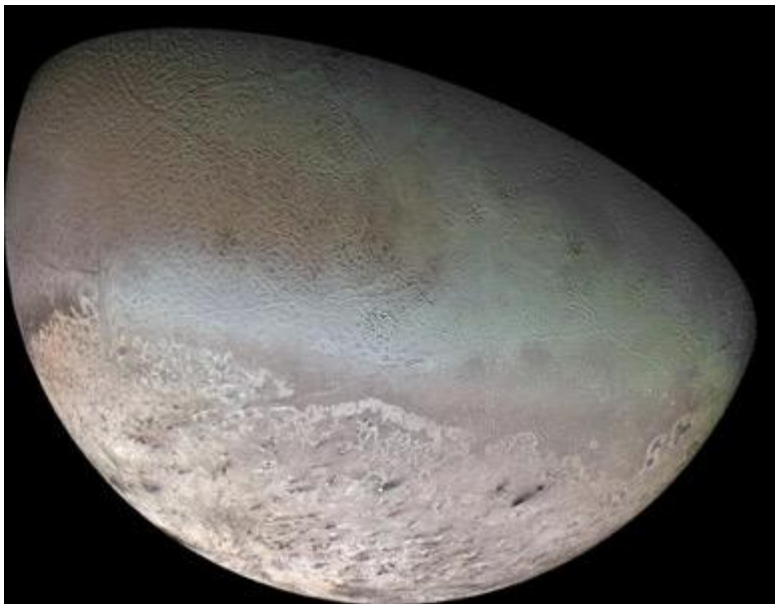
Saturn's moon, Enceladus, has geysers that shoot water vapor out into space. There it freezes and falls back to the surface as snow. Some of the ice also escapes Enceladus to become part of Saturn's rings. The water vapor comes from a heated ocean which lies beneath the moon's icy surface. (Jupiter's moon Europa is also an icy world with a liquid ocean below the frozen surface.) All of this ice and snow make Enceladus one of the brightest objects in our solar system.



Enceladus as viewed from NASA's Cassini spacecraft. Credit: NASA

A Moon of Neptune: Triton

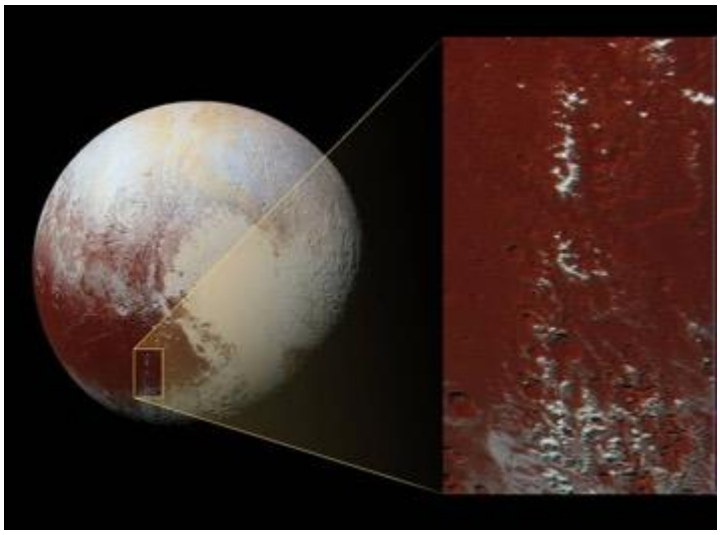
Neptune's largest moon is Triton. It has the coldest surface known in our solar system. Triton's atmosphere is made up mainly of nitrogen. This nitrogen freezes onto its surface covering Triton with ice made of frozen nitrogen. Triton also has geysers like Enceladus, though they are smaller and made of nitrogen rather than water.



The Voyager 2 mission captured this image of Triton. The black streaks are created by nitrogen geysers. Credit: NASA/JPL/USGS

Pluto

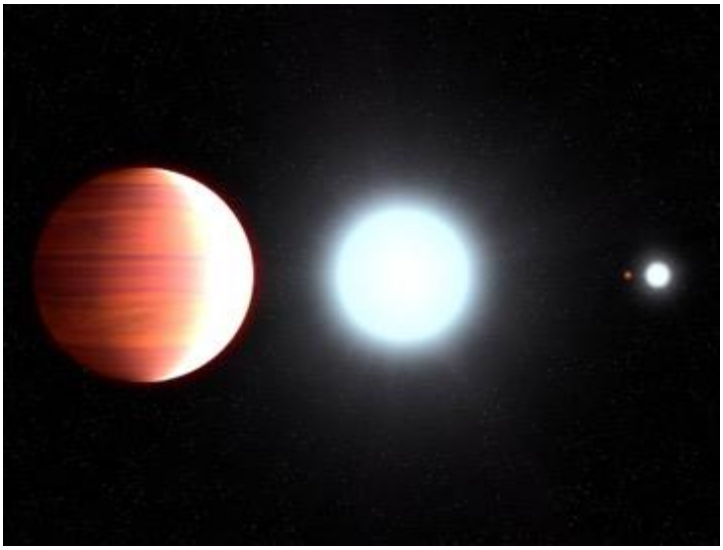
Farther out in our solar system lies the dwarf planet Pluto. In 2016, scientists on the New Horizons mission discovered a mountain chain on Pluto where the mountains were capped with methane snow and ice.



The snowy Cthulhu (pronounced kuh-THU-lu) mountain range on Pluto. Credits: NASA/JHUAPL/SwRI

Beyond Our Solar System

There might even be snow far outside our solar system! Kepler-13Ab is a hot, giant planet 1,730 light years from Earth. It's nine times more massive than Jupiter and it orbits very close to its star. The Hubble Space Telescope detected evidence of titanium oxide—the mineral used in sunscreen—in this planet's upper atmosphere. On the cooler side of Kepler-13Ab that faces away from its host star, the planet's strong gravity might cause the titanium oxide to fall down as "snow."



This is an artist's illustration of what Kepler-13Ab might look like. Credit: NASA/ESA/G. Bacon (STScI)

Want to learn more about weather on other planets? Check out NASA Space Place: https://spaceplace.nasa.gov/planet-weather

This article is provided by NASA Space Place. With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology. Visit https://spaceplace.nasa.gov/ to explore space and Earth science!

News Headlines

Arecibo Radar Returns with Asteroid Phaethon Images
After several months of downtime since Hurricane Maria struck the island of Puerto Rico, the Arecibo Observatory Planetary Radar has returned to normal operation, providing the highest-resolution images to date of near-Earth asteroid 3200 Phaethon during its December 2017 close approach to Earth.
https://goo.gl/cHDc4H

Did you see it? Falcon 9 launch lights up Southern California Sky
Take a look back at the Dec. 21 liftoff of a SpaceX Falcon 9 rocket from Vandenberg Air Force Base in California, a launch that was visible across Southern California and as far away as Arizona as the booster climbed into sunlight at dusk to deliver 10 commercial Iridium communications satellites to orbit.
https://goo.gl/MJurcv

A New Stellar X-ray "Reality" Show Debuts
A new project using data from NASA's Chandra X-ray Observatory and other telescopes allows people to navigate through real data of the remains of an exploded star for the first time. This three-dimensional virtual reality (VR) project with augmented reality (AR) allows users to explore inside the debris from actual observations of the supernova remnant called Cassiopeia A. Cassiopeia A (Cas A, for short) is the debris field of a massive star that blew itself apart over 400 years ago.
https://goo.gl/6B6WBh

Bright Areas on Ceres Suggest Geologic Activity
If you could fly aboard NASA's Dawn spacecraft, the surface of dwarf planet Ceres would generally look quite dark, but with notable exceptions. These exceptions are the hundreds of bright areas that stand out in images Dawn has returned. Now, scientists have a better sense of how these reflective areas formed and changed over time -- processes indicative of an active, evolving world.
https://goo.gl/o6UtiR

NASA's Look At the Difference of a Few Days in the Thomas Fire
What a difference a few days can make in the life cycle of a fire. In this particular case, the Thomas Fire that is ongoing in the Ventura and Santa Barbara Counties in Southern California.
https://goo.gl/VX7U5e

Doing without dark energy
Three mathematicians have a different explanation for the accelerating expansion of the universe that does without theories of 'dark energy.' Einstein's original equations for General Relativity actually predict cosmic acceleration due to an 'instability,' they argue in a new paper.
https://www.sciencedaily.com/releases/2017/12/171214100859.htm

Astronomers Figure Out a New Way to Search for Planets at Alpha Centauri
At 4.37 light-years from Earth, Alpha Centauri is the nearest star system to our own. For generations, scientists and speculative thinkers have pondered whether it might have a planetary system like our own Sun, and whether or not life may also exist there. Unfortunately, recent efforts to locate extra-solar planets in this star system have failed, with potential detections later shown to be the result of artifacts in the data.
https://www.universetoday.com/138120/astronomers-figure-new-way-search-planets-alpha-centauri/

January Sky Data

Full Jan 1/31 | Last Qtr Jan 8 | New Jan 16 | First Qtr Jan 24

Best time for deep sky observing this month:
January 11 through January 18

Mercury reaches greatest elongation west on New Year's Day shining at magnitude -0.1. It will be seen low in the Southeast before dawn and will be visible for a couple of weeks before sinking back towards the Sun. Its angular diameter reduces from 6.7 to 4.9 arc seconds but, as the percentage illuminated surface area increases from 62% to 95%, its brightness remains constant throughout the month.

Venus passes through superior conjunction (on the far side of the Sun) on January 9th and so cannot be observed this month.

At the start of the month **Mars** lies in Libra but moves down into Scorpius at the end of the Month. Now a morning, it rises four hours or so earlier than the Sun. During the month, Mars has a magnitude increasing from 1.7 to 1.4 and an angular size of just 4.8, increasing to 5.6, arc seconds so no details will be seen on its salmon-pink surface.

Jupiter is now a pre-dawn object rising some three and a half hours before the Sun at the beginning of the month with its 33 arc second disk, at a magnitude of -1.4. As the month progresses, its apparent diameter increases to 35.8 arc seconds and it brightens to magnitude -1.6. The elevation before dawn will then be sufficiently high to enable crisp views of the giant planet.

Saturn passed behind the Sun on December 21st (superior conjunction) and reappears in the pre dawn sky this month at the start of its new apparition. It is unlikely to be seen in the first week of January, but climbs higher and so becomes easier to spot as the month progresses. The rings were at their widest a few months ago and are still well open.

The first major **meteor shower** of the year, the Quadrantids, will peak on the night of January 3 and early morning hours of January 4. A Full Moon may make it difficult to see some of the fainter meteors. If you still wish to try your luck, astronomers predict a peak in meteor activity after nightfall on January 3 to 4.

Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
1/1/2018	5:55pm	7:21am	8:00am	5:52pm
1/5/2018	10:25pm	10:55am	8:00am	5:56pm
1/10/2018	2:23am	1:49pm	8:00am	6:00pm
1/15/2018	6:47am	5:14pm	7:59am	6:04pm
1/20/2018	10:12am	9:44pm	7:58am	6:10pm
1/25/2018	1:06pm	1:42am	7:55am	6:15pm
1/31/2018	6:53pm	7:57am	7:52am	6:21pm

Planet Data

Jan 1

	Rise	Transit	Set	Mag
Mercury	6:18am	11:21am	4:24pm	-0.1
Venus	7:56am	12:51pm	5:45pm	-3.5
Mars	3:39am	8:59am	2:19pm	1.7
Jupiter	3:50am	9:09am	2:27pm	-1.4
Saturn	7:18am	12:15pm	5:13pm	1.6

Jan 15

	Rise	Transit	Set	Mag
Mercury	6:46am	11:41am	4:37pm	-0.2
Venus	8:11am	1:12pm	6:12pm	-3.5
Mars	3:26am	8:39am	1:52pm	1.5
Jupiter	3:05am	8:22am	1:39pm	-1.5
Saturn	6:29am	11:27am	4:25pm	1.6

Jan 31

	Rise	Transit	Set	Mag
Mercury	7:22am	12:23pm	5:23pm	-0.5
Venus	8:16am	1:31pm	6:47pm	-3.4
Mars	3:11am	8:16am	1:22pm	1.4
Jupiter	2:12am	7:27am	12:43pm	-1.6
Saturn	5:33am	10:32am	3:30pm	1.7

Planet, Sun, and Moon data calculated for local time at Lancaster, CA

Chart is plotted for the sky

on January 13th, 2018 in Lancaster at 10PM.

To use the chart, go outside within an hour or so of the time listed and hold it up to the sky. Turn the chart so the direction you are looking is at the bottom of the chart. If you are looking to the south then have 'South horizon' at the lower edge.

Suggested Observing List

The list below contains objects that will be visible on the night of the AVAC Star Party. There is no club star party this month, but for those willing to brave the cold, this list is for Saturday, January 13. The list is sorted by the transit time of the object.

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC436	Open	Cas	01h 15m 58s	+58°48'42"	8.8	Circum	7:30 PM	Circum
NGC457	Open	Cas	01h 19m 35s	+58°17'12"	6.4	Circum	7:34 PM	Circum
NGC559	Open	Cas	01h 29m 31s	+63°18'24"	9.5	Circum	7:44 PM	Circum
M103	Open	Cas	01h 33m 23s	+60°39'00"	7.0	Circum	7:47 PM	Circum
M33	Gal	Tri	01h 33m 51s	+30°39'37"	6.2	12:10 PM	7:48 PM	3:26 AM
M76	P Neb	Per	01h 42m 18s	+51°34'15"	12.0	9:54 AM	7:56 PM	5:59 AM
NGC637	Open	Cas	01h 43m 04s	+64°02'24"	8.2	Circum	7:57 PM	Circum
NGC654	Open	Cas	01h 44m 00s	+61°53'06"	6.5	Circum	7:58 PM	Circum
NGC710	Gal	And	01h 52m 54s	+36°03'11"	14.0	12:05 PM	8:07 PM	4:09 AM
NGC752	Open	And	01h 57m 41s	+37°47'06"	5.7	12:01 PM	8:12 PM	4:22 AM
NGC811	Gal	Cet	02h 04m 00s	-09°06'21"	14.0	2:40 PM	8:18 PM	1:56 AM
NGC820	Gal	Ari	02h 08m 25s	+14°20'57"	13.0	1:40 PM	8:22 PM	3:05 AM
NGC869	Open	Per	02h 19m 00s	+57°07'42"	4.0	Circum	8:33 PM	Circum
NGC884	Open	Per	02h 22m 18s	+57°08'12"	4.0	Circum	8:36 PM	Circum
NGC896	Neb	Cas	02h 25m 28s	+62°01'09"		Circum	8:39 PM	Circum
NGC956	Open	And	02h 32m 30s	+44°35'37"	9.0	11:54 AM	8:47 PM	5:39 AM
NGC957	Open	Per	02h 33m 21s	+57°33'36"	7.6	Circum	8:47 PM	Circum
NGC986	Gal	For	02h 33m 34s	-39°02'44"	11.0	4:56 PM	8:48 PM	12:39 AM
M34	Open	Per	02h 42m 05s	+42°45'42"	6.0	12:17 PM	8:56 PM	5:36 AM
NGC1027	Open	Cas	02h 42m 40s	+61°35'42"	6.7	Circum	8:57 PM	Circum
NGC1179	Gal	Eri	03h 02m 38s	-18°53'54"	12.0	4:07 PM	9:17 PM	2:26 AM
NGC1199	Gal	Eri	03h 03m 39s	-15°36'50"	11.5	3:58 PM	9:18 PM	2:37 AM
NGC1261	Glob	Hor	03h 12m 16s	-55°12'57"	8.4	8:15 PM	9:26 PM	10:38 PM
NGC1275	Gal	Per	03h 19m 48s	+41°30'42"	11.6	1:02 PM	9:34 PM	6:05 AM
NGC1277	Gal	Per	03h 19m 52s	+41°34'24"	13.5	1:02 PM	9:34 PM	6:06 AM
NGC1333	Neb	Per	03h 29m 20s	+31°24'56"		2:02 PM	9:43 PM	5:24 AM
NGC1342	Open	Per	03h 31m 38s	+37°22'36"	6.7	1:37 PM	9:46 PM	5:54 AM
NGC1404	Gal	Eri	03h 38m 52s	-35°35'36"	10.3	5:45 PM	9:53 PM	2:01 AM
NGC1433	Gal	Hor	03h 42m 01s	-47°13'19"	10.0	6:58 PM	9:56 PM	12:54 AM
NGC1432	Neb	Tau	03h 45m 50s	+24°22'06"		2:45 PM	10:00 PM	5:14 AM
NGC1435	Neb	Tau	03h 46m 10s	+23°45'54"		2:48 PM	10:00 PM	5:13 AM
M45	Open	Tau	03h 47m 30s	+24°07'00"	1.6	2:48 PM	10:02 PM	5:15 AM
NGC1491	Neb	Per	04h 03m 14s	+51°18'57"		12:19 PM	10:17 PM	8:16 AM
NGC1499	Neb	Per	04h 03m 14s	+36°22'00"		2:14 PM	10:17 PM	6:21 AM
NGC1496	Open	Per	04h 04m 32s	+52°39'42"	10.0	11:59 AM	10:19 PM	8:38 AM
NGC1501	P Neb	Cam	04h 06m 59s	+60°55'14"	13.0	Circum	10:21 PM	Circum
NGC1502	Open	Cam	04h 07m 50s	+62°19'54"	5.7	Circum	10:22 PM	Circum
NGC1514	P Neb	Tau	04h 09m 17s	+30°46'33"	10.0	2:45 PM	10:23 PM	6:02 AM

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC1535	P Neb	Eri	04h 14m 16s	-12°44'22"	10.0	5:01 PM	10:28 PM	3:56 AM
NGC1545	Open	Per	04h 20m 57s	+50°15'12"	6.2	12:50 PM	10:35 PM	8:20 AM
NGC1579	Neb	Per	04h 30m 14s	+35°16'47"		2:46 PM	10:44 PM	6:42 AM
NGC1624	Open	Per	04h 40m 36s	+50°27'42"	10.4	1:07 PM	10:55 PM	8:42 AM
NGC1662	Open	Ori	04h 48m 27s	+10°56'12"	6.4	4:30 PM	11:02 PM	5:35 AM
NGC1724	Open	Aur	05h 03m 32s	+49°29'30"	10.0	1:41 PM	11:18 PM	8:54 AM
NGC1792	Gal	Col	05h 05m 14s	-37°58'49"	10.2	7:23 PM	11:19 PM	3:16 AM
NGC1800	Gal	Col	05h 06m 25s	-31°57'14"	12.6	6:57 PM	11:20 PM	3:44 AM
NGC1788	Neb	Ori	05h 06m 53s	-03°20'27"		5:27 PM	11:21 PM	5:15 AM
NGC1778	Open	Aur	05h 08m 04s	+37°01'24"	7.7	3:16 PM	11:22 PM	7:29 AM
NGC1817	Open	Tau	05h 12m 15s	+16°41'24"	7.7	4:37 PM	11:26 PM	6:16 AM
NGC1851	Glob	Col	05h 14m 07s	-40°02'46"	7.3	7:42 PM	11:28 PM	3:14 AM
NGC1857	Open	Aur	05h 20m 05s	+39°19'30"	7.0	3:15 PM	11:34 PM	7:53 AM
M79	Glob	Lep	05h 24m 11s	-24°31'29"	8.5	6:47 PM	11:38 PM	4:30 AM
NGC1979	Gal	Lep	05h 34m 01s	-23°18'35"	13.0	6:53 PM	11:48 PM	4:43 AM
NGC1952	Neb	Tau	05h 34m 32s	+22°00'52"	8.4	4:42 PM	11:49 PM	6:55 AM
NGC1973	Neb	Ori	05h 35m 05s	-04°43'55"		5:59 PM	11:49 PM	5:39 AM
NGC1981	Open	Ori	05h 35m 09s	-04°25'54"	4.6	5:58 PM	11:49 PM	5:40 AM
NGC1977	Neb	Ori	05h 35m 16s	-04°49'15"		6:00 PM	11:49 PM	5:39 AM
M42	D Neb	Ori	05h 35m 16s	-05°23'25"	4.0	6:01 PM	11:49 PM	5:37 AM
NGC1975	Neb	Ori	05h 35m 18s	-04°41'05"		5:59 PM	11:49 PM	5:39 AM
NGC1980	Neb	Ori	05h 35m 25s	-05°54'54"		6:03 PM	11:49 PM	5:36 AM
M43	D Neb	Ori	05h 35m 31s	-05°16'03"	9.0	6:01 PM	11:50 PM	5:38 AM
NGC1990	Neb	Ori	05h 36m 13s	-01°12'07"		5:51 PM	11:50 PM	5:50 AM
M36	Open	Aur	05h 36m 18s	+34°08'24"	6.5	3:57 PM	11:50 PM	7:43 AM
NGC1999	Neb	Ori	05h 36m 25s	-06°42'57"		6:06 PM	11:50 PM	5:35 AM
NGC2023	Neb	Ori	05h 41m 38s	-02°15'33"		5:59 PM	11:56 PM	5:52 AM
NGC2024	Neb	Ori	05h 41m 42s	-01°51'24"		5:58 PM	11:56 PM	5:53 AM
NGC2022	P Neb	Ori	05h 42m 06s	+09°05'13"	12.0	5:29 PM	11:56 PM	6:24 AM
NGC2064	Neb	Ori	05h 46m 18s	+00°00'21"		5:58 PM	12:00 AM	6:03 AM
NGC2067	Neb	Ori	05h 46m 31s	+00°07'54"		5:57 PM	12:01 AM	6:04 AM
M78	D Neb	Ori	05h 46m 45s	+00°04'48"	8.0	5:58 PM	12:01 AM	6:04 AM
NGC2071	Neb	Ori	05h 47m 07s	+00°17'39"		5:58 PM	12:01 AM	6:05 AM
M37	Open	Aur	05h 52m 18s	+32°33'12"	6.0	4:20 PM	12:06 AM	7:52 AM
NGC2139	Gal	Lep	06h 01m 08s	-23°40'22"	11.7	7:21 PM	12:15 AM	5:09 AM
NGC2141	Open	Ori	06h 02m 55s	+10°26'48"	9.4	5:45 PM	12:17 AM	6:48 AM
NGC2149	Neb	Mon	06h 03m 31s	-09°43'50"		6:41 PM	12:18 AM	5:54 AM
NGC2158	Open	Gem	06h 07m 25s	+24°05'48"	8.6	5:08 PM	12:21 AM	7:35 AM
NGC2170	Neb	Mon	06h 07m 32s	-06°23'57"		6:36 PM	12:22 AM	6:07 AM
NGC2169	Open	Ori	06h 08m 24s	+13°57'54"	5.9	5:41 PM	12:22 AM	7:04 AM
M35	Open	Gem	06h 09m 00s	+24°21'00"	5.5	5:09 PM	12:23 AM	7:37 AM
NGC2174	Neb	Ori	06h 09m 24s	+20°39'34"		5:21 PM	12:23 AM	7:25 AM
NGC2182	Neb	Mon	06h 09m 31s	-06°19'35"		6:38 PM	12:24 AM	6:09 AM
NGC2183	Neb	Mon	06h 10m 47s	-06°12'43"		6:39 PM	12:25 AM	6:11 AM
NGC2185	Neb	Mon	06h 11m 00s	-06°13'36"		6:39 PM	12:25 AM	6:11 AM

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC2186	Open	Ori	06h 12m 07s	+05°27'30"	8.7	6:09 PM	12:26 AM	6:44 AM
NGC2194	Open	Ori	06h 13m 45s	+12°48'24"	8.5	5:50 PM	12:28 AM	7:06 AM
NGC2215	Open	Mon	06h 20m 49s	-07°17'00"	8.4	6:52 PM	12:35 AM	6:18 AM
NGC2232	Open	Mon	06h 28m 01s	-04°50'48"	3.9	6:52 PM	12:42 AM	6:32 AM
NGC2243	Open	CMa	06h 29m 34s	-31°17'00"	9.4	8:17 PM	12:44 AM	5:10 AM
NGC2244	Open	Mon	06h 31m 56s	+04°56'35"	4.8	6:30 PM	12:46 AM	7:02 AM
NGC2245	Neb	Mon	06h 32m 41s	+10°09'24"		6:16 PM	12:47 AM	7:17 AM
NGC2247	Neb	Mon	06h 33m 05s	+10°19'17"		6:16 PM	12:47 AM	7:18 AM
NGC2242	P Neb	Aur	06h 34m 07s	+44°46'38"	14.0	3:54 PM	12:48 AM	9:42 AM
NGC2252	Open	Mon	06h 34m 42s	+05°22'00"	8.0	6:31 PM	12:49 AM	7:06 AM
NGC2261	Neb	Mon	06h 39m 10s	+08°44'40"		6:27 PM	12:53 AM	7:20 AM
NGC2264	Open	Mon	06h 40m 58s	+09°53'42"	3.9	6:25 PM	12:55 AM	7:25 AM
M41	Open	CMa	06h 46m 01s	-20°45'24"	5.0	7:56 PM	1:00 AM	6:04 AM
NGC2282	Neb	Mon	06h 46m 51s	+01°18'56"		6:55 PM	1:01 AM	7:07 AM
NGC2286	Open	Mon	06h 47m 40s	-03°08'54"	7.5	7:07 PM	1:02 AM	6:56 AM
NGC2281	Open	Aur	06h 48m 17s	+41°04'42"	5.4	4:33 PM	1:02 AM	9:31 AM
NGC2298	Glob	Pup	06h 48m 59s	-36°00'15"	9.4	8:57 PM	1:03 AM	5:09 AM
NGC2302	Open	Mon	06h 51m 55s	-07°05'00"	8.9	7:22 PM	1:06 AM	6:49 AM
NGC2316	Neb	Mon	06h 59m 41s	-07°46'39"		7:32 PM	1:14 AM	6:55 AM
M50	Open	Mon	07h 02m 42s	-08°23'00"	7.0	7:37 PM	1:17 AM	6:57 AM
NGC2337	Gal	Lyn	07h 10m 14s	+44°27'25"	13.0	4:33 PM	1:24 AM	10:16 AM
NGC2354	Open	CMa	07h 14m 10s	-25°41'24"	6.5	8:41 PM	1:28 AM	6:16 AM
NGC2268	Gal	Cam	07h 14m 18s	+84°22'55"	11.5	Circum	1:28 AM	Circum
NGC2355	Open	Gem	07h 16m 59s	+13°45'00"	10.0	6:50 PM	1:31 AM	8:12 AM
NGC2359	Neb	CMa	07h 18m 30s	-13°13'36"		8:06 PM	1:33 AM	6:59 AM
NGC2362	Open	CMa	07h 18m 41s	-24°57'18"	4.1	8:43 PM	1:33 AM	6:23 AM
NGC2383	Open	CMa	07h 24m 40s	-20°56'54"	8.4	8:36 PM	1:39 AM	6:42 AM
NGC2371	P Neb	Gem	07h 25m 34s	+29°29'17"	13.0	6:06 PM	1:40 AM	9:13 AM
NGC2376	Gal	Gem	07h 26m 36s	+23°04'22"	14.0	6:31 PM	1:41 AM	8:51 AM
NGC2392	P Neb	Gem	07h 29m 11s	+20°54'42"	10.0	6:40 PM	1:43 AM	8:46 AM
M47	Open	Pup	07h 36m 35s	-14°29'00"	4.5	8:28 PM	1:51 AM	7:13 AM
NGC2423	Open	Pup	07h 37m 06s	-13°52'18"	6.7	8:27 PM	1:51 AM	7:16 AM
NGC2419	Glob	Lyn	07h 38m 08s	+38°52'54"	10.4	5:36 PM	1:52 AM	10:08 AM
M46	Open	Pup	07h 41m 46s	-14°48'36"	6.5	8:34 PM	1:56 AM	7:17 AM
NGC2438	P Neb	Pup	07h 41m 50s	-14°44'07"	10.0	8:34 PM	1:56 AM	7:18 AM
NGC2440	P Neb	Pup	07h 41m 55s	-18°12'31"	11.0	8:44 PM	1:56 AM	7:08 AM
NGC2451	Open	Pup	07h 45m 15s	-37°58'00"	2.8	10:03 PM	1:59 AM	5:56 AM
NGC2452	P Neb	Pup	07h 47m 26s	-27°20'07"	13.0	9:20 PM	2:01 AM	6:43 AM
NGC2453	Open	Pup	07h 47m 35s	-27°11'42"	8.3	9:20 PM	2:02 AM	6:44 AM
NGC2455	Open	Pup	07h 49m 01s	-21°18'06"	10.0	9:01 PM	2:03 AM	7:05 AM
NGC2477	Open	Pup	07h 52m 10s	-38°31'48"	5.8	10:12 PM	2:06 AM	6:00 AM
NGC2489	Open	Pup	07h 56m 15s	-30°03'48"	7.9	9:39 PM	2:10 AM	6:42 AM
NGC2509	Open	Pup	08h 00m 48s	-19°03'06"	9.0	9:06 PM	2:15 AM	7:24 AM
NGC2547	Open	Vel	08h 10m 09s	-49°12'54"	4.7	11:44 PM	2:24 AM	5:05 AM
NGC2546	Open	Pup	08h 12m 15s	-37°35'42"	6.3	10:28 PM	2:26 AM	6:25 AM

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M48	Open	Hya	08h 13m 43s	-05°45'00"	5.5	8:41 PM	2:28 AM	8:15 AM
NGC2571	Open	Pup	08h 18m 56s	-29°45'00"	7.0	10:00 PM	2:33 AM	7:05 AM
NGC2587	Open	Pup	08h 23m 25s	-29°30'30"	9.0	10:04 PM	2:37 AM	7:11 AM
NGC2610	P Neb	Hya	08h 33m 23s	-16°08'57"	14.0	9:30 PM	2:47 AM	8:05 AM
NGC2626	Neb	Vel	08h 35m 31s	-40°40'18"		11:07 PM	2:50 AM	6:32 AM
M44	Open	Cnc	08h 40m 24s	+19°40'00"	4.0	7:56 PM	2:54 AM	9:53 AM
NGC2659	Open	Vel	08h 42m 37s	-44°59'00"	8.6	11:41 PM	2:57 AM	6:12 AM
NGC2658	Open	Pyx	08h 43m 27s	-32°39'30"	9.0	10:37 PM	2:57 AM	7:18 AM
NGC2649	Gal	Lyn	08h 44m 08s	+34°43'02"	13.0	7:03 PM	2:58 AM	10:54 AM
NGC2683	Gal	Lyn	08h 52m 42s	+33°25'14"	9.7	7:17 PM	3:07 AM	10:56 AM
NGC2710	Gal	UMa	08h 59m 48s	+55°42'22"	14.0	Circum	3:14 AM	Circum
NGC2792	P Neb	Vel	09h 12m 27s	-42°25'41"	14.0	11:54 PM	3:26 AM	6:59 AM
NGC2811	Gal	Hya	09h 16m 11s	-16°18'47"	11.3	10:13 PM	3:30 AM	8:47 AM
NGC2805	Gal	UMa	09h 20m 21s	+64°06'11"	11.3	Circum	3:34 AM	Circum
NGC2844	Gal	Lyn	09h 21m 48s	+40°09'04"	12.9	7:12 PM	3:36 AM	11:59 AM
NGC2910	Open	Vel	09h 30m 30s	-52°55'06"	7.2	1:48 AM	3:45 AM	5:41 AM
NGC2968	Gal	Leo	09h 43m 12s	+31°55'42"	11.8	8:14 PM	3:57 AM	11:40 AM
NGC2997	Gal	Ant	09h 45m 39s	-31°11'27"	11.0	11:33 PM	4:00 AM	8:27 AM
NGC3015	Gal	Sex	09h 49m 23s	+01°08'41"	14.0	9:58 PM	4:03 AM	10:09 AM
NGC3105	Open	Vel	10h 00m 39s	-54°47'18"	9.7	2:53 AM	4:15 AM	5:36 AM
NGC3132	P Neb	Vel	10h 07m 02s	-40°26'11"	8.0	12:37 AM	4:21 AM	8:05 AM
NGC3154	Gal	Leo	10h 13m 01s	+17°02'03"	14.0	9:36 PM	4:27 AM	11:18 AM
NGC3166	Gal	Sex	10h 13m 45s	+03°25'30"	10.6	10:16 PM	4:28 AM	10:40 AM
NGC3201	Glob	Vel	10h 17m 37s	-46°24'45"	6.8	1:27 AM	4:32 AM	7:36 AM
NGC3193	Gal	Leo	10h 18m 25s	+21°53'38"	10.9	9:26 PM	4:32 AM	11:39 AM
NGC3242	P Neb	Hya	10h 24m 46s	-18°38'34"	9.0	11:29 PM	4:39 AM	9:49 AM
NGC3258	Gal	Ant	10h 28m 53s	-35°36'21"	11.7	12:35 AM	4:43 AM	8:51 AM
NGC3271	Gal	Ant	10h 30m 26s	-35°21'34"	11.7	12:35 AM	4:44 AM	8:54 AM
NGC3319	Gal	UMa	10h 39m 10s	+41°41'14"	11.3	8:21 PM	4:53 AM	1:26 PM
NGC3344	Gal	LMi	10h 43m 31s	+24°55'20"	10.0	9:41 PM	4:58 AM	12:14 PM
NGC3442	Gal	LMi	10h 53m 08s	+33°54'36"	13.0	9:15 PM	5:07 AM	12:59 PM
NGC3448	Gal	UMa	10h 54m 39s	+54°18'19"	11.7	6:13 PM	5:09 AM	4:05 PM
NGC3486	Gal	LMi	11h 00m 24s	+28°58'30"	10.3	9:43 PM	5:14 AM	12:46 PM
M97	P Neb	UMa	11h 14m 48s	+55°01'08"	12.0	6:06 PM	5:29 AM	4:51 PM
NGC3640	Gal	Leo	11h 21m 07s	+03°14'06"	10.3	11:24 PM	5:35 AM	11:47 AM
NGC3672	Gal	Crt	11h 25m 02s	-09°47'42"	11.0	12:03 AM	5:39 AM	11:15 AM
NGC3680	Open	Cen	11h 25m 38s	-43°14'36"	7.6	2:13 AM	5:40 AM	9:07 AM
NGC3869	Gal	Leo	11h 45m 46s	+10°49'27"	13.0	11:27 PM	6:00 AM	12:32 PM
NGC3951	Gal	Leo	11h 53m 41s	+23°22'55"	14.0	10:57 PM	6:08 AM	1:19 PM
NGC4017	Gal	Com	11h 58m 46s	+27°27'09"	13.0	10:47 PM	6:13 AM	1:38 PM
NGC4045	Gal	Vir	12h 02m 42s	+01°58'36"	11.8	12:09 AM	6:17 AM	12:25 PM
NGC4096	Gal	UMa	12h 06m 01s	+47°28'41"	10.6	9:04 PM	6:20 AM	3:36 PM
NGC4147	Glob	Com	12h 10m 06s	+18°32'30"	10.3	11:29 PM	6:24 AM	1:19 PM
M98	Gal	Com	12h 13m 48s	+14°54'01"	10.9	11:44 PM	6:28 AM	1:12 PM
NGC4227	Gal	CVn	12h 16m 34s	+33°31'18"	14.0	10:41 PM	6:31 AM	2:21 PM

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC4229	Gal	CVn	12h 16m 39s	+33°33'39"	14.0	10:40 PM	6:31 AM	2:21 PM
NGC4245	Gal	Com	12h 17m 37s	+29°36'28"	11.4	10:58 PM	6:32 AM	2:05 PM
NGC4281	Gal	Vir	12h 20m 22s	+05°23'12"	11.3	12:17 AM	6:34 AM	12:52 PM
NGC4309	Gal	Vir	12h 22m 12s	+07°08'39"	14.0	12:14 AM	6:36 AM	12:58 PM
NGC4314	Gal	Com	12h 22m 32s	+29°53'44"	10.5	11:02 PM	6:37 AM	2:11 PM
M100	Gal	Com	12h 22m 55s	+15°49'21"	10.1	11:50 PM	6:37 AM	1:24 PM
NGC4340	Gal	Com	12h 23m 35s	+16°43'22"	11.0	11:48 PM	6:38 AM	1:27 PM
NGC4361	P Neb	Crv	12h 24m 31s	-18°47'06"	10.0	1:29 AM	6:39 AM	11:48 AM
NGC4395	Gal	CVn	12h 25m 49s	+33°32'49"	10.2	10:50 PM	6:40 AM	2:30 PM
M86	Gal	Vir	12h 26m 12s	+12°56'46"	9.9	12:02 AM	6:40 AM	1:19 PM
NGC4424	Gal	Vir	12h 27m 12s	+09°25'13"	11.6	12:13 AM	6:41 AM	1:10 PM
NGC4425	Gal	Vir	12h 27m 13s	+12°44'05"	11.9	12:03 AM	6:41 AM	1:19 PM
NGC4442	Gal	Vir	12h 28m 04s	+09°48'14"	10.5	12:12 AM	6:42 AM	1:12 PM
NGC4478	Gal	Vir	12h 30m 17s	+12°19'42"	11.2	12:08 AM	6:44 AM	1:21 PM
NGC4490	Gal	CVn	12h 30m 36s	+41°38'32"	9.8	10:12 PM	6:45 AM	3:17 PM
NGC4494	Gal	Com	12h 31m 24s	+25°46'29"	9.9	11:26 PM	6:45 AM	2:05 PM
NGC4536	Gal	Vir	12h 34m 27s	+02°11'15"	10.4	12:40 AM	6:48 AM	12:57 PM
M68	Glob	Hya	12h 39m 28s	-26°44'32"	9.0	2:10 AM	6:53 AM	11:37 AM
NGC4698	Gal	Vir	12h 48m 23s	+08°29'15"	10.7	12:36 AM	7:02 AM	1:28 PM
NGC4699	Gal	Vir	12h 49m 02s	-08°39'53"	9.6	1:24 AM	7:03 AM	12:42 PM
NGC4754	Gal	Vir	12h 52m 18s	+11°18'48"	10.6	12:32 AM	7:06 AM	1:40 PM
NGC4782	Gal	Crv	12h 54m 36s	-12°34'08"	11.7	1:40 AM	7:09 AM	12:37 PM
NGC4793	Gal	Com	12h 54m 41s	+28°56'16"	11.7	11:38 PM	7:09 AM	2:40 PM
M64	Gal	Com	12h 56m 44s	+21°40'58"	9.3	12:05 AM	7:11 AM	2:16 PM
NGC4902	Gal	Vir	13h 01m 00s	-14°30'50"	11.2	1:52 AM	7:15 AM	12:38 PM
NGC4942	Gal	Vir	13h 04m 19s	-07°38'57"	14.0	1:36 AM	7:18 AM	1:00 PM
NGC4956	Gal	CVn	13h 05m 01s	+35°10'40"	13.0	11:21 PM	7:19 AM	3:17 PM
NGC4977	Gal	UMa	13h 06m 05s	+55°39'21"	14.0	Circum	7:20 AM	Circum
M53	Glob	Com	13h 12m 55s	+18°10'07"	8.5	12:33 AM	7:27 AM	2:21 PM
NGC5053	Glob	Com	13h 16m 27s	+17°41'52"	9.8	12:38 AM	7:30 AM	2:23 PM
NGC5087	Gal	Vir	13h 20m 25s	-20°36'39"	11.0	2:30 AM	7:34 AM	12:39 PM
NGC5102	Gal	Cen	13h 21m 58s	-36°37'51"	9.7	3:33 AM	7:36 AM	11:39 AM
NGC5139	Glob	Cen	13h 26m 47s	-47°28'53"	3.7	4:45 AM	7:41 AM	10:37 AM
NGC5161	Gal	Cen	13h 29m 14s	-33°10'27"	12.0	3:25 AM	7:43 AM	12:02 PM
M83	Gal	Hya	13h 37m 00s	-29°51'51"	8.0	3:19 AM	7:51 AM	12:23 PM
M3	Glob	CVn	13h 42m 11s	+28°22'35"	7.0	12:27 AM	7:56 AM	3:25 PM
NGC5286	Glob	Cen	13h 46m 27s	-51°22'30"	7.6	5:44 AM	8:00 AM	10:17 AM
NGC5307	P Neb	Cen	13h 51m 03s	-51°12'20"	12.0	5:46 AM	8:05 AM	10:24 AM
NGC5367	Neb	Cen	13h 57m 43s	-39°58'42"		4:26 AM	8:12 AM	11:58 AM
NGC5466	Glob	Boo	14h 05m 28s	+28°31'57"	9.1	12:50 AM	8:19 AM	3:49 PM
NGC5460	Open	Cen	14h 07m 27s	-48°20'36"	5.6	5:33 AM	8:21 AM	11:10 AM

A.V.A.C. Information

Membership in the Antelope Valley Astronomy Club is open to any individual or family.

The Club has three categories of membership.

- Family membership at $30.00 per year.
- Individual membership at $25.00 per year.
- Junior membership at $15.00 per year.

Membership entitles you to…

- Desert Sky Observer–monthly newsletter.
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- The A.V.A.C. Membership Manual.
- To borrow club equipment, books, videos and other items.

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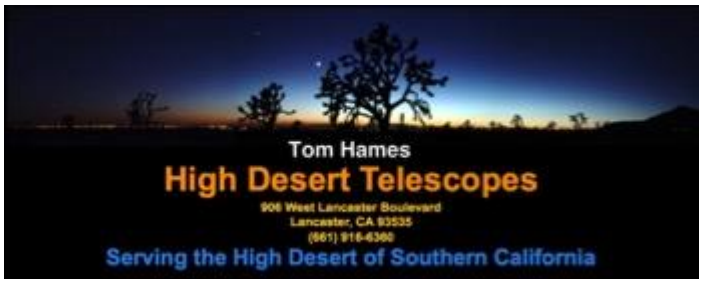

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