ANTELOPE VALLEY ASTRONOMY CLUB, INC.

Desert Sky Observer

Volume 35 *Antelope Valley Astronomy Club Newsletter* **July 2015**

Up-Coming Events

July 08: Quarterly Board Meeting
July 10: Club Meeting*
July 11: AVAC Star-B-Que
July 18: Prime Desert Moon Walk
July 22: Acton Library Star Party

* 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

Greetings fellow AVAC members. In light of the recent extreme heat wave, I hope everyone is staying cool. The shocker for Rose and I was when the outside temperature reached 103 degrees at our house near Tehachapi a few days ago. Even in the depths of summer, we normally never get above 90 degrees. I certainly hope it cools off a little between now and July 11, the date of the club "Star-B-Que" at Brite Lake. In any event, it will still be 10 degrees cooler here than anywhere in the Antelope Valley on that date. While I welcome the cooler temperatures afforded by the monsoonal flow of the last few days, we also need it to go away for awhile so the sky will be clear for the post-picnic star party.

As you may have noted from my previous email, things did not go as planned for Rose and I at the June star party at Chuchupate near Frazier Park. We arrived in the late afternoon of Thursday June 18 to find Don Bryden and few friends already setting up camp. We got settled in and I went about setting up our C-11 and Rose's 12" Lightbridge. The sky was beautiful, with the Milky Way stretching from horizon to horizon, but Rose was feeling a bit under the weather than and never really came out to observe except to briefly observe Omega Centauri as it skirted the southern horizon. For those of who were outside observing Thursday night, we were treated to views of a crescent moon before it set, Venus, Jupiter, Saturn, and a plentiful selection of deep sky objects under the dark skies.

Friday morning, I set up the club's 60mm Coronado h-alpha scope and we observed a display of the hugest prominences I had seen through that instrument in real time. I guess some of the active regions causing these prominences, and the complex of sunspots that were visible, must have been responsible for the solar storms, radio disturbances, and aurora over the last week. Meanwhile, in the motorhome, Rose feeling more and more ill till we finally decided to take down the telescopes, break camp, and head for home. This was our first star party trip with our new (to us) motorhome, we had been preparing for it for weeks, and it was disappointment to have to leave. It was, however, a good thing that we left when we did since I subsequently got sick as well and it would have been very difficult to break camp, and drive the RV home, with the potent bug we both contracted. Oh well. All the work done, we'll be ready for next time.

Since Rose and I missed it, Don and Matt will have share with you the details of our double-star viewing clinic with Mark Brewer.

Earlier on June 6, we had a Prime Desert Woodland Moonwalk that was well attended by both club members with telescopes and the public. We were able to share Venus, Jupiter, Saturn, and numerous deep sky objects with the public on a moonless night.

Make sure you reserve Saturday July 11 to attend our annual "Star-B-Cue", and overnight public star party, at Brite Lake near Tehachapi. We'll be sending out further details, including directions for several different routes, as the date approaches. Though the "Star-B-Cue" usually serves as our monthly star party, at least several members are planning on having a long weekend (three or four day), unofficial star party at Mt. Pinos on the weekend of July 18. We'll be sending details out about that as well.

Also, and this is an annual "all hands on deck" event for those who can attend, we will once again be participating in Lockheed Martin's "A Night to Explore" at the Boys and Girls Club in Palmdale, 815 E. Avenue Q6, the night of Friday July 24. The event runs from 6:00 pm till 9:00 pm. A portion of the parking lot will be roped off for our telescopes and we will have a booth inside with educational displays, brochures and videos playing on a large screen. This is always a rewarding event, with plenty of curious young minds, and I hope to see many of you there.

Vice President

Don Bryden

We had a nice couple of days up at Chuchupate. Thanks to all who came out. Matt and I got a chance to work with Mark Brewer and do some calculations for separation and position angle for some double stars. It was nice to see how Mark worked the calculation and reduced the data. The conditions were great, too. We were able to view Omega Centauri at transit for several minutes!

Our next outing will be up at Brite Lake, in Tehachapi on Saturday, July 11th. Of course, this is no ordinary star party – it's our Star-B-Que! Come out early and join us for burgers, dogs and many other treats from the club and other members. If you'd like to bring a dish or dessert, please let me or Rose know. The club will provide the drinks, meat and other basics – Thanks again to Matt Leone of Al's Sewing and Vacuum for once again providing the burgers and dogs!

If you'd like to contribute something other than food, we can use that too. Any and all donations will be accepted – they don't have to be astronomy related – we'll add them to the silent auction or raffle. So please let me or Rose know if you can bring something. And remember, "If you win it, you must take it!"

The Friday before the Star-B-Que will be our monthly meeting at the SAGE. This month we have a treat as Doug Drake will be speaking on the cosmos. We'll have a few raffles and of course, Jeremy will give us a nice star tour so you can prepare for observing the next night.

Secretary

Rose Moore

Our club picnic is coming up on July 11th, Saturday at 4pm at Brite Lake, Tehachapi. (See Don's/Frank's notes above). Members and their guests are welcome to bring a side dish. The club will be supplying burgers, hot dogs, charcoal, buns, condiments and drinks. If you have anything you would like to donate for the silent auction or raffle, please bring it to the picnic. Star Party to follow, and overnight camping is permitted. Come on out and enjoy our yearly picnic and star party!

We will be looking over the payment list for Mt. Wilson soon. If we need to go to the standby list, we will contact those on the list.

Clear skies!

Space Place

No Surprise! Earth's Strongest Gravity Lies Atop The Highest Mountains

By Ethan Siegel

Put more mass beneath your feet and feel the downward acceleration due to gravity increase. Newton's law of universal gravitation may have been superseded by Einstein's, but it still describes the gravitational force and acceleration here on Earth to remarkable precision. The acceleration you experience is directly proportional to the amount of mass you "see," but inversely proportional to the distance from you to that mass squared.

The denser the mass beneath your feet, the stronger the gravitational force, and when you are closer to such a mass, the force is even greater. At higher elevations or even higher altitudes, you'd expect your gravitational force to drop as you move farther from Earth's center. You'd probably also expect that downward acceleration to be greater if you stood atop a large mountain than if you flew tens of thousands of feet above a flat ocean, with nothing but ultra-light air and liquid water beneath you for all those miles. In fact this is true, but not just due to the mountain's extra mass!

Earth is built like a layer-cake, with the less dense atmosphere, ocean, and crust floating atop the denser mantle, which in turn floats atop the outer and inner cores of our planet. An iceberg's buoyancy is enough to lift only about one tenth of it above the sea, with the other nine tenths below the surface. Similarly, each and every mountain range has a corresponding "invisible mountain" that dips deep into the mantle. Beneath the ocean floor, Earth's crust might be only three to six miles thick, but it can exceed 40 miles in thickness around major mountain ranges like the Himalayas and the Andes. It's where one of Earth's tectonic plates subducts beneath another that we see the largest gravitational anomalies: another confirmation of the theory of continental drift.

A combination of instruments aboard NASA's Gravity Recovery and Climate Experiment (GRACE) satellites, including the SuperSTAR accelerometer, the K-band ranging system and the onboard GPS receiver, have enabled the construction of the most accurate map of Earth's gravitational field ever: to accelerations of nanometers per second squared. While the mountaintops may be farther from Earth's center than any other point, the extra mass of the mountains and their roots – minus the mass of the displaced mantle – accounts for the true gravitational accelerations we actually see. It's only by the grace of these satellites that we can measure this to such accuracy and confirm what was first conjectured in the 1800s: that the full layer-cake structure of Earth must be accounted for to explain the gravity we experience on our world!

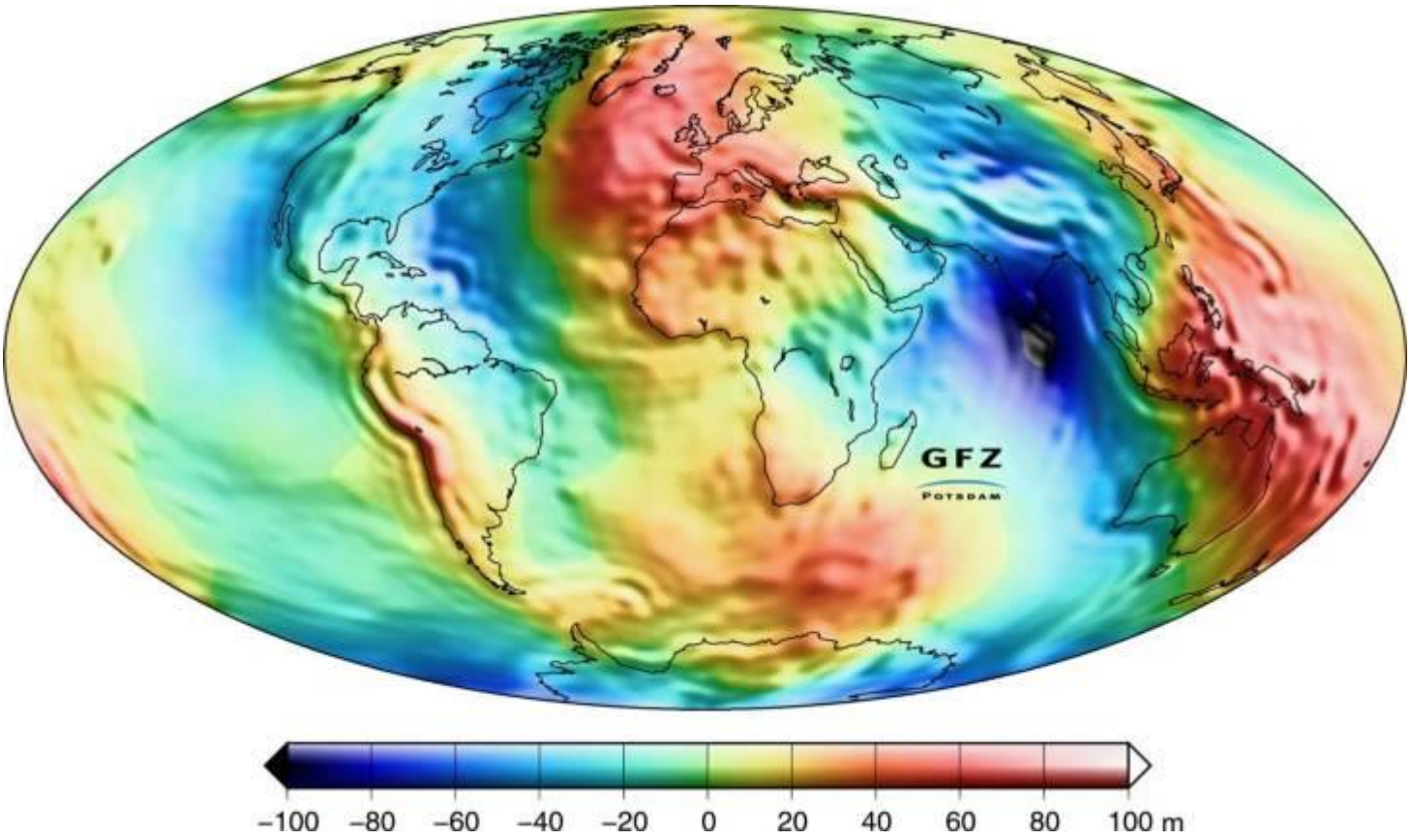


Image credit: NASA / GRACE mission / Christoph Reigber, et al. (2005): An Earth gravity field model complete to degree and order 150 from GRACE: EIGEN-GRACE02S, Journal of Geodynamics 39(1),1–10. Reds indicate greater gravitational anomalies; blues are smaller ones.

News Headlines

New Horizons PI's Perspective, June 25 – Build the Buzz !!
We are now deep in the encounter, and already seeing just how interesting Pluto and Charon promise to be. There's only one Pluto flyby planned in all of history, and it's happening next month! New Horizons is healthy and has so far been conducting a textbook approach—all systems are 'Go' for the flyby!
http://pluto.jhuapl.edu/News-Center/PI-Perspectives.php?page=piPerspective_06_25_2015

Can Planets Be Rejuvenated Around Dead Stars?
For a planet, this would be like a day at the spa. After years of growing old, a massive planet could, in theory, brighten up with a radiant, youthful glow. Rejuvenated planets, as they are nicknamed, are only hypothetical. But new research from NASA's Spitzer Space Telescope has identified one such candidate, seemingly looking billions of years younger than its actual age.
http://www.jpl.nasa.gov/news/news.php?feature=4639&utm_source=iContact&utm_medium=email&utm_campaign=NASAJPL&utm_content=daily20150625-3

A Darker Future for All: The Battle Against Light Pollution
Research into the environmental and health effects of lighter nights suggests that too much light disrupts the behaviors of humans, plants, and animals — and it poses serious health problems. Light pollution is also expensive. As cities grow, most municipal lighting is wasted, according to the International Dark Sky Association, a body started by astronomers at the National Solar Observatory and National Optical Astronomy Observatory.
http://ow.ly/OLf8l

Want to Go Stargazing? Know the Stars of Early Summer
Early summer is an "in-between" time in the skies. The realm of the galaxies has moved off to the west, but the summer Milky Way has not yet arrived. This is the best time of year to observe globular clusters and double stars. The centerpiece of the early summer constellations is Boötes, the herdsman, with the bright star Arcturus at his heart.
https://shar.es/1q6u9B

Exploring dark energy with robots
Five thousand pencil-shaped robots, densely nested in a metal hive, whir to life with a precise, dizzying choreography. Small U-shaped heads swivel into a new arrangement in a matter of seconds. This preprogrammed routine will play out about four times per hour every night at the Dark Energy Spectroscopic Instrument. The robots of DESI will be used to produce a 3-D map of one-third of the sky.
http://www.symmetrymagazine.org/article/june-2015/exploring-dark-energy-with-robots

SETI's attempt to make contact with other signs of life —
Human beings have always wondered if they're alone in the Universe. In 1960, a young astronomer named Frank Drake decided to find out. He pointed an 85-foot antenna at two distant stars and started listening for signs of life. In that moment, a new discipline was born: the search for extraterrestrial intelligence, or SETI. The epicenter of this search is the SETI Institute, an unassuming office building in Mountain View, California—the heart of Silicon Valley.
http://buff.ly/1KinUjc

July Sky Data

Best time for deep sky observing this month:
July 6 through July 22

Mercury reached greatest elongation west of the Sun on the 24th June and so, in July, will sink back into the light of the pre-dawn sky. It will be best seen at the very start of the month when it will have a magnitude of -0.2 and have a phase of 52%.

Venus dominates the western sky after sunset for the first part of the month. At the start of July it will be visible abut half an hour after sunset and be ~19 degrees above the western horizon, setting at about 11:35pm. Its angular size increases from 33 to 51 arc seconds during the month becoming an increasingly narrow crescent with its phase decreasing from 34 to 8%.

Mars passed behind the Sun (superior conjunction) on June 14th so, in July, will be visible low above the north-eastern horizon before dawn breaks. Its magnitude of +1.6 at the start of July increases slightly to +1.7 by month's end while it fully illuminated disk stays at an angular size of 3.6 arc seconds. Again, we will have to wait for quite a few months until it becomes a worthwhile object.

Following its close conjunction with Venus on the last day of June, **Jupiter** stays close to the far brighter planet for much of July, both seen in the western sky at sunset On July 1st, they are only 0.6 degrees apart and both set about 2 hours and 20 minutes after the Sun

Saturn is still well placed for observation in the south at nightfall - providing that you do not mind staying up late! Saturn dims slightly from +0.2 to +0.4 magnitudes during the month whilst its disk reduces in angular size from 18.1 to 17.3 arc seconds. Its ring system, spanning ~40 arc seconds make a beautiful sight as they are tilted ~24 degrees from the line of sight - almost as open as they can be.

There are various minor **meteor-showers** which are active in July, mainly with radiants in the Capricorn-Aquarius area. Towards the end of the month, we may also start to see the first of the Perseids, which peak in August.

Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
7/1/2015	20:48	06:28	06:42	21:08
7/5/2015	23:53	10:44	06:44	21:08
7/10/2015	02:32	16:09	06:47	21:07
7/15/2015	06:38	20:44	06:50	21:05
7/20/2015	11:13	23:44	06:53	21:02
7/25/2015	15:44	01:57	06:56	20:59
7/31/2015	21:05	07:19	07:01	20:55

Planet Data

Jul 1

	Rise	Transit	Set	Mag
Mercury	04:16	11:28	18:36	-0.2
Venus	09:01	15:51	22:40	-4.4
Mars	05:13	12:35	19:56	1.6
Jupiter	08:57	15:50	22:41	-1.8
Saturn	16:45	22:01	03:17	0.3

Jul 15

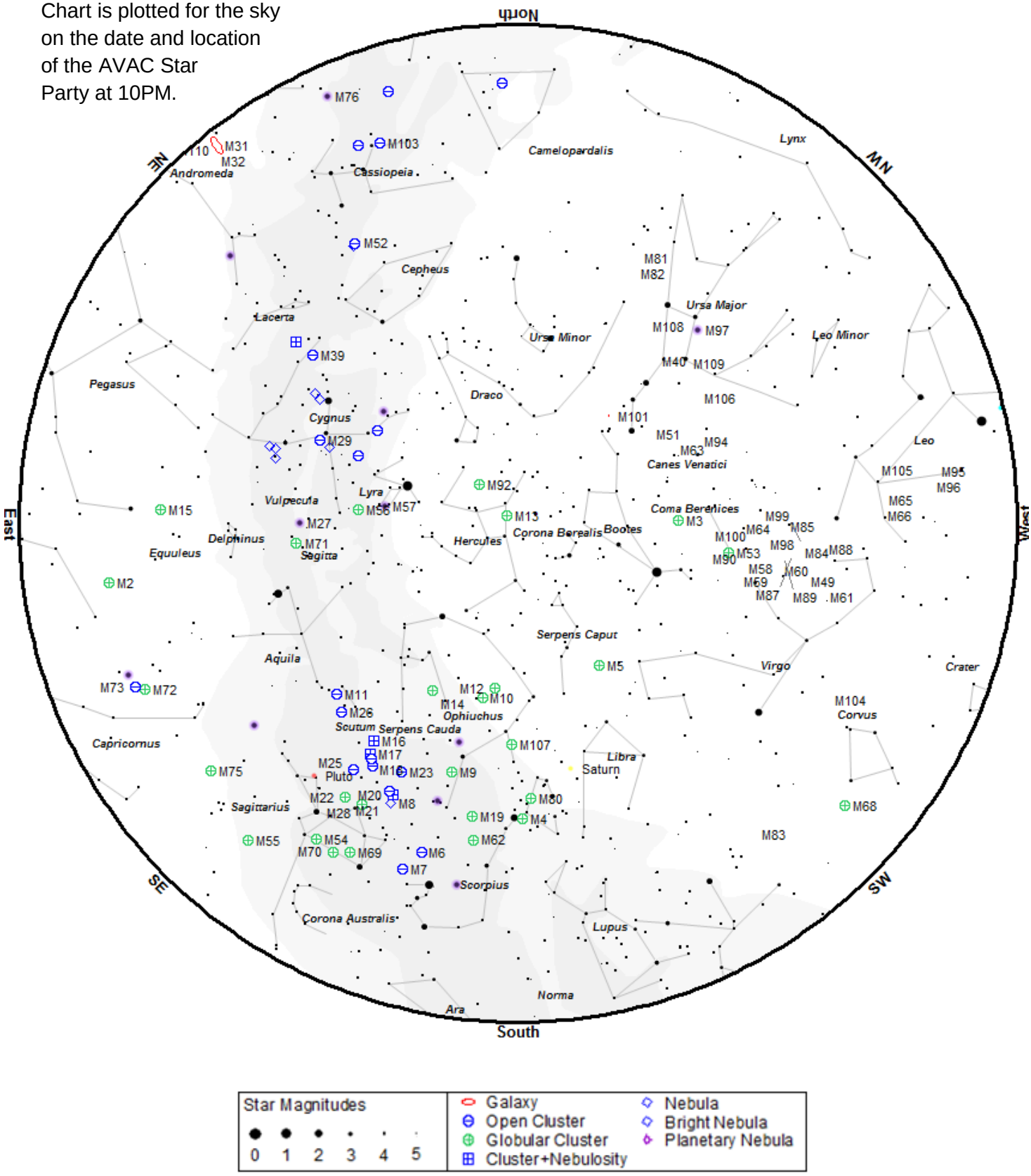
	Rise	Transit	Set	Mag
Mercury	05:03	12:18	19:38	-1.5
Venus	08:42	15:20	21:56	-4.5
Mars	05:00	12:20	19:39	1.6
Jupiter	08:15	15:06	21:53	-1.8
Saturn	15:47	21:04	02:20	0.4

Jul 31

	Rise	Transit	Set	Mag
Mercury	06:41	13:35	20:34	-1.2
Venus	07:45	14:15	20:40	-4.3
Mars	04:47	12:02	19:16	1.7
Jupiter	07:28	14:16	21:00	-1.7
Saturn	14:43	20:00	01:16	0.4

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

Chart is plotted for the sky on the date and location of the AVAC Star Party at 10PM.



Star Magnitudes		Galaxy	Nebula
0 1 2 3 4 5		Open Cluster	Bright Nebula
		Globular Cluster	Planetary Nebula
		Cluster+Nebulosity	

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. The list is sorted by the best time to observe the object. The difficulty column describes how difficult it is to observe the object from the current location on a perfect night in a 6 inch Newtonian telescope.

ID	Cls	Con	RA 2000	Dec 2000	Mag	Begin	Best	End	Difficulty
M 49	Gal	Vir	12h29m46.8s	+08°00'01"	9.3	21:30	21:48	21:58	detectable
M 86	Gal	Vir	12h26m12.2s	+12°56'44"	9.8	21:33	21:49	22:09	detectable
M 84	Gal	Vir	12h25m03.9s	+12°53'12"	10.1	21:31	21:49	22:07	detectable
M 87	Gal	Vir	12h30m49.2s	+12°23'29"	9.6	21:31	21:49	22:12	detectable
NGC 5986	Glob	Lup	15h46m03.0s	-37°47'12"	7.6	21:31	21:51	22:38	difficult
Col 256	Open	Com	12h25m06.0s	+26°06'00"	2.9	21:27	21:52	22:40	easy
NGC 4565	Gal	Com	12h36m20.8s	+25°59'15"	10.1	21:34	21:52	22:34	difficult
M 64	Gal	Com	12h56m43.8s	+21°41'00"	9.3	21:31	21:52	23:01	detectable
NGC 5897	Glob	Lib	15h17m24.0s	-21°00'36"	8.4	21:34	21:53	22:26	challenging
M 97	PNe	UMa	11h14m47.7s	+55°01'09"	9.7	21:35	21:54	22:33	detectable
M 82	Gal	UMa	09h55m52.4s	+69°40'47"	9.0	21:32	21:56	21:58	detectable
M 81	Gal	UMa	09h55m33.1s	+69°03'56"	7.8	21:32	21:56	23:34	detectable
M 106	Gal	CVn	12h18m57.6s	+47°18'13"	9.1	21:34	21:56	23:04	detectable
M 94	Gal	CVn	12h50m53.1s	+41°07'12"	8.7	21:30	21:56	23:34	detectable
M 3	Glob	CVn	13h42m11.0s	+28°22'42"	6.3	21:28	21:56	23:47	easy
NGC 5195	Gal	CVn	13h29m59.6s	+47°15'58"	10.5	21:32	21:58	23:40	detectable
M 51	Gal	CVn	13h29m52.3s	+47°11'40"	8.7	21:30	21:58	00:14	easy
M 5	Glob	Ser	15h18m34.0s	+02°05'00"	5.7	21:27	21:58	00:21	easy
M 101	Gal	UMa	14h03m12.4s	+54°20'53"	8.4	21:35	22:00	00:07	detectable
NGC 6124	Open	Sco	16h25m20.0s	-40°39'12"	6.3	21:22	22:02	23:41	challenging
M 80	Glob	Sco	16h17m02.0s	-22°58'30"	7.3	21:27	22:04	23:01	detectable
NGC 6167	Open	Nor	16h34m34.0s	-49°46'18"	6.6	21:45	22:08	22:33	challenging
NGC 6178	Open	Sco	16h35m47.0s	-45°38'36"	7.2	21:28	22:10	23:11	detectable
NGC 6193	Open	Ara	16h41m20.0s	-48°45'48"	5.4	21:40	22:15	22:52	difficult
M 13	Glob	Her	16h41m41.0s	+36°27'36"	5.8	21:28	22:21	02:43	easy
M 12	Glob	Oph	16h47m14.0s	-01°56'48"	6.1	21:27	22:23	01:40	easy
M 10	Glob	Oph	16h57m09.0s	-04°06'00"	6.6	21:30	22:31	01:21	detectable
M 62	Glob	Oph	17h01m13.0s	-30°06'48"	6.4	21:30	22:35	00:34	detectable
M 19	Glob	Oph	17h02m38.0s	-26°16'06"	6.8	21:31	22:36	00:33	detectable
M 92	Glob	Her	17h17m07.0s	+43°08'12"	6.5	21:29	22:50	03:19	easy
M 9	Glob	Oph	17h19m12.0s	-18°31'00"	7.8	21:34	22:52	00:49	difficult
NGC 6322	Open	Sco	17h18m25.0s	-42°56'00"	6.5	21:32	22:52	00:23	easy
NGC 6383	Open	Sco	17h34m48.0s	-32°34'00"	5.4	21:31	23:08	01:14	easy
NGC 6388	Glob	Sco	17h36m17.0s	-44°44'06"	6.8	22:22	23:10	23:57	challenging
M 14	Glob	Oph	17h37m36.0s	-03°14'48"	7.6	21:32	23:11	01:58	detectable
M 6	Open	Sco	17h40m20.0s	-32°15'12"	4.6	21:27	23:13	01:34	easy
IC 4665	Open	Oph	17h46m18.0s	+05°43'00"	5.3	21:34	23:20	02:11	detectable
M 7	Open	Sco	17h53m51.0s	-34°47'36"	3.3	21:37	23:27	01:24	detectable

ID	Cls	Con	RA 2000	Dec 2000	Mag	Begin	Best	End	Difficulty
M 23	Open	Sgr	17h57m04.0s	-18°59'06"	5.9	21:36	23:29	01:25	detectable
NGC 6543	PNe	Dra	17h58m33.4s	+66°37'59"	8.3	21:18	23:30	04:33	obvious
M 20	Open	Sgr	18h02m42.0s	-22°58'18"	5.2	22:23	23:36	00:48	easy
M 21	Open	Sgr	18h04m13.0s	-22°29'24"	7.2	22:19	23:37	00:55	detectable
M 8	Neb	Sgr	18h04m02.0s	-24°23'14"	5.0	22:49	23:37	00:25	easy
NGC 6541	Glob	CrA	18h08m02.0s	-43°42'54"	6.3	22:49	23:41	00:33	challenging
NGC 6572	PNe	Oph	18h12m06.4s	+06°51'12"	8.0	21:15	23:44	03:38	obvious
M 16	Open	Ser	18h18m48.0s	-13°48'24"	6.5	21:25	23:52	02:21	obvious
M 18	Open	Sgr	18h19m58.0s	-17°06'06"	7.5	21:45	23:53	02:02	easy
M 17	Open	Sgr	18h20m47.0s	-16°10'18"	7.3	21:53	23:54	01:56	difficult
M 28	Glob	Sgr	18h24m33.0s	-24°52'12"	6.9	23:22	23:57	00:34	detectable
NGC 6633	Open	Oph	18h27m15.0s	+06°30'30"	5.6	21:27	00:00	03:46	easy
M 25	Open	Sgr	18h31m47.0s	-19°07'00"	6.2	22:11	00:04	01:58	detectable
M 22	Glob	Sgr	18h36m24.0s	-23°54'12"	5.2	23:12	00:09	01:06	detectable
IC 4756	Open	Ser	18h39m00.0s	+05°27'00"	5.4	21:33	00:12	03:28	easy
M 70	Glob	Sgr	18h43m13.0s	-32°17'30"	7.8	22:35	00:16	01:56	detectable
M 11	Open	Sct	18h51m05.0s	-06°16'12"	6.1	21:42	00:24	03:12	detectable
M 57	PNe	Lyr	18h53m35.1s	+33°01'45"	9.4	21:27	00:26	04:21	easy
NGC 6716	Open	Sgr	18h54m34.0s	-19°54'06"	7.5	22:41	00:27	02:13	detectable
M 54	Glob	Sgr	18h55m03.0s	-30°28'42"	7.7	22:57	00:28	01:57	difficult
NGC 6723	Glob	Sgr	18h59m33.0s	-36°37'54"	6.8	23:05	00:32	01:59	detectable
M 56	Glob	Lyr	19h16m36.0s	+30°11'06"	8.4	21:44	00:49	03:59	detectable
M 55	Glob	Sgr	19h40m00.0s	-30°57'42"	6.3	23:23	01:13	02:57	detectable
NGC 6818	PNe	Sgr	19h43m57.8s	-14°09'12"	10.0	22:49	01:16	03:44	easy
M 71	Glob	Sge	19h53m46.0s	+18°46'42"	8.4	21:42	01:26	04:22	easy
M 27	PNe	Vul	19h59m36.3s	+22°43'16"	7.3	21:42	01:32	04:22	easy
NGC 6871	Open	Cyg	20h05m59.0s	+35°46'36"	5.8	21:39	01:38	04:22	easy
NGC 6910	Open	Cyg	20h23m12.0s	+40°46'42"	7.3	21:39	01:55	04:24	easy
M 29	Open	Cyg	20h23m57.0s	+38°30'30"	7.5	21:44	01:56	04:23	easy
M 39	Open	Cyg	21h31m48.0s	+48°26'00"	5.3	22:00	02:56	04:27	easy
IC 5146	Neb	Cyg	21h53m24.0s	+47°16'00"	10.0	22:29	02:56	04:27	challenging
M 15	Glob	Peg	21h29m58.0s	+12°10'00"	6.3	23:25	02:56	04:25	easy
NGC 7160	Open	Cep	21h53m40.0s	+62°36'12"	6.4	21:33	02:57	04:31	obvious
IC 1396	Neb	Cep	21h39m06.0s	+57°30'00"		22:01	02:57	04:24	challenging
NGC 7243	Open	Lac	22h15m08.0s	+49°53'54"	6.7	23:33	02:57	04:22	detectable
M 2	Glob	Aqr	21h33m27.0s	-00°49'24"	6.6	23:57	02:56	04:25	detectable
M 52	Open	Cas	23h24m48.0s	+61°35'36"	8.2	00:40	03:48	04:19	detectable
NGC 7790	Open	Cas	23h58m24.0s	+61°12'30"	7.2	23:31	03:51	04:29	easy

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.
- The Reflector – the publication of the Astronomical League.
- The A.V.A.C. Membership Manual.
- To borrow club equipment, books, videos and other items.

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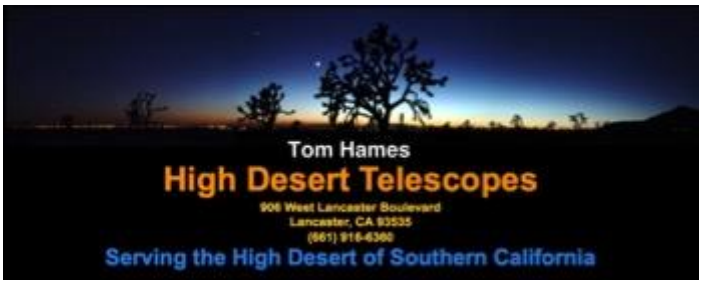

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