

Astronomy Club of Lompoc Presents The Sidereal Times



M13 (see page 5)

Meeting News:

At the August ACL Club meeting we did some club business. Also Capt Hufstetler presented how they use our observatory site for training in tracking satellites etc.

Reminder: ACL club meeting September 9th 7:00 PM Manzanita School Teachers Lounge. (Mask!)



Lunar Calendar

New Moon 25th

Full Moon 10th

Old Town Display Jul 29



Presidents Message

Hello, Friends,

What a delightful evening our August meeting proved to be! Eleven members and a guest were on hand to hear our speaker. Captain Brandon Hufstetler came pretty much straight from an assignment in Florida to be with us, bringing the enthusiasm of a dedicated young person who loves their work. As the Department Head of Space Sciences with the 533rd Training Squadron, "Huf" revealed that he instructs every new Guardian of the Space Force, amounting to 250 students a term, who are required to take his Orbital and Electromagnetic Warfare course. He guided us through a brief overview of the course, gave a non-classified description of the two types of orbital defenses studied. He told how he is incorporating telescopic tracking into the Guardian's training, explaining ways they use the Endeavour Center Observatory as part of their learning. He highlighted the wonderful job these young Guardians are doing keeping the area around the Observatory clear of foliage and readily accessible, and expressed his anticipation of working with ACL in the future in public outreach. And, he was able to get away in time to keep a promised date night with his wife! Thank you, Brandon!

ACL has been invited to support Lost Flores Ranch Park by attending two upcoming public events they are hosting. First there is a Star Gazing Party on Saturday, September 17th, starting at 7pm. The following month, Sunday, October 9th, the Park hosts a "Solar Viewing" from (12-3pm). Their Mobile Observatory will be at both events. ACL members are encouraged to bring telescopes and share with wonders of astronomy [other area clubs will be present as well, so there will be lots of viewing possibilities].

Our next meeting, on September 9th, will be in-person at Manzanita Teachers' Lounge. As to business, we need to have a serious discussion about Officers [since nominations are made in November], particularly the position I currently occupy. Also, lets' talk about committees. Topping off our meeting, we will have a program on the James Webb Space Telescope and the marvels it is so quickly accomplishing.

An important, fun meeting this will be; show up and bring an astronomically curious friend. I look forward to seeing each of you! Skyward,

Tom

Events

September 3, 17, and 20 -*Star Party at the Observatory*



Yea!

September 10th The full Moon will be located on the opposite side of Earth as the Sun and its face will be fully illuminated. This phase occurs at 09:58 UTC. This full Moon was known by early American tribes as the Corn Moon because the corn is harvested around this time of year. This Moon is also known as the Harvest Moon. The harvest Moon is the full Moon that occurs closest to the September equinox each year.

September 16 Neptune at opposition and the blue planet will at its closest approach to Earth and its face will be fully illuminated by the Sun. It will be brighter than any other time of year and be visible all night long. This is the best time of year to view and photograph Neptune.

September 23 September Equinox occurs at 00 55 UTC. The Sun will shine directly on the Equator and there will be nearly equal amounts of day and night throughout the world. This is also the first day of Fall (autumnal equinox) in the Northern Hemisphere and the first day of Spring in the Southern Hemisphere.

September 26 Jupiter at opposition and will be at its closest approach to Earth and will be fully illuminated by the Sun. It will be brighter than any other time of the year and will be visible all night long. This is the best time to view and photograph Jupiter and its Moons.

Old Town Display Cont.



Star party's and Events

August 6, 17, & 24 Star Party at the Observatory. Weather poor, cancelled!



Sometimes it pays to look at nothing. By Steve & Kate Medvedoff

Case in point: the *Hubble Deep Field* images captured between 1995 and 2009.

Around Christmas of 1995 – the year that *Star Trek: Voyager* began airing – a seemingly crazy idea was born. Robert Williams, director of the Hubble telescope science institute, thought it would be interesting to point the Hubble at a dark area of space. And not only point it there, but keep it pointed there for 100 hours. The idea was perceived by many – particularly those desiring valuable Hubble time – as a waste of a precious resource. But Williams prevailed, and Hubble's observation of a dark, pin-sized section of sky in Ursa Major ensued.

When the observation was complete, a single image created from 342 separate exposures rewarded Williams and the world with astounding images of nearly 3000 never before seen galaxies. By looking at a particularly dark area of sky, the Hubble had seen far beyond nearby galaxies, and consequently deep into the past. Scientists determined that many of the galaxies had not yet formed stars, and represented the universe when it was quite young.

A subsequent *Hubble Deep Field* observation was completed in 1996, this one of a different swath of super dark sky. Scientists were curious if other areas of the universe would show similar numbers and concentrations of galaxies, or if the area observed initially was unique. It turned out that the 1996 observation was just as astounding as the first, and also included a quasar.

Hubble Deep Field observations were made in 2004 (the *Hubble Ultra Deep Field*), and 2009 (the *Hubble Ultra Deep Field Infrared*). Images derived from these observations include some of the earliest galaxies formed after the Big Bang. Some date back to when our 13.7 billion year old universe was a mere 800 million years old.

This year, the James Webb telescope was launched and is now in position to look even deeper into our past. It has already produced mind-blowing images of ancient galaxies and other space entities with even greater clarity than Hubble. And it has only viewed a piece of sky equivalent to holding a grain of sand at arms length. It's exciting to imagine what it might ultimately glimpse.

This year also saw the premiere of the new series *Star Trek: Strange New Worlds*.

Interesting how science fiction and science fact often converge on the same themes.

September 2022 Moon



Full 10th , New 25th , Last Quarter 17th , First Quarter 3rd

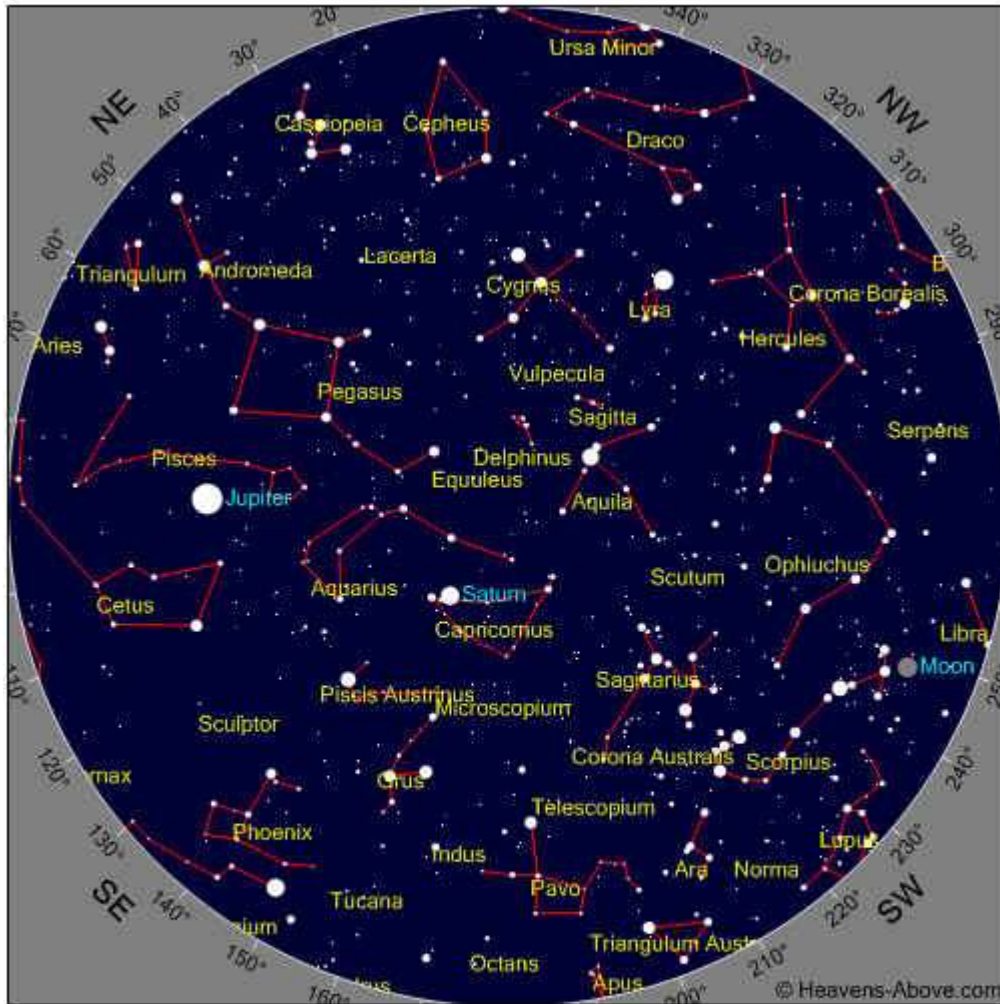
Moon Facts and folk lore

The Moon is drifting away from Earth about 3.8 centimeters per year. It is estimated that it will continue to do so for about 50 billion years. By the time that happens the Moon will be taking around 47 days to orbit Earth instead of the current 27.3 days.

JWST Image



September 2022 Sky
Some Objects of interest, M31, Saturn, Jupiter



Time

Year	2022	Month	9	Day	2	Hour	22	Minute	2
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ACL picnic



Photo Courtesy Gary Satterfield



Messier 13, NGC 6205 also known as the Great Globular Cluster in the constellation of Hercules. M13 is one of the brightest and best known Globular in the Northern sky. It has an apparent magnitude of 5.8v and lies at a distance of 25,100 light years from Earth. It has an age estimated to be 11.65 billion years and contains about 300,000 stars. The estimated mass is half million solar masses. M13 stretches across 20 arc minutes of sky that corresponds to a linear diameter of 145 light years. The brightest star in M13 is V11, a red giant classified as a Cepheid variable and has a visual magnitude of 11.95. The cluster contains an unusually young B2 type star designated as Bernard 29. The star does not really belong to the globular cluster but was presumably picked up by M13 on its orbit around the Milky Way. Other stars in the cluster are very old and only have about 5% of the Sun's iron content as they were formed before stars in our galaxy created metals. M13 also contains about 15 blue stragglers, old stars that appear younger and bluer than their neighbors. M13 is a class V globular cluster, one with intermediate concentration of stars toward the center. In other words stars in the clusters core region are about 500 times more concentrated than those in our immediate stellar neighborhood. Globular clusters orbit the Milky Way outside the Galactic disk at tens of thousands of light years away. Image capture 8 inch RC scope, canon 500D camera, hypertuned CGEM mount and images plus camera control and guiding with Mini Borg and PHD guiding. Integration time 0.7 hrs.

Some of the Work Crew / solar array



For What its Worth

Even small changes in solar activity can impact Earth's climate in significant and surprisingly complex ways. The Sun is a constant star when compared with many others in the galaxy. Some stars pulsate dramatically, varying wildly in size and brightness and even exploding. In comparison the Sun varies in the amount of light it emits by only 0.1 percent over the course of a relatively stable 11 year long pattern known as the solar cycle. Still the light reaching the top of Earth's atmosphere provides about 2,500 times as much energy as the total of all other sources combined. As such even 0.1 percent of the amount of light the Sun emits exceeds all other energy sources the Earth's atmosphere sees combined, such as the radioactivity naturally emitted from Earth's core. To learn more about how such tiny variations in solar energy might impact terrestrial climate the National Research Council (NRC) convened dozens of experts in fields such as plasma physics, solar activity, atmospheric chemistry, fluid dynamics and energetic particle physics. The ways these solar fluctuations could influence Earth were complicated in nature. For instance solar energetic particles and cosmic rays could reduce ozone levels in the stratosphere. This in turn alters the behavior of the atmosphere below it, perhaps even pushing storms on the surface off course. In the lower stratosphere the presence of ozone causes local warming because of the breakup of ozone molecules by ultra-violet light. When the ozone is removed the stratosphere there becomes cooler increasing the temperature contrast between the tropics and the polar region. The contrast in temperatures in the stratosphere and the upper troposphere leads to atmospheric flow west to east. The instability make for eddies or irregular motions. These eddies feed the strength of jet streams, ultimately altering the flows in the upper troposphere, the layer of atmosphere closest to Earth's surface. The geographical positioning of the jet streams aloft can alter the distribution of storms over the middle latitudes. So the Sun might have a role to play in this kind of process. This is a very difficult mechanism to prove in climate models. That does not mean it may not exist, it is just hard to prove. Solar variability is leaving a definite imprint on climate especially in the Pacific Ocean. When researchers look at sea surface temperature data using sunspot peak years, the tropical Pacific showed a pattern very much like that expected with La Nina, a cyclical cooling of the Pacific ocean that regularly affects climate worldwide, with sunspot peak years leading to a cooling of almost 1 degree C (1.8 deg F) in the equatorial eastern Pacific. In addition, peaks in the sunspot cycle were linked with increased precipitation in a number of areas across the globe as well as above normal sea level pressure in the mid latitude North and South Pacific. The Pacific is particularly sensitive to small variations in trade winds. Solar activity may influence processes linked with trade wind strength. Scientists have often speculated whether the Maunder Minimum, a 70 year dearth of sunspots in the late 17th to early 18th century was linked with the coldest part of the little ice age during which Europe and North America experienced bitterly cold winters. This regional cooling may be linked with a drop in the Sun's extreme ultraviolet radiation. In fact the Sun could currently be on the cusp of a miniature version of the Maunder Minimum since the current solar cycle is the weakest in more than 50 years. If the Sun is really entering an unfamiliar phase of the solar cycle then we must redouble our efforts to understand the Sun's climate link. Although the Sun is the main source of heat for Earth solar variability may have more of a regional effect than a global one. As such solar variability is not the cause of the global warming seen in recent times. While the Sun is the dominant energy source powering our climate system, do not assume that it is causing much of recent climate changes. It is pretty stable, think of it as an 800-pound gorilla in climate, it has the weight to cause enormous changes but lucky for us its pretty placidly lazy. While solar changes have historically caused climate changes, the Sun is most likely responsible for less than 15 percent of the global temperature increases we have seen over the last century during which human caused changes such as increased greenhouse gasses may have caused some atmospheric warming. Tracking the Sun: In the future, researchers suggested to better understand how solar variability might affect the Earth, a future space observatory may include a radiometric imager. Such a device could essentially map the surface of the Sun and reveal the contributions of each of its surface features to the Sun's luminosity. The solar disk is dotted by dark sunspots and bright magnetic areas known as faculae. Sunspots tend to vanish during low points in the solar cycle. Therefore, a radiometric imager could help reveal the links between prolonged spotlessness on the Sun and Earth climate. Ancient signals of climate such as tree rings and ice cores might also help shed light on the link between Sun and climate. Since variations in Earth's magnetic field and atmospheric circulation might disrupt this evidence on Earth, a better long term record of solar radiation might lie in the rocks and sediments of the Moon and Mars.

Astronomy Club Officers



President
Tom Gerald

Vice President &
Treasurer
Jana Hunking

ACL Support Personnel

ACL News Letter Editor
Serf / Minion Vahan Yeterian



ACL Webmaster
Serf / Minion Aaron Anderson
(New Zealand)



Club Meeting

Reminder Club meeting September 9th 7:00 Pm. Teachers Lounge. (Masks!)

Star Parties (as always weather permitting)

Other Astronomy Club Meetings

Central Coast Astronomical Society

Link to web site...

<http://www.centralcoastastronomy.org/>

Santa Barbara Astronomical Unit

Link to web site...

[http:// www.sbau.org/#AU_EVENTS_Calendar](http://www.sbau.org/#AU_EVENTS_Calendar)

Night Time Bright Objects (no scope required)

The web site link below will take you to some Great Milky Way interactive images and how It was developed. (Type it in the search box.)

<http://skysurvey.org/>

*“Astronomy compels the soul to look upward,
and leads us from this world to another”.*
(Plato)

ACL Club Logo

