12 MAY 2023

WEYMOUTH ASTRONOMY

VOLUME 18 #1

SKYWATCHER NEWSLETTER

LATEST NEWS

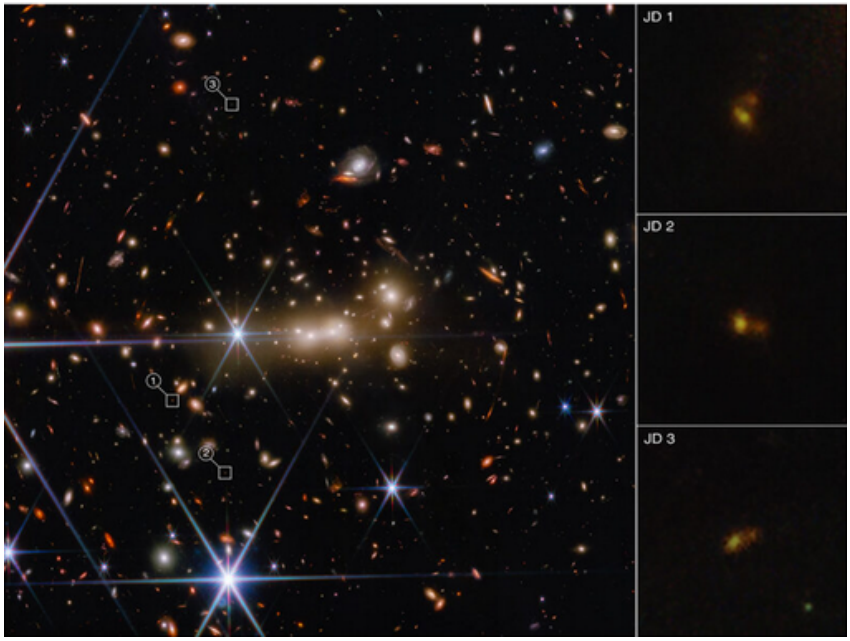
The news of Bob Mizon's passing is truly a loss to the Astronomical community. An amazing catalyst in the CfDS as well as astronomical public outreach, Bob's was truly one of a kind. I remember fondly his passion for astronomical painting as well and count myself so very fortunate to hold three of his works in my collection. The most treasured is a lovely painting of the Antennae Galaxy merger. He painted this after attending a talk on Galaxy Collisions that I gave to the WAC many years ago as he was 'inspired'. Well I must say, Bob has inspired me through the years with his amazing energy and devotion to astronomical societies large and small. His special affinity with the WAC over the years has been such a great asset to the members. He will be greatly missed but never forgotten.

Until next month... SLK

SKY&TELESCOPE

The James Webb Space Telescope May Have Spotted a Baby Galaxy Merger

By: Arwen Rimmer



TThe massive gravity of galaxy cluster MACS0647 acts as a cosmic lens to bend and magnify light from the more distant MACS0647-JD system. It also triply lensed the JD system, causing its image to appear in three separate locations. These images, which are highlighted with white boxes, are marked JD1, JD2, and JD3; zoomed-in views are shown in the panels at right. Science: NASA / ESA / CSA / Dan Coe (STScI) / Rebecca Larson (UT) / Yu-Yang Hsiao (JHU); Image processing: Alyssa Pagan (STScI)

Big galaxies like the Milky Way — a spiral disk 100,000 light years across containing some 200 billion stars — are thought to come from the celestial meet-and-greets of the first galaxies, which were originally little more than tiny clumps of stars. Now, the James Webb Space Telescope (JWST) has imaged two baby galaxies that existed just 430 million years after the Big Bang, each only hundreds of light-years across. Astronomers think they might be merging, shedding light on galaxy growth in the early universe.

"Most galaxies today will have been through several merger events," says Tiger Yu-Yang Hsiao, (Johns Hopkins University), who led the study. "So [mergers] are key to studying the formation and evolution of galaxies today. Our target is from such an early time, right at the very beginning of this process. There is much we can learn from it."

MACS0647–JD (MACS-JD) is an extremely distant object first observed about 10 years ago. At the time, it was considered to be the most distant galaxy ever observed, and it is still one of the earliest things we can study in detail with JWST.

Generally speaking, galaxies from the dawn of time are too faint and too far away to see. The reason we can see MACS-JD is because its light has been triply lensed, magnified and distorted by a massive galaxy cluster lying in front of it from our point of view.

The cluster warps spacetime, splitting the light into three images of the same system. The images are magnified by factors of eight, five, and two, so they appear brighter than other galaxies at similar distances.

Hsiao's JWST observations of MAC-JD verified previous conclusions about its distance, size, and physical properties — but with a surprising twist. What was once seen as a single object now appears to be two baby galaxies, labeled A and B. A is brighter and larger with very recent star formation and no dust, while B looks older and has a little bit of dust. Their differing star formation histories suggest they formed farther apart, only coming together recently.

"The researchers did a very good job approaching this problem, but there is a lot of uncertainty," says Andrea Ferrara (Scuola Normale Superiore, Italy), who was not part of the study. He suggests that while a merger is a possibility, it's also possible that one of the galaxies is a satellite of the other. Alternatively, the two components might be part of the same galaxy.

"We do expect that galaxies at this very high redshift are in the assembly process," he notes, but he adds that additional data about the galaxies' motions would help clarify their relationship.

Hsiao's team based this study, posted on the arXiv and accepted to Astrophysical Journal Letters, solely on JWST images. Upcoming spectroscopic observations, also with JWST, should tell us how A and B are moving with respect to each other. If they are both part of the same galaxy, the difference between their velocities would be relatively small; if they are actually two merging galaxies, there would be a larger discrepancy. Besides shedding light on the objects' motions, spectra will also tell us more about the chemical properties of these tiny, highly magnified galaxies observed in the early universe.

https://skyandtelescope.org/astronomy-news/james-webb-space-telescope-may-have-spotted-baby-galaxy-merger/

LOCAL EVENTS

May 17 - CADAS - Ask the Panel

June 6 - WAS - David Smith – (Buglife) Bugs, the First Astronomers

June 21 - CADAS - Jo Richardson Dark sies of Exmoor

July 4 - WAS - Nial Tanvir – Re-ionisation of the Universe/GRBs (exact title to follow)

Aug 1 - WAS - Quiz evening

Sept 5 - WAS - David Bryant – Meteorites (exact title to follow)

VISIT OUR WEBSITE FOR THE LATEST CLUB INFORMATION

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Starlink Update

56 MORE STARLINK SATELLITES: SPACEX LAUNCHED A NEW BATCH OF STARLINK BROADBAND SATELLITES EARLY SUNDAY MORNING, MAY 14TH, AND LANDED A ROCKET AT SEA IN THE COMPANY'S LATEST SUCCESSFUL MISSION. TWENTY-ONE HOURS LATER KEVIN FETTER WATCHED ALL 56 SATELLITES ORBIT OVER HIS HOME IN BROCKVILLE, ONTARIO:

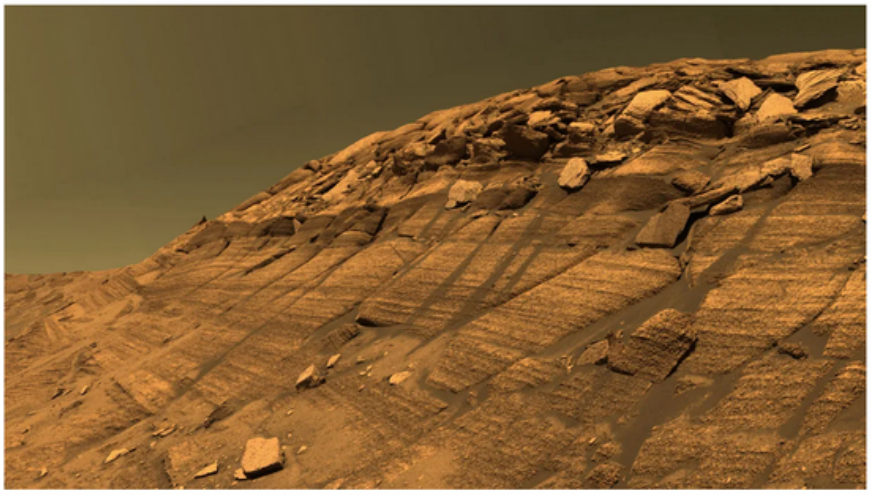
"IT WAS A NICE SHOW," SAYS FETTER.
THIS LAUNCH BRINGS THE TOTAL COUNT OF STARLINKS IN ORBIT TO 4127, A NUMBER THAT WOULD HAVE SEEMED INCREDIBLE LESS THAN 5 YEARS AGO. THE ENTIRE CONSTELLATION HAS BEEN LAUNCHED SINCE 2019, MORE THAN DOUBLING THE NUMBER OF ACTIVE SATELLITES IN EARTH ORBIT. THIS HAS MADE SIGHTINGS OF BRIGHT "STARLINK TRAINS" LIKE FETTER RECORDED INCREASINGLY COMMONPLACE.
ADDING TOGETHER FUTURE LAUNCHES PROPOSED BY SPACEX AND OTHER COMPANIES, SOME RESEARCHERS ESTIMATE AS MANY AS 100,000 NEW SATELLITES COULD BE ORBITING EARTH BY THE END OF THE DECADE. NOTE TO MISSION PLANNERS: DON'T FORGET SPACE WEATHER.

A New Origin Story for Mars's Burns Formation

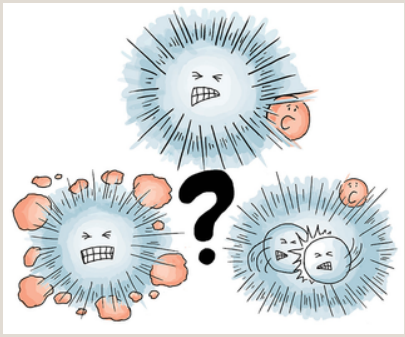
The Red Planet's Grasberg and Burns formations have different compositions today, but they may have started out the same way.
3 May 2023

Eos

There is a reason that NASA's Opportunity rover explored Mars's Meridiani Planum region for 14 years: The locale could hold crucial hints about the Red Planet's early geology and environment. The region's Burns formation, a layer of sandstone embedded with spherules of hematite referred to as "blueberries," is of particular interest to scientists because it shows hallmarks of liquid water and has a sulfur-rich composition that echoes features common across Mars. The Burns formation lies atop a thin rock layer called the Grasberg formation, and in a new study, McCollom and Hynek propose a novel, common origin story for the two.
The idea is based on the recent finding that the Burns and Grasberg rocks are chemically similar, except that the former are enriched in magnesium and sulfate.
Previously, there were two main hypotheses to explain the Burns formation's chemical composition. One family of models suggested that the original sands were a combination of ancient silicates and sulfate salts of iron, magnesium, and calcium that precipitated from evaporating groundwater on the margins of ancient lakes. A second group of models proposed that the sandstones began as basaltic ash and were transformed through the addition of volcanic or atmospheric sulfuric acid.
The authors of the new study put forth a third possibility, that the two formations may come from the same source material, or at least a very similar one. They proposed that the Burns/Grasberg precursor was deposited onto Meridiani Planum as particles of dust or falling ash from nearby volcanic eruptions. These materials solidified, were weathered to the size of sand grains, and were blown by the wind to their current location. Once settled, the sand dunes experienced periodic flows of groundwater, which enriched the upper layers in magnesium and sulfate. Water flow also cemented the sediments to form the sandstones observed by Opportunity.
Full article at: https://tinyurl.com/mues9cmw



Opportunity collected valuable data on the Burns formation, including this image of Burns Cliff. Credit: NASA/JPL/Cornell, Public Domain



WAC Upcoming Events

JUNE 9 - BOB MIZON - EIGHT GREAT ASTRONOMERS

JULY 14 - JULIAN ONIONS: COLD DARK MATTER - IS IT COLD, IS IT DARK AND IS IT MATTER? (FACE TO FACE AND ZOOM)

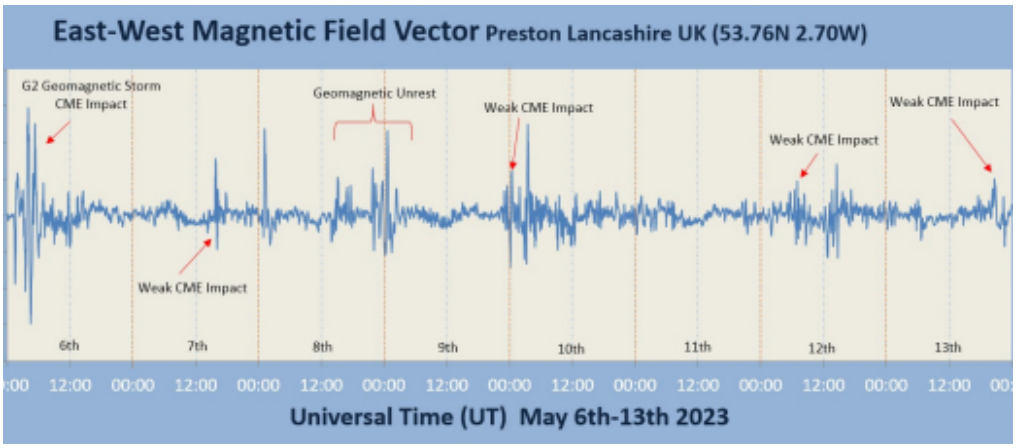
AUG 11 -
MEMBERS VIEWING EVENING FOR THE PERSEID METEORS AND SUMMER CONSTELLATIONS.

SEPT 8 -
ROCKETS ON THE BEACH

OCT 13 - RICHARD MILES: THE HISTORY OF AN EXPLOSIVE COMET (FACE TO FACE AND ZOOM)

MORE TO COME!!

PRACTICAL OBSERVING



Spaceweather.com on 15 May 2023

MAGNETOMETERS ARE GETTING RESTLESS: Last week, solar activity was high. The sun hurled so many CMEs into space that scarcely a day went by without one hitting Earth. Stuart Green's magnetometer in Lancashire, England, recorded every impact:

"Our crackling sun released multiple minor CMEs over the past week," says Green. "Their geomagnetic effect was generally weak, but nevertheless sufficient to be detected on my magnetometer here in the UK. The constant 'drumbeat' of CMEs shows that Solar Cycle 25 is continuing to develop nicely."

Green built his own magnetometer from scratch. "The sensor is buried in my garden about 0.5 meters below ground in an East/West orientation," he explains. "This allows very sensitive (sub nanotesla) measurements of magnetic declination during geomagnetic storms."

Would you like to build one, too? Here's how.

https://spaceweather.com/images2022/04jul22/MagnetometerProject.pdf

Excerpt of one version 'Type 1' provided on the right,

Helpful links:
http://www.geomag.bgs.ac.uk/education/earthmag.html
http://www.intermagnet.org/
http://en.wikipedia.org/wiki/Geomagnetic_storm
http://helios.gsfc.nasa.gov/magnet.html

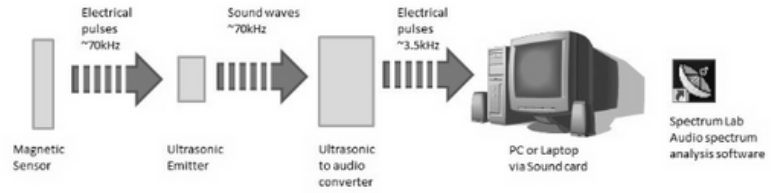


Figure 2: *Schematic layout of magnetometer: Sensor to PC*

Type 1

The wiring arrangement for this set-up is shown in Figure 10. There are two sets of batteries required; one set (four AA batteries) runs the FGM-3 and the second set is located within the Magenta Bat-5 (four AAA batteries). A minimum 3-core cable is required for +ve, ground and signal. Depending on the degree of electrical noise in the local environment and the distance between the sensor and ultrasonic transducer/detector, it may be necessary to provide local decoupling to ground any unwanted noise on the supply line. This can be achieved using a 56nH induction coil and 33µF capacitor as shown. Leads can be soldered directly onto the pins of the FGM-3. It is advisable to use heat-shrink tubing on all soldered terminals to minimise the risk of shorting. The cable should preferably be one of the internally shielded types with wrapped foil, available from electrical stores.

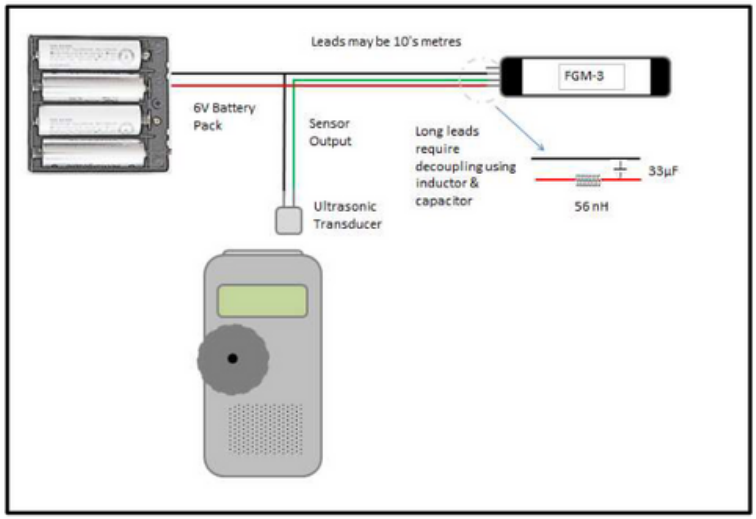


Figure 10

Type 1 version: battery operated sensor and detector

Skymaps.com—Feel free to download the full article directly each month.

The Evening Sky Map

FREE* EACH MONTH FOR YOU TO EXPLORE, LEARN & ENJOY THE NIGHT SKY

WWW.SKYMAPS.COM

NORTHERN HEMISPHERE MAY 2023

Sky Calendar – May 2023

Get Sky Calendar on Twitter
http://twitter.com/skymaps

1 **Mercury at inferior conjunction** with the Sun at 23h UT. The innermost planet passes into the morning sky.

4 **Moon near Spica** at 5h UT (evening sky).

5 **Penumbral Lunar Eclipse** from 15:14 to 19:32 UT, mid-eclipse at 17:23 UT. Best seen at mid-eclipse as a slight dimming of the Full Moon. Visible from Africa, Asia and Australia.

5 **Full Moon** at 17:36 UT.

6 **Eta Aquarid meteor shower peaks.** Most active for 7 days around this date. Associated with Comet Halley. Very fast, bright meteors, up to 40 per hour. Best seen from the tropics and southern hemisphere a few hours before dawn. Moonlight interferes this year.

7 **Moon near Antares** at 14h UT (morning sky).

9 **Venus 1.8° N of M35 star cluster** at 17h UT (44° from Sun, evening sky). Mag. −4.2.

11 **Moon at perigee** (closest to Earth) at 5:07 UT (distance 369,343km; angular size 32.4').

12 **Last Quarter Moon** at 14:28 UT.

13 **Moon near Saturn** at 16h UT (morning sky). Mag. 1.0.

17 **Moon near Jupiter** at 13h UT (morning sky). Mag. −2.1. Occultation visible from North America, Canada and Greenland.

18 **Moon near Mercury** at 0h UT (morning sky). Mag. 1.7.

19 **New Moon** at 15:55 UT. Start of lunation 1242.

23 **Moon near Venus** at 13h UT (41° from Sun, evening sky). Mag. −4.2. Look out for this spectacular pairing!

24 **Moon near Mars** at 20h UT (evening sky). Mag. 1.5.

25 **Moon near Beehive cluster M44** at 7h UT (evening sky).

26 **Moon at apogee** (farthest from Earth) at 2h UT (distance 404,509km; angular size 29.5').

27 **Moon near Regulus** at 5h UT (evening sky).

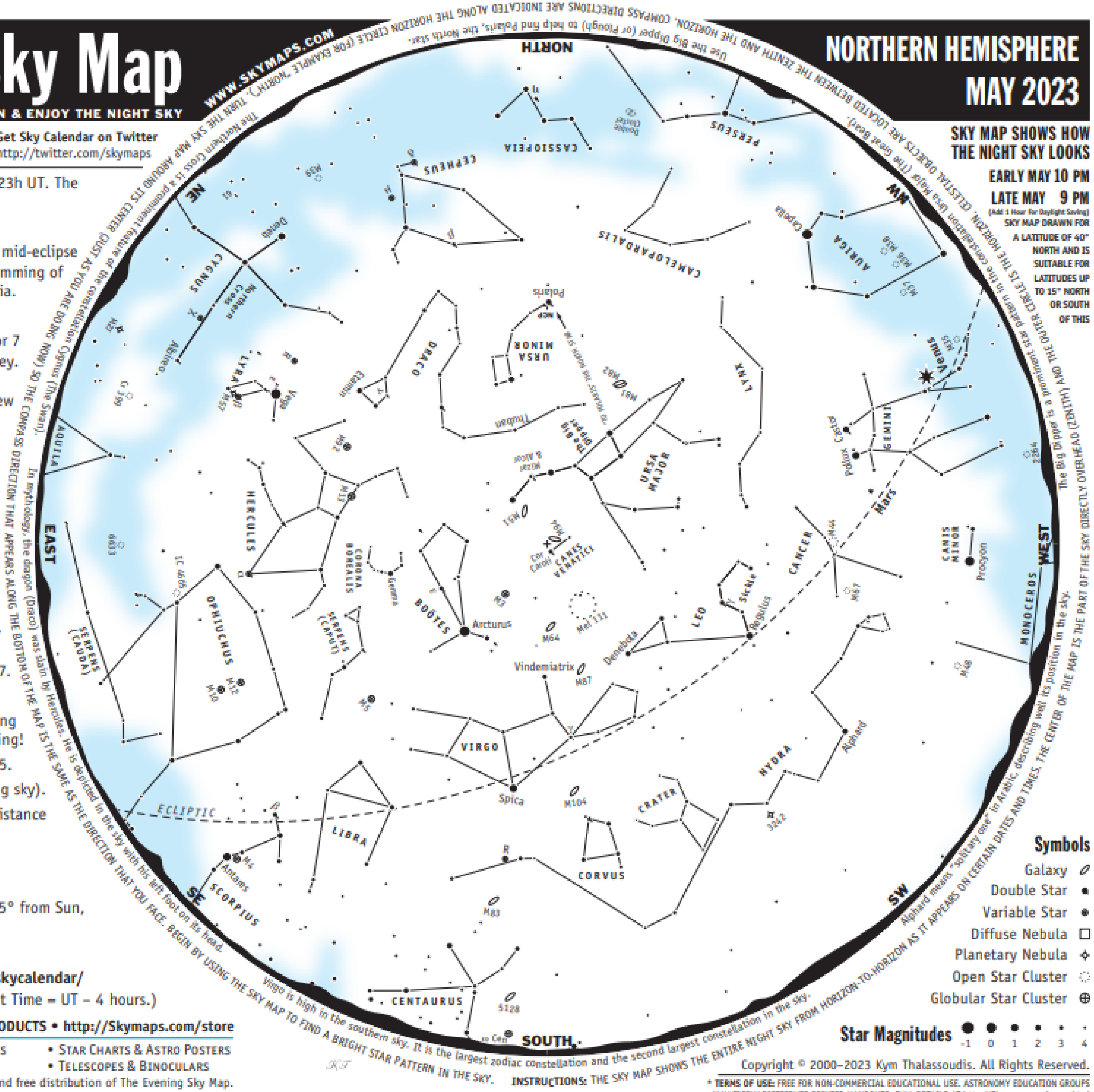
27 **First Quarter Moon** at 15:23 UT.

29 **Mercury at greatest elongation west** at 5h UT (25° from Sun, morning sky). Mag. 0.6.

31 **Moon near Spica** at 14h UT (evening sky).

More sky events and links at http://Skymaps.com/skycalendar/
All times in Universal Time (UT). (USA Eastern Daylight Time = UT – 4 hours.)

SKY MAP SHOWS HOW THE NIGHT SKY LOOKS
EARLY MAY 10 PM
LATE MAY 9 PM
(Add 1 Hour For Daylight Saving)
SKY MAP DRAWN FOR A LATITUDE OF 40° NORTH AND IS SUITABLE FOR LATITUDES UP TO 15° NORTH OR SOUTH OF THIS.



INSTRUCTIONS: THE SKY MAP SHOWS THE ENTIRE NIGHT SKY FROM HORIZON-TO-HORIZON AS IT APPEARS ON CERTAIN DATES AND TIMES. THE CENTER OF THE MAP IS THE PART OF THE SKY DIRECTLY OVERHEAD (ZENITH) AND THE OUTER CIRCLE IS THE HORIZON. CELESTIAL OBJECTS ARE LOCATED BETWEEN THE ZENITH AND THE HORIZON. COMPASS DIRECTIONS ARE INDICATED ALONG THE HORIZON CIRCLE (FOR EXAMPLE "NORTH"). TURN THE SKY MAP AROUND ITS CENTER (JUST AS YOU ARE DOING NOW) SO THE COMPASS DIRECTION THAT APPEARS ALONG THE BOTTOM OF THE MAP IS THE SAME AS THE DIRECTION THAT YOU FACE. BEGIN BY USING THE SKY MAP TO FIND A BRIGHT STAR PATTERN IN THE SKY.

Use the Big Dipper (or Plough) to help find Polaris, the North star.

Symbols
Galaxy
Double Star
Variable Star
Diffuse Nebula
Planetary Nebula
Open Star Cluster
Globular Star Cluster

Star Magnitudes -1 0 1 2 3 4