

Skywatchers

Newsletter of the China Lake Astronomical Society

Volume 57 No. 05

May 01, 2020

NEXT MEETING 7:30 p.m., Monday, May 04th, 2020 - Cancelled
Maturango Museum, 100 East Las Flores Avenue, Ridgecrest, California.

PROGRAM FOR THE May 04, 2020 7:30 PM MEETING - Cancelled

STAR PARTY SCHEDULE FOR THE 2020 SEASON:

Star Parties will be held on the dates listed below. Star Parties are an activity where members and guests come together to view the skies. If you have a telescope, bring it; if not, come and look through someone else's. They are held at a site in the open desert south of Ridgecrest. To reach the site from Ridgecrest, go south on China Lake Boulevard 6.5 miles from its intersection with Ridgecrest Boulevard. Continue straight across Highway 395 and you will be on Brown Road (Old Highway 395). Follow Brown Road as it curves to the right and goes west. After 2.3 miles, there will be a 30-inch orange cone on the left. Turn left and follow the dirt road marked by 12-inch cones. The CLAS star party is south 0.5 mile along this road. Signs and cones will be put out about a half hour before viewing starts. All viewing is weather dependent.

Call Roger Brower 760-446-0454, 760-677-1143 or Keith Weisz 760-375-9114, for more information.

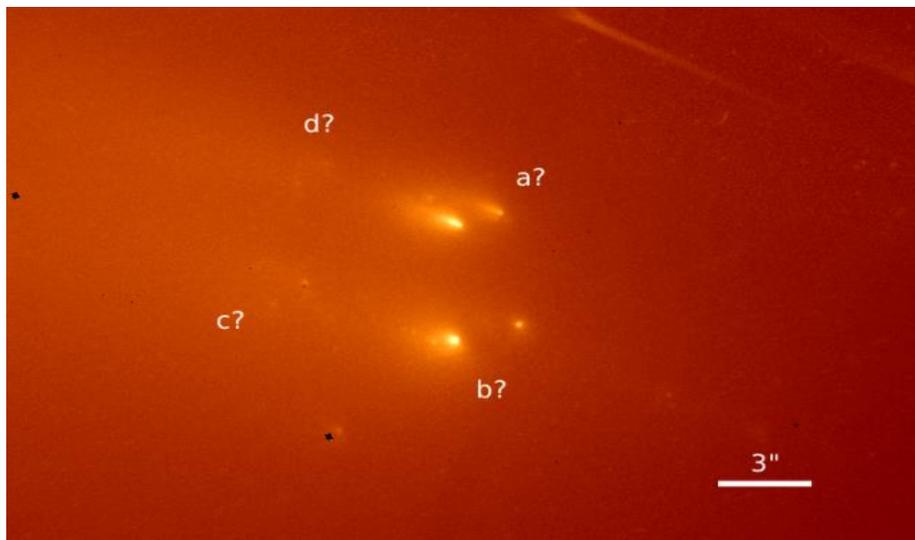
I have included the Star Party times and locations for the rest of the year despite at this time we have no plans yet to have them. Hopefully that will change in the near future.

Fri,	May 22nd	Signs out at 7:30 p.m., Star viewing at 9:00 p.m. (New Moon) (Cancelled)
Sat,	May 23rd	Red Rock Canyon – Visitors Center, Star viewing at Sundown (Cancelled)
Fri,	June 20th	Signs out at 8:30 p.m., Star viewing at 9:00 p.m. (New Moon – 2 days) (TBA)
Fri,	July 18th	Signs out at 8:30 p.m., Star viewing at 9:00 p.m. (New Moon – 3 days) (TBA)
Fri,	Aug 21st	Signs out at 8:00 p.m., Star viewing at 8:30 p.m. (New Moon +2 days) (TBA)
Fri,	Sept 18th	Signs out at 7:00 p.m., Star viewing at 7:30 p.m (New Moon + 1 Day) (TBA)
Sat,	Sept 19th	Red Rock Canyon – Visitors Center, Star viewing at Sundown (TBA)
Sat,	Oct 10th	Red Rock Canyon – Visitors Center, Star viewing at Sundown (TBA)
Fri,	Oct 16th	Signs out at 6:30 p.m., Star viewing at 7:00 p.m. (New Moon) (TBA)
Sat,	Oct 17th	Red Rock Canyon – Visitors Center, Star viewing at Sundown (TBA)
Sat,	Nov 07th	Red Rock Canyon – Visitors Center, Star viewing at Sundown (TBA)
Fri,	Nov 13th	Signs out at 6:00 p.m., Star viewing at 6:30 p.m. (New Moon – 2 days) (TBA)
Sat,	Nov 14th	Red Rock Canyon – Visitors Center, Star viewing at Sundown (TBA)

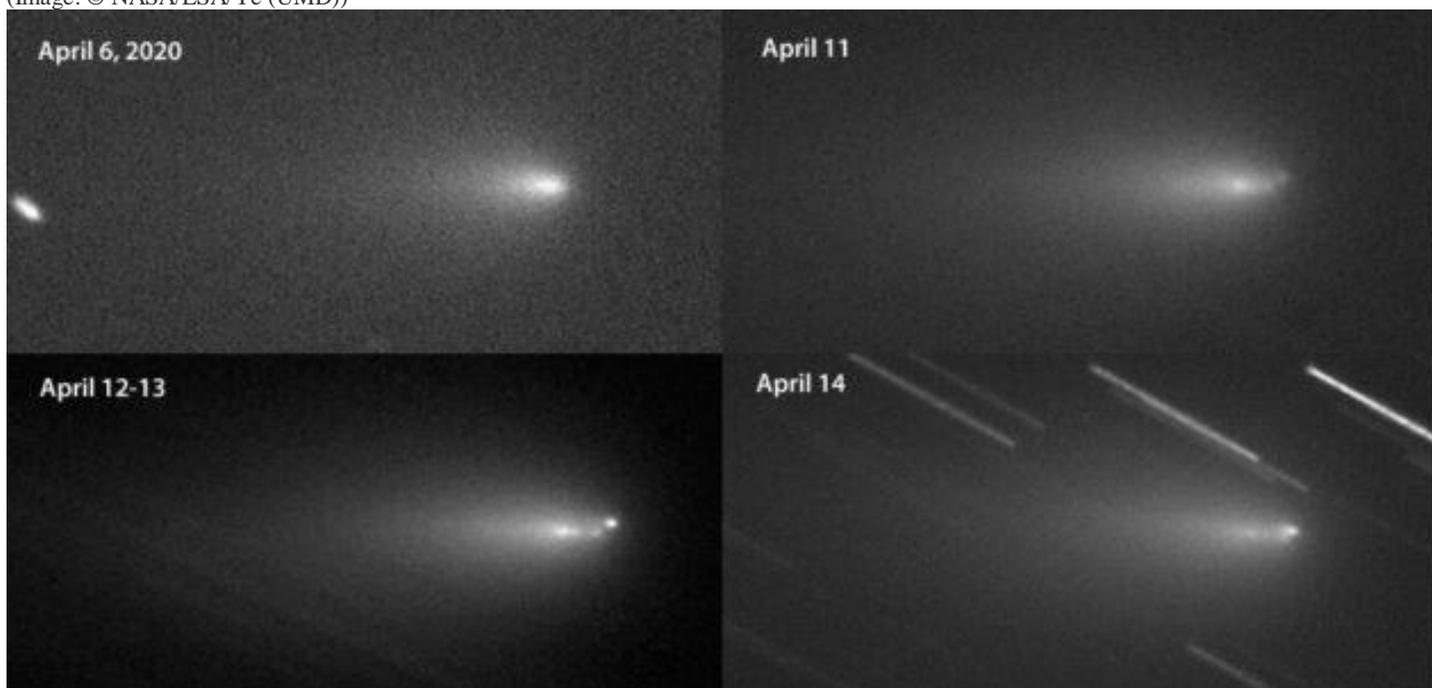
All Star Parties at the Brown Road site and Red Rock Campground are postponed until further notification..

Next CLAS Meeting: May 04, 2020 at 7:30 PM. If conditions change for the better you will be notified if a meeting and program will be presented.

That's the way the comet crumbles: Hubble image shows remains of Comet ATLAS



An image taken on April 20, 2020, shows the fragments of Comet ATLAS.
 (Image: © NASA/ESA/Ye (UMD))



<https://skyandtelescope.org/astronomy-news/new-comet-alert-trio-of-comets-grace-our-skies/>

The evolution of Comet ATLAS's fragmenting pseudo-nucleus is clearly visible in these images taken between April 6th and 14th. The brightest fragment situated off-axis from the other pieces may be the original nucleus. In the final frame note that it has developed a tiny tail of its own. North is up.

Gianluca Masi and Nick Haigh

Skywatchers had high hopes that a [comet called ATLAS](#) would light up the night sky this spring, with forecasts suggesting it could become bright enough to see with the unaided eye.

Instead, the icy object crumbled to pieces — but it's still putting on a spectacular show for scientists. Ye Quanzhi, an astronomer at the University of Maryland, snagged some time with [NASA's Hubble Space Telescope](#) to take a look at Comet ATLAS on Monday (April 20) and caught a stunning image of its fragments that he [shared on Twitter](#) as a preview of his research.

Ye hopes those mini-comets will help scientists understand what [caused ATLAS to fall apart](#). In particular, astronomers rely on the distance between fragments to reconstruct events, since that distance increases as more time passes since a specific fracture.

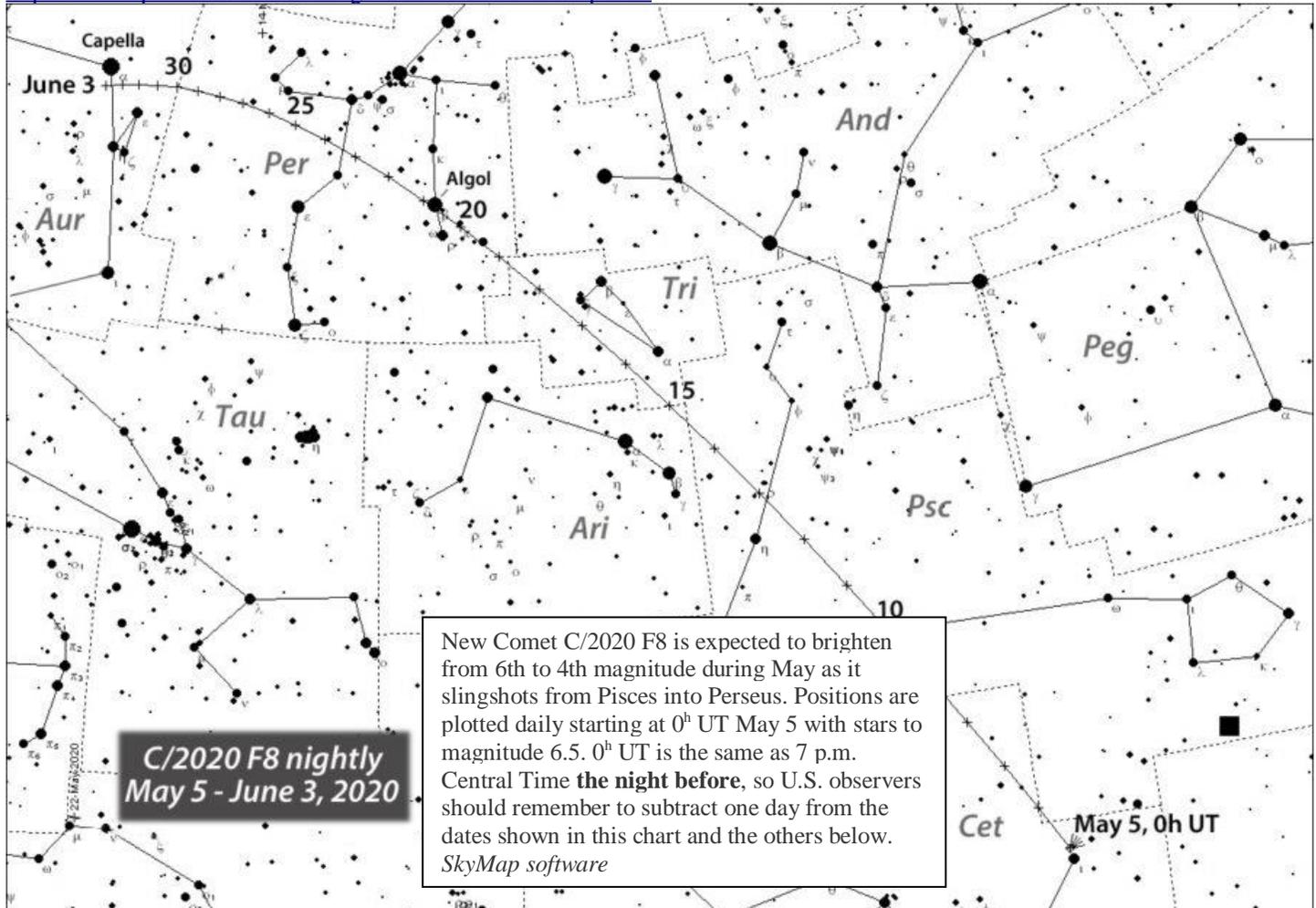
Previous observations had identified four main fragments from [Comet ATLAS](#). In the Hubble image, Ye said, he believes two of those fragments have broken down even more, yielding the two pairs of bright spots on the right, which represent the four largest fragments at the time.

The two clouds of brightness on the left may represent where older fragments have broken up into smaller pieces. Before beginning the observations, which lasted for one of Hubble's orbits around Earth, Ye had hoped

that Hubble would be able to spot more mini-comets in those regions, but it would appear those fragments had already disintegrated too far by the time the observations began.

Comet ATLAS is hardly the first icy space rock to break up within scientists' view, but there are a few special conditions that make these new observations particularly exciting, Ye said. First, ATLAS happened to break up when it was quite close to Earth and quite bright, giving astronomers an [especially clear view](#). And ATLAS hails from the [Oort Cloud](#), a distant sphere of icy rubble enveloping the solar system as much as 9.3 trillion miles (15 trillion kilometers) away from Earth. That vast distance makes it quite difficult for astronomers to study the Oort Cloud directly, but watching Comet ATLAS's antics will help scientists develop new hypotheses about what's happening out there.

ATLAS is only the second bright Oort cloud comet whose fragments Hubble has been able to observe in its 30 years of work, Ye said. <https://www.space.com/hubble-image-comet-atlas-broken-up.html>



NEW COMET TO THE RESCUE

Meanwhile, Michael Mattiazzo of Australia has found a new comet named [Comet SWAN \(C/2020 F8\)](#) in imagery taken by the Solar Wind ANisotropies (SWAN) camera on the [Solar and Heliospheric Observatory](#) (SOHO) and publicly available [here](#). Comet SWAN is presently 8th magnitude, compact, and brightening steadily as it plows across Piscis Austrinus at dawn for Southern Hemisphere observers. Soon it will swing northward, making its first appearance in Aquarius at 7th magnitude for southern U.S. observers by month's end. Comet SWAN (C/2020 F8) will continue to brighten and move rapidly northward in the May dawn sky reaching a **peak magnitude of 3.5** between May 15–23 while racing from Triangulum across Perseus. Though bright, the comet remains low in the northeastern sky at the start of dawn throughout the best part of its apparition. Amazingly, Comet SWAN arrived just in time to pinch-hit for ATLAS in the event that comet disintegrates completely. It even reaches peak brightness in the same area of the sky. Perihelion occurs on May 27th at a distance of 64.3 million kilometers.



Comet SWAN (C/2020 F8) is expected to reach naked-eye visibility by mid-May low in the east at dawn. On April 13th it presents a bright, dense coma and a spike of a tail.
[Rolando Ligustri](#)



<https://www.universetoday.com/142068/keep-an-eye-out-for-the-eta-aquarid-meteors-this-weekend/>

Eta Aquariids Meteor Shower 2020

In 2020, the forecast calls for the greatest number of Eta Aquariid meteors to fall before dawn on (or near) May 5. However, this shower has a rather broad maximum, so just as many meteors may be flying on the mornings before and after. There is one big bugaboo for watching the Eta Aquariids in 2020, though. The shower will have to contend with a nearly full [waxing gibbous moon](#). That's why we recommend you *try* watching for meteors before sunup on May 1, 2 and 3. Fewer meteors will be flying then, but there will be a larger moon-free window between moonset and dawn. This shower favors the Southern Hemisphere, ranking as one of the finest showers of the year there, in a year when the moon isn't obscuring the show. At mid-northern latitudes, these

meteors don't fall so abundantly, although people in the southern states in the U.S., for example, tend to see more meteors than those at more northerly latitudes. In a dark sky – when the moon is down – especially at more southerly latitudes, the Eta Aquariids can produce up to 20 to 40 meteors per hour. From mid-northern latitudes, you might only see about 10 meteors per hour.

When and how should I watch the Eta Aquariids? Let's talk for a minute about the fact that the Eta Aquariid shower extends on either side of its peak morning of May 5, 2020. [Writing for the International Meteor Organization](#) in 2017, veteran meteor expert Robert Lunsford pointed out:... There is no sharp peak for this shower, but rather a plateau of good rates that last approximately one week centered on May 6. So, in 2020, we stand by our hope that some meteors will be flying in the early morning hours on May 1, 2 and 3. But, of course, you never know. In general, the best time to watch these fast and often bright meteors is in the hour or two before the onset of morning twilight. Don't know when twilight begins in your part of the world? Visit [Sunrise Sunset Calendars](#) and remember to check the *astronomical twilight* box. Want to know the time of moonset in your area? Visit [Sunrise Sunset Calendars](#), and check the *moonrise and moonset* box, to find out when the moon sets in your sky. Give yourself at least an hour of viewing time for watching any meteor shower. Meteors tend to come in spurts that are interspersed by lulls. Also, it can take as long as 20 minutes for your eyes to adapt to the dark. You need no special equipment to watch a meteor shower, but a little luck always helps. Find a [dark](#), open sky away from artificial lights, and sprawl out on a reclining lawn chair. Meteor watching is a lot like fishing. Sometimes you catch a good number of them, and sometimes you don't.

Radiant point of the Eta Aquariid shower. If you trace the paths of the Eta Aquariid meteors backward, they all seem to radiate from a certain point in front of the constellation Aquarius the Water Bearer. This point on the sky's dome is called the *radiant* of the meteor shower, which nearly aligns with the faint star Eta Aquarii. Hence, this meteor shower is named in honor of this star. Eta Aquarii is one of the four stars making up the Y-shaped *Water Jar* asterism in the northern part of Aquarius. If you can find the Water Jar in the constellation Aquarius, you've as good as located the radiant point for the Eta Aquariid meteors. The alignment of the radiant and the star is of course coincidental. Eta Aquarii is some 170 [light-years](#) away – trillions upon trillions of miles away – while the Eta Aquariid meteors burn up about 60 miles (100 km) above Earth's surface. Meteor shower radiants are sometimes misunderstood by casual meteor-watchers. You don't need to know where they are to watch a meteor shower. That's because the meteors fly every which way across the sky, in front of numerous constellations. However, the higher a shower's radiant appears in your sky, the more meteors you're likely to see. For the Eta Aquariids, the radiant soars highest in the nighttime sky just before dawn. That's why you can expect to see the most meteors in the wee morning hours. You can see some Eta Aquariid meteors in late evening, before the radiant rises into your sky. In fact, late evening is the best time to see earthgrazers, meteors that make exceptionally long streaks across your sky. As the radiant rises higher – that is, as the hours of the night tick away to dawn – you'll see shorter meteors, but more meteors. May 5 and 6. Image via [NASA Blueshift](#). **Halley's Comet is the source of the Eta Aquariid meteor shower.** Every year, our planet Earth crosses the [orbital path of Halley's Comet](#) in late April and May, so bits and pieces from this comet light up the nighttime as Eta Aquariid meteors. This shower is said to be active from April 19 to May 20, although Earth plows most deeply into this stream of comet debris around May 5 or 6. The comet dust smashes into Earth's upper atmosphere at nearly 150,000 miles per hour (240,000 kilometers per hour). Roughly half of these swift-moving meteors leave *persistent trains* – ionized gas trails that glow for a few seconds after the meteor has passed. Our planet also crosses the orbital path of Halley's Comet at the other end of the year, giving rise to the Orionid meteor shower, which is usually at its best in the predawn hours on or near October 21. Bottom line: What's a good meteor shower for the Southern Hemisphere? It's usually the Eta Aquariid shower. This year, 2020, nearly full waxing gibbous moon interferes with the peak on the morning of May 5. Try watching after moonset and before dawn on the mornings of May 1, 2 and 3.

Source: <https://earthsky.org/astronomy-essentials/everything-you-need-to-know-eta-aquarid-meteor-shower>

Telescope for Sale

Orion SkyQuest XT8

Includes:

Correcting Image Right Angle

25mm eyepiece

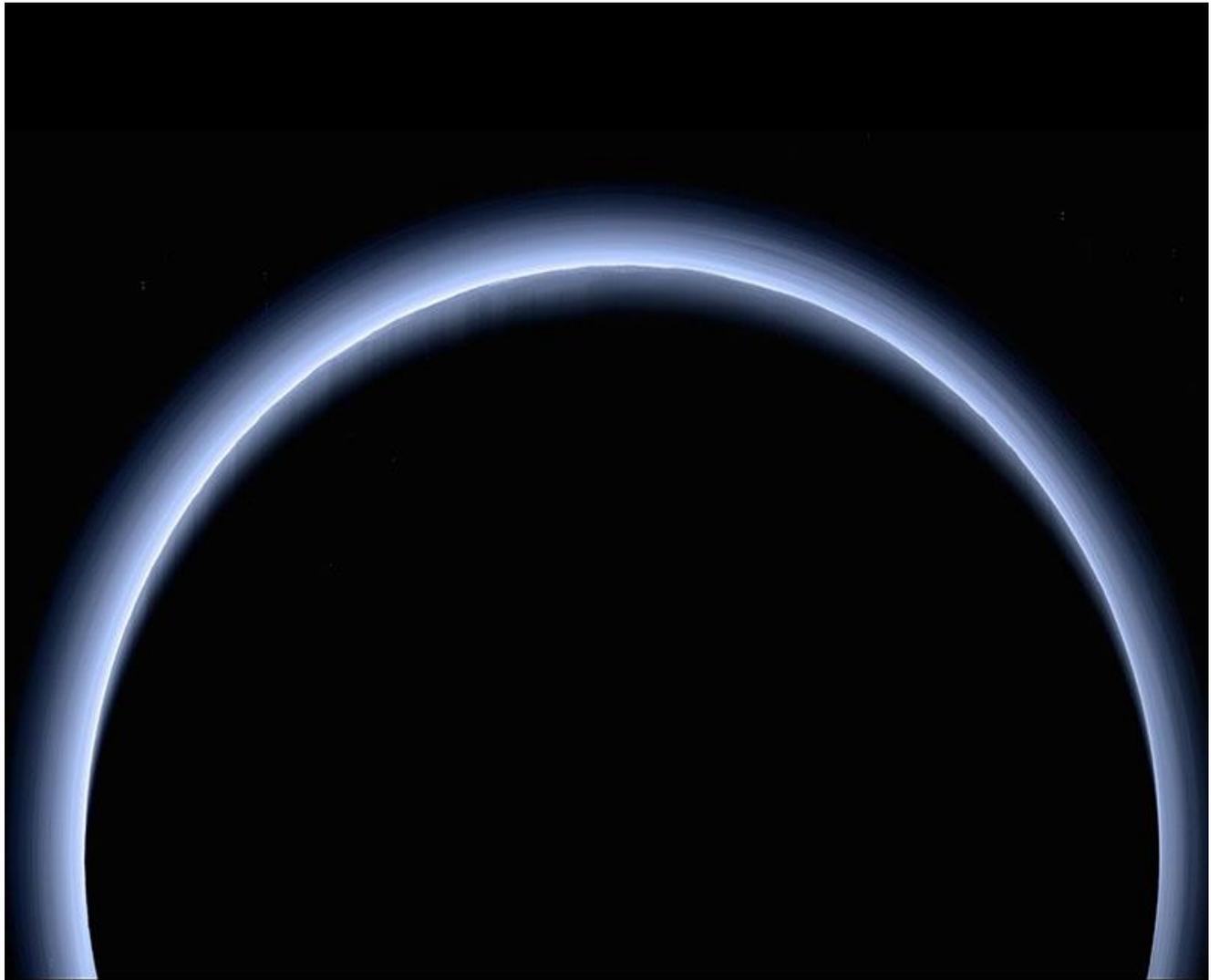
2X Barlow Lens
Meade Series 5000 60 degree 5 element Plossl 40mm
Edge on Planetary 6mm eyepiece
Manual and Instructions

The telescope has hardly been used; not sure what something like this is worth, but I will entertain reasonable offers.
If you know of anyone who might be interested, please send them my way.

Thanks,

Michael Chartier
Head, WD Cost & Acquisition Analysis Dept.
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New studies shed light on the early years of Pluto's formation, and whether it ever hosted a subsurface ocean.

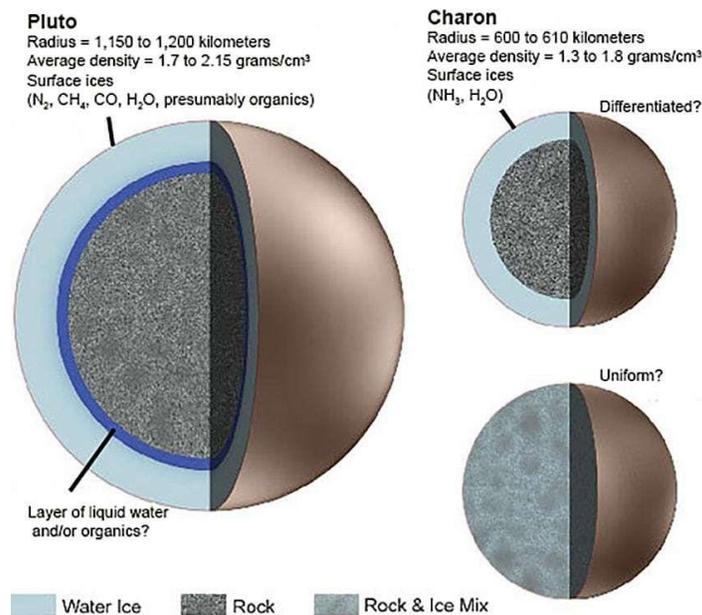


New interpretations of our brief glimpse of Pluto has implications both for its formation and for the early history of the solar system. Two recent studies looked at the possibility that ancient Pluto may have hosted an ocean underneath its surface. The presentations appeared at the 51st Lunar and Planetary Science Conference in March, which became a virtual meeting due to the ongoing [COVID-19 pandemic](#). While the idea of a subsurface ocean predates the 2015 flyby, these analyses of New Horizons data are providing new evidence in favor of the idea.

HOT START VS. COLD STAR.

One study, titled "[The Plausibility of an Ocean on Pluto Shortly After Accretion](#)," used New Horizons' images of Pluto to look at a key question in planetary formation: Did Pluto get off to a *cold start*, slowly aggregating rock and ice particles? Or did it form more quickly in a *hot start*, accumulating more heat than it was losing into space? Either scenario has key implications for whether Pluto was capable of hosting an early ocean under an icy surface. If Pluto formed in a cold start scenario, researchers would expect to see evidence for compressional features on Pluto's surface; extensional features would point to a hot start scenario. Either scenario could support a subsurface ocean, but in different ways.

“An early [subsurface] ocean that is refreezing predicts early global extension,” explains lead author Carver Bierson (University of Santa Cruz). “In contrast, an early ice shell melting to form an ocean would produce compressional features.” Scouring the images returned from New Horizons, the researchers found tentative evidence of extensional features, specifically *graben* located west of the heart-shaped Sputnik Planitia region. These features, which are 4 billion years old according to crater counts in the area, are just what you’d expect to see if the hot start model was correct. To date, no related compression features have been found on Pluto’s surface. Models of early formation predict that Pluto would see a period of warming via gravitational compression and radioactive decay in the core, followed by widespread extension as ice refroze and swelled. But the hot start model would have Pluto form in a very short period of time, less than 30,000 years. “If Pluto formed fast, the heat from the impacts adding material can warm Pluto faster than the energy can be radiated to space,” says Bierson. “Other groups trying to explain why so many Kuiper Belt objects (KBOs) have moons suggest that KBOs must form fast. It is great to have these two very independent approaches pointing towards the same answer.” “There’s little evidence for compression and very much so for extension,” says William McKinnon (Washington University-St Louis). “Ocean evidence at this point is circumstantial . . . but it is the simplest explanation that makes the most sense.” Indeed, McKinnon explains, the formation environment may have favored a hot start: “It’s actually really hard to argue for a cold start,” he says, “as there are too many energy sources (from initial formation, radioactive element decay, and the Charon-forming impact) around.” Though several lines of evidence point to a subsurface ocean on Pluto, they aren’t as definitive as the plume venting the Cassini spacecraft saw at Saturn’s moon Enceladus, say, or the magnetic induction evidence the Galileo spacecraft detected at Jupiter’s moon Europa. If the hot start theory for Pluto is correct, we should see similar extensional features on Eris, Haumea, and other Kuiper Belt objects, should we ever decide to visit.



MODELING PLUTO'S INTERIOR

[A second study](#) presented at the virtual LPSC conference reported on ripples seen on Pluto's Charon-facing side. These features are consistent with shock waves from the massive impact that is presumed to have formed Sputnik Planitia on the opposite hemisphere.

New Horizons only saw Pluto's Charon-facing hemisphere in low resolution during its 2015 flyby. Nevertheless, the team has run simulations showing that a 400-kilometer (250-mile) diameter impactor striking Pluto at about 2 km/s (5 mph), along with an ancient subsurface ocean 150 kilometers deep, would help explain the surface features we see today. When a large body smashes into a world, the impact releases seismic waves that travel through to the exact opposite side, explains the study's lead author Adeene Denton (Purdue University). The internal structure of the world thus determines how much damage the seismic waves do in the region on the opposite side as the impact, she adds. The analysis of features seen on Pluto and the impact simulations in the study allow us to peer inside Pluto and place constraints on its structure and the possible presence and nature of a subsurface ocean. "We know that deformation at the antipode to Sputnik Planitia is highly responsive to Pluto's ocean thickness and core composition," Denton says. "So, we can examine how oceans of different thicknesses affect deformation at the antipode to determine whether an ocean is necessary for these features to form, and if so, how thick it needs to be." This preliminary work is promising, she and colleagues write, and suggests that such calculations will provide insight into Pluto's interior structure.

FUTURE VIEWS

Will we ever go back to Pluto? We only saw one of its hemispheres in high resolution during the 2015 pass. A return would be intriguing, but it would take some time: New Horizons traveled for nearly a decade before flying by Pluto. Even now, researchers are scouring the flight path of New Horizons for a possible 3rd flyby target. (The mission is also conducting a [unique parallax experiment](#) — follow the link to see how you can join!) If we can't go back to Pluto, another intriguing world to explore (and compare to Pluto) would be Neptune's large moon, [Triton](#), thought to be a captured Kuiper Belt object. Though it's a ways off, there are proposals to launch an [Ice Giant Orbiter mission](#) or set of missions in the 2030s.

For now, we can ponder the brief snapshot that New Horizons provided of Pluto, and wonder what lies within the distant world.

Astronomy Column May Events

May 01-05	Eta Aquariid meteor shower
May 02	Jupiter 2 degrees north of the Moon.
May 07	Full Moon
May 14	Last Quarter Moon
May 15	Comet Swan Peak Magnitude 3.5
May 21-22	Evening twilight viewing of Mercury and Venus less than 1 degree apart.
May 22	New Moon
May 23-24	Moon joins Mercury and Venus as a great binocular opportunity.
May 28	For active observers there will be an ingress and shadow transit of the moon Europa across the disc of Jupiter at 8:48 U.T. (early Thursday)
May 30	First Quarter Moon

The group rate price for a single copy if you buy **in person** from CLAS is \$27.00 for the handbook and \$10.00 for the calendar. Calendar and Handbook are sold together for the combined price of \$35.00. **Available NOW.**

MEMBERSHIP INFORMATION

Basic CLAS dues are \$25.00 per year - due in January. Students and Skywatchers Newsletter are **FREE**. Members also receive discounted rates for Astronomy Magazine and /or Sky and Telescope Magazine.

The fee schedule is as follows: Verify current magazine prices with Roger!

Basic membership \$25.00 per year.

Membership with Astronomy magazine is \$59.00 per year.

Membership with Sky and Telescope magazine is \$58.00 per year.

Membership with both S & T and Astronomy is \$92.00 per year.

Send your Check or Money Order to:

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Meetings of the China Lake Astronomical Society are held at the Maturango Museum at 7:30 p.m. on the first Monday evening of each month, except when the first Monday is a holiday.

WESTERN AMATEUR ASTRONOMERS WEB SITE <http://www.waa.av.org/>
New! CHINA LAKE ASTRONOMICAL SOCIETY WEB SITE <http://chinalakeastro.org/>