Sonoma Skies

Newsletter of the Sonoma County Astronomical Society
A nonprofit scientific and educational organization

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Former SCAS President Observes at 6.5M MMT

—by Claude Plymate

There are likely still a few in SCAS that remember back to the mid-80's when Teresa Bippert-Plymate was president of SCAS. Teresa had recently graduated from SSU and was elected president in 1985. She had to cut short her second term when I, her husband Claude, accepted a position with the National Solar Observatory (NSO) at Kitt Peak. Always ready for an adventure, Teresa left the redwoods & vineyards behind and relocated to the Mecca of Astronomy, Tucson, AZ.

While I pursued my career at the McMath-Pierce Solar Telescope (McM-P), Teresa began her own career path in Astronomy. Over the years, she has assembled an impressively diverse resume in the field. She started by volunteering her time measuring ellipticity and orientation of galaxies on a microdensitometer for a well-known astronomer's research project. That led to a fulltime position with the University of Arizona's Steward Observatory as a team member of a group that was developing an IR detector that eventually flew on NASA's Spitzer Telescope. As that project neared completion, Teresa migrated across the street to the National Solar Observatory where she spent the next 7 years operating the McM-P and Kitt Peak Vacuum Telescope (KPVT).

Teresa Bippert-Plymate

Teresa's time at the McM-P is arguably best remembered by the time she was working under the false floor in the main observing room. One of the floor tiles had been removed exposing the long drop into the area below. She got on the mountain-wide radio and warned the visitor center "You'd better not bring the public tour down to the McMath today. We've got an open 'nomer trap in the observing room." Ever since that day, the term "'nomer" has become commonly accepted slang around Kitt Peak - usually used derogatorily.

The venerable KPVT went into operation in 1973. The NSO began developing its successor in the mid-90's called SOLIS

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Seeing Differently: The Wool-Gatherer's Report

Ben Pietsch
SCAS June 11 Meeting, 7:30 PM
at Proctor Terrace School

Bernard "Ben" Pietsch has been a member of SCAS since the early 80's. Prior to the existence of the club Ben became interested in astronomy in the 1950's, and with the aid of friends and mentors was soon an avid amateur astronomer—learning to use telescopes and to make them. Over the years he has logged in many hours of lens grinding, along with actual nighttime observation.

Ben at Machu Picchu

In the last few decades his interests have turned toward archeo-astronomy and the investigation of ancient monuments around the world. Using computer assistance to turn back the heavens, Ben has made many original and controversial discoveries correlating astronomical alignments with ancient architecture.

At the next meeting, Ben, now approaching his third Saturn return, will share some of his adventures in a long life's quest for understanding. His talk will include slides from places he's been and the unique observations he's made there: the Pyramids of Egypt and Peru, Stone Circles in Great Britain, and New Mexico, and much more.

Please join us to learn more from our own space explorer. As always, the public is welcome.

Young Astronomers See page 6

Sonoma County Astronomical Society (SCAS)

Membership Information

Meetings: 7:30 PM on the second Wednesday of each month, in the Multipurpose Room of Proctor Terrace Elementary School, 1711 Bryden Lane at Fourth Street, Santa Rosa, unless otherwise announced in this publication. The public is invited.

Dues: $25, renewable June 1 of each year. New members joining between December 1 and May 31 pay partial-year dues of $12.50.

Star Parties: See the Events section for dates and times.

Rental Telescope: Members are eligible to borrow the club's 80mm refractor with tripod. Contact any Board member listed below.

Egroup URL: Connect with other members about going observing, observing reports and chat about astronomy and news items from AANC and *Sky & Telescope.* Hosted by Robert Leyland at *r.leyland@verizon.net*. Any SCAS member is welcome to join. Visit *http://groups.yahoo.com/group/scas* and click the "Join" button, or send an email to *scas-subscribe@yahoogroups.com*

Discount Subscriptions: For ***Sky & Telescope***, new subscribers may send a check for $32.95 payable to "SCAS", with your complete mailing address, directly to: Larry McCune, 544 Thyme Place, San Rafael, CA 94903. Once you have received the discount rate, you may renew your subscription by sending your personal check with the renewal notice directly to Sky Publishing. Discount subscriptions to ***Astronomy*** Magazine occur annually in October. Check *Sonoma Skies* for details.

Library: SCAS Librarian David Simons hosts a library of astronomy books that may be checked out by members at SCAS meetings, to be returned at the next meeting. Videotaped lectures on astronomy may be rented for $3 per month.

Sonoma Skies is the monthly newsletter of the Sonoma County Astronomical Society (SCAS). Subscription is included as part of membership. Articles and member announcements are welcome and are published on a first come, first served basis, space permitting, and may be edited. **The deadline for submissions is 10 days prior to the end of each month.** Mail to: Editor, SCAS, P.O. Box 183, Santa Rosa, CA 95402, or email *publications@sonomaskies.org*

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Visit us on the web at:
www.sonomaskies.org

June Observing Notes

6/1 Jupiter rises just after 11:00 PM. By month's end it will rise at 9:00 PM, heralding evening enjoyment of shadow transits in July! What a treat we have in store, with Jupiter gracing beautiful Sagittarius all summer long.

6/3 New Moon near perigee 12:30 PM; large tides

6/7 Crescent Moon near Mars 10:00 PM

6/8 Moon near Regulus and Saturn 10:00 PM

6/16 Moon very near Antares 10:00 PM

6/20 Summer Solstice 5:00 PM

Moon near Jupiter 5:00 AM

6/23-30 Mars is moving ever closer to Regulus in Leo. At evening twilight on June 23 will have a beautiful lineup of Mars, Regulus, and Saturn in the West, each separated by about 4º.

Mars continues East to approach Regulus until they are separated by only 3/4º on June 30. Magnitudes: Saturn 0.8, Regulus 1.4, Mars 1.6. Be sure to compare their colors before they settle into the horizon at 11:22 PM.

On July 9 Mars will race past Saturn at about 18º above the western horizon at evening twilight.

—Some of above courtesy of Jack Welch

Teresa Plymate *(from Page 1)*

(Synoptic Optical Long-term Investigations of the Sun). In 2000, Teresa took on the position of Technical Writer for the SOLIS project. That position only lasted a couple of years. (Many, if not most, jobs in astronomy last only as long as the project or its funding. Once the project comes to fruition, it is time to look for another position or write another grant proposal.)

Tom McMahon is another SSU graduate who knew Teresa from their days as undergrads out at the SSUO. Tom's circuitous career path also eventually led to Tucson where he is now a Project Manager at Steward Observatory. When Tom got wind that Teresa was available, he hired her on the spot. Teresa now works as an Interferometry Technical Specialist for the Steward Observatory's Center for Astronomical Adaptive Optics (CAAO). The CAAO group is currently developing the beam combiner interferometer that will allow the two 8.4-m mirrors of the Large Binocular Telescope (LBT) to act as a single telescope with the resolution of a 22-m aperture!

One of the primary goals of the LBT interferometer (LBTI) is direct imaging of exoplanets. As you all know, planets are far too faint to be seen next to the bright glare of its parent star. The interferometer is being designed to allow the light from the star to be combined out of phase. This will cause the star image to null out (or be phase cancelled), but leaving the light from the nearby planet undisturbed. They hope to have first light through the instrument within the year. With luck, Teresa's group will begin producing some of the first exoplanet images sometime later.

This summer, the LBTI group will be shipping their instrument to Mt Graham for its initial test-fitting and alignment. The LBTI is dependent on some of the other systems to be operational (particularly the adaptive secondary mirror system) and not all of them will be finished and/or installed by this summer. So she will be spending some of her days there in July high above the desert heat dealing with the routing and installation of cabling for LBTI.

Nulling interferometry isn't the only technology the CAAO group is investigating in the pursuit of imaging exoplanets. Drs. Phil Hinz and Matt Kenworthy developed the IR array Clio (named for the Muse of Astronomy – not an acronym!) for use with the 6.5m MMT. Clio is a 320x256 pixel Indium Antimonide array that is sensitive in the 3 - 5 micron region. (The visible spectrum covers roughly 0.4 - 0.7 microns.) A clever optic called a Phase Plate was added to Clio. The Phase Plate redistributes the energy in the telescope's diffraction pattern. Properly oriented, the Airy Pattern is shifted from symmetrically about the stellar image to mostly only on one side, drastically reducing its glare - hopefully by just enough to be able to see a large planet a few AU away. Their strategy is to use the MMT and its Adaptive Optics system to look at relatively bright, nearby stars that are already known to host a planetary system.

Teresa was talking with Dr. Hinz one day and expressed interest in their MMT/Clio project. Suddenly she found herself enlisted. She was asked to join the team for a run on the MMT scheduled for the nights of April 23 and 24. Since the project is looking at fairly bright objects, they are typically allocated a couple of nights around the full Moon. An observatory like the 6.5m MMT reserves the dark Moon nights only for programs that require them.

Teresa's involvement in this first run was intended mostly to train her on operating the instrument. She wasn't going to be left alone to solo just yet. Still, she admitted to having butterflies in her stomach as they drove towards the Mt. Hopkins Observatory, about 45 miles south of Tucson. When asked what it was like to observe at such a monster telescope, she responds, sounding both a bit modest as well as overwhelmed, "Well, the telescope operator drives the telescope to target star and the AO operator calibrates and locks the system. I then push a bunch of buttons..." Teresa's greatest hope is that maybe, just maybe they'll be able to bag a planet - and of course she wants to be at the helm when they do! No results so far, but they'll have another try at it in June.

So how long will we have to wait before one of these programs succeed in producing an image of a pale blue dot orbiting another star? I have no idea. They have a long way to go before getting to the point of imaging anything as small as the Earth. Still, it's an exciting prospect to contemplate and a truly exhilarating addition to Teresa's already diverse career. Personally, I find it thrilling to see an ex-president of SCAS becoming involved in something so central to astronomy in the 21st century. I am, though, admittedly biased. After all, I'm married to her.

More information: *http://caao.as.arizona.edu/*

Social Amenities

Many thanks to Ron Tietz for providing coffee and refreshments at the May meeting.

Sonoma Skies FYI

Those of you who receive the paper newsletter were probably very surprised to see last month's issue. Believe me, so was I! Due to a printer misunderstanding, it was published in gorgeous color, though they kindly charged us for black and white. Would that we could afford color.

Which brings me back to this ongoing request—that you choose to receive the online version if you possibly can. Printer costs have risen over 50%, and we sincerely hope to keep dues low.

If you are able to receive the newsletter online (and, in color!!!) please contact Membership Director Walt Bodley at *membership@sonomaskies.org* to make the change. Thanks!

Scope City

New Member Bonus!

Scope City at 350 Bay Street, San Francisco, is offering a **$25 merchandise discount to new members**.

Manager Sam Sweiss has supported SCAS and Striking Sparks and offers a huge selection of telescopes, accessories and more. Obtain a receipt from Walt Bodley, Membership Director, showing you have paid the $25 SCAS membership dues. To arrange for your merchandise discount, contact Sam at 415/421-8800 or at *sanfrancisco@scopecity.com*

Events

Robert Ferguson Observatory Public Viewing

Saturdays, June 7, June 28
Solar Viewing: Noon - 4:00 PM
Night Viewing begins 9:00 PM

The Observatory features three telescopes: A 14-inch SCT with CCD camera in the East wing, an 8-inch refractor under the dome and a 24-inch Dobsonian in the West wing. SCAS members may set up telescopes in the observatory parking lot to assist with public viewing. Auto access closes at dusk; late arrivals must carry equipment from the horse stable parking area.

Fees: No admission fee for the solar viewing, but donations are appreciated. The Park charges $6 per vehicle for entry. A $3 donation is requested from adults 18 and over for admission to the observatory during night viewing sessions.

NIGHT SKY SUMMER SERIES

Session #1—June 2; Session #2—June 9; Session #3—June 30

Classes held Mondays at 7:30 PM. Each class includes a lecture on the constellations of the season, their history and mythology, and how to find objects within them. **Fees:** $75 for the series of six presentations. (Single session fee is $23). 10% discount for VMOA members. Classes are held at the Observatory. For information or to register: (707) 833-6979, *http://www.rfo.org* or *nightsky@rfo.org*

OBSERVING LABS

Sunday, June 1 —"Diffuse Nebulae, Star Formation and Open Clusters (Summer)"—Raincheck June 4

Sunday, June 29—"Binaries and Multiple Stars (Summer)"—Raincheck July 2

"Diffuse Nebulae, Star Formation, and Open Clusters" - An intensive telescope observing session after a brief presentation on the night's theme. Handouts/Observing Lists provided. Attendance limited to 6. Fee: $30. Seasonal sessions on each topic occur during year with different observing lists. Lab begins 8:30 PM. For reservations, email: *nightsky@rfo.org*

Reserve the Ferguson Observatory!

Groups of up to 50 can be accommodated. Astronomer docents provide sky interpretation and operate telescopes, and you can stay up as late as you want! Make your reservation at least two weeks prior to your event. Best times for optimal sky gazing are any time more than a week away from a Full Moon.

In addition to $111 charged by the RFO for use of the observatory facilities, the State Park System charges $111 for use of the *Group Campground*. Because it is adjacent to the Observatory, the group camp must be reserved for private events. Total Cost: $222. For information on how to reserve, visit *www.rfo.org* or contact George Loyer at *gloyer@rfo.org*.

Bill Nye at Planetary Society Town Hall Meeting on Space

June 20, 7:00-9:00 PM (doors open at 6:30), Cubberly Community Center, 4000 Middlefield Road Palo Alto

We hope you will be able to join Bill Nye the Science Guy at The Planetary Society's Town Hall Meeting on Space at Cubberly Community Center in Palo Alto, June 20. Nye, our Society's vice-president, will host this meeting.

The purpose of our Town Halls is to engage the public in charting a course for human space exploration beyond Earth orbit. A new Administration will soon take power in Washington, D.C., and we need to begin preparing to influence the policies that will determine how the United States addresses the potential future in space. We need your input!

Bill Nye will moderate the Town Hall discussions, which will kick off with a short presentation from Chris McKay, a planetary scientist at NASA Ames Research Center, and a member of The Planetary Society's Board of Directors. In addition, Kevin Stube, Executive Secretary of the Space Generation Advisory council and a member of The Planetary Society's Advisory Council, will present the Generation Y viewpoint, while Sandra Bodley, an emeritus professor of nursing at Sonoma State University, will speak as an interested citizen and taxpayer.

Following their presentations, we will open up the discussion to the audience to hear your opinions about what direction you would like to see the United States and the world take in space exploration.

Seating is limited and will be released on a first come, first served basis.

2008 Golden State Star Party July 2-6

Registration is in full swing, and it looks like we will have a great turn out at this year's Golden State Star Party. The unrivalled new site near Adin, California, is as good as it gets. The site features a huge observing field with minimal dust and no rocks, ideal for camping and equipment set-up. There are ample amenities and conveniences.

All are welcome, including people new to the hobby or don't own their own telescope. We have many seasoned astronomers who would be thrilled to share views, knowledge, and their sheer joy of the night sky. The whole idea behind GSSP is simply to provide the best possible venue for the pure enjoyment of Astronomy. The cost is $55 for registration, camping, and site amenities (excluding food). Your equipment can remain set up for the entire event. For registration and more information, visit *http://www.goldenstatestarparty.org*.

Events

SCAS in Yosemite August 8 & 9

This year our weekend in Yosemite is August 8 & 9. For once the Yosemite weekend does not conflict with an RFO Public Night. Lynn Anderson will be out of the country for several weeks before the Yosemite weekend, so Len Nelson (*lennelsn@comcast.net*) will coordinate the sign-ups for this event. Let him know who you are, how many in your party and how many telescopes you will be bringing. The National Park Service allows us only 5 campsites, with each site limited to 6 people and two vehicles. While sometimes people can go to Yosemite and secure extra campsites, last year there were no extra campsites available, so sign up early or be wait listed.

Morrison Planetarium Dean Lecture Series

June 23, 7:30 PM: "Planetary Nebulae: Death Shrouds of Lonely Stars or Aftermaths of Binary Interactions?"—Dr. Orsola de Marco, American Museum of Natural History

Some of the most beautiful objects in the sky, planetary nebulae, are thought to be the death shroud of single, middle-weight stars, much like our own sun; however, evidence has been steadily accumulating that this picture might have fundamental flaws. Complex shapes, jets, and other structures suggest a new scenario, with planetary nebulae shaped by the action of a companion star, or even a large planet, orbiting the primary star at some distance. But theoretical plausibility is not enough to prove a conjecture, and observations are ongoing to find the binary stars in the center of the planetary nebulae and to finally show that it takes two to tango.

Location: Kanbar Hall, Jewish Community Center, 3200 California Street (at Presidio). Parking in the UCSF Laurel Heights campus parking lot is $1.25/night. Parking in the JCC garage is $1.25 per half-hour. Tickets $5 at the door or by email. Contact: 415/321-8000.

http://www.calacademy.org/events/

Mt. Tamalpais Astronomy

June 7, 8:30 PM: "Space Ecology: The Final Frontier of Environmentalism"—Lynda Williams, Santa Rosa Junior College

Space Debris? ASAT Tests? Weapons & War in Space? Fifty years after Sputnik launched the space age, humans are turning space into yet another junk yard.

Sponsored by the Mt Tamalpais State Park and coordinated by volunteers of the Mt Tam Interpretive Association. FREE and open to the public. Families and students encouraged to come. Presentations held in the Mountain Theatre. Viewing afterwards in Rock Springs Parking Area, provided by San Francisco Amateur Astronomers. Dress warmly and car pool if possible. Bring a flashlight! Info: 415/455-5370; *http://www.mttam.net/*

Community Activities

The last school star party on the calendar was held under reasonably clear skies at Guerneville Elementary School on Friday, May 9th. Lynn Anderson, John Whitehouse and Loren Cooper provided views of the 4-day old, crescent moon, Saturn, Mars, and Mizar. The late sunset and lingering twilight prevented viewing any of the Messier objects. The students, their siblings and parents had many good questions and we can chalk this event up as a success.

The following night was Astronomy Day. Lynn and Loren were joined by Jerry McBride under the street lights on the corner of Healdsburg Avenue and North Streets in Healdsburg, where they provided views of the 5-day old moon and Saturn for about 150 passers-by. It was a balmy, T-shirt weather night and interested members of the general public that were still lingering around the telescopes past 10:30.

In Petaluma, Len Nelson, along with Steve Alvernaz, Blaine Eldred, Rose Demma, Stuart and Maxwell Hyde and Casa Grande High School science teacher Todd Creighton and some of his students enjoyed marvelously clear views of Saturn and our Moon until 10:30. Mercury also was viewed but the atmosphere along the western horizon was not steady enough to get a clear view of it. Len advises that, unfortunately, no members of the public came. This was due to the location of the viewing site—out of sight of the main road and then a meandering path to it and insufficient notification. In prior years they had been near the intersection of Washington and McDowell in Petaluma and attracted many passers-by who could see them even if they were not previously aware of the event. Next year, Len declares that they will seek out such a site and advertise more.

I owe an apology to John Whitehouse for omitting any mention of the afternoon he and Lynn spent a Riebli Elementary School on Saturday, March 29th. They had the Night Sky Network one meter sun poster and the model planets on display, as well as providing a few brief views of the small cluster of sunspots whenever the hazy sky opened up.

Thanks to all of the SCAS volunteers who have given their time (and fuel) to make our star parties successful.

Don't forget Yosemite, August 8 and 9. To reserve a campsite, contact Len at *lennelsn@comcast.net*. I may need one assistant for a weekend at the end of August, but I'll be contacting the regular volunteer list if that comes to pass. If you have an urge to participate at future star parties, contact me at *astroman@sonic.net*

—Lynn Anderson

"Seeing in the Dark" on PBS

For those of you who missed seeing Timothy Ferris' film *Seeing in the Dark* in February, here's another chance. His high-definition television spectacular on amateur astronomy and the wonders of the night sky, returns to PBS on Wednesday, June 11, at 8:00 PM (check local listings).

Young Astronomers

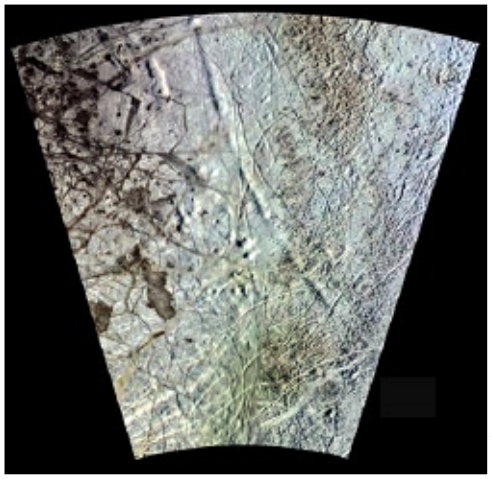
Happy Summer Viewing, Young Astronomers

As you know, YA meetings are suspended for the summer. However, all the SCAS activities are open to you, and we would be delighted to see you. Please feel free to join us for observing at the Ferguson Observatory (see Page 4), and at our meetings and other events. Happy Skywatching!

Slipping Poles: Europa's Polar Region Shifted Toward Equator

If you spin around quickly for a long period of time, you're probably going to lose your balance and fall. Strangely, something similar can happen with orbiting bodies such as a planet. Spinning on its axis for millions of years, a planet's surface features can shift position over time, upsetting its balance. In fact, if a major shift occurs, the planet might even tilt over.

Now, scientists say they have evidence that such a shift actually happened on Jupiter's icy moon, Europa. Images taken by three different spacecraft—Voyager, Galileo and New Horizons—provide the clues. The images show three deep troughs that curve hundreds of miles across the moon's surface. After analyzing the size, shape and location of the troughs and comparing them to models, researchers suspect that the depressions were formed when Europa's thick, icy surface slid a huge 80 degrees—nearly a quarter-turn!



JPL/NASA

SHIFTING POLES: These deep depressions on Europa indicate the moon's icy surface slid 80 degrees, shifting the polar regions toward the equator.

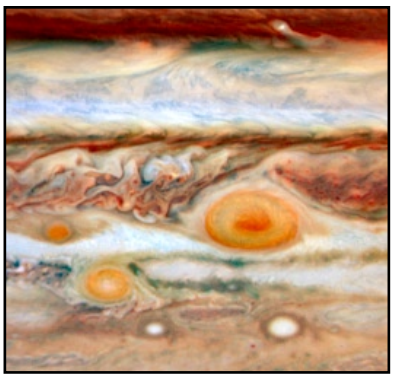
What could trigger such a massive shift? Scientists say a heavy buildup of ice at the poles might do it. A spinning body, such as a planet, is most stable when its mass is farthest from its spin axis, or axis of rotation. A concentration of heavy polar ice could have knocked Europa off balance, moving the polar regions toward the equator. This strange movement, called "true polar wander," would normally take millions of years to play out. But the new evidence suggests Europa's icy shell may have shifted over a period of just a few decades.

How could this be? Scientists believe Europa's heavy ice shell floats on top of a hidden ocean. The sliding of the moon's surface provides further evidence for this possibility. After all, moving 300,000 trillion metric tons of surface weight almost 90 degrees would be very difficult unless it was floating on water, scientists say. Furthermore, the study suggests another intriguing idea: If an ocean lies beneath the Europa's icy surface, it just might harbor life.

—Adapted from an article by Susan Gaidos in Science News

New Red Spot on Jupiter

In what's beginning to look like a case of planetary measles, a third red spot has appeared alongside its cousins—the Great Red Spot and Red Spot Jr.—in the turbulent Jovian atmosphere. This third red spot, which is a fraction of the size of the two other features, lies to the west of the Great Red Spot in the same latitude band of clouds. The visible-light images were taken on May 9 and 10 with Hubble's Wide Field and Planetary Camera 2.



M. Wong and I. de Pater (UC Berkeley)

Some Great Links this Month

Spectacular photos from Mauna Kea:

Fox Fur Nebula at right was taken in January. The nebula surrounding bright star S Mon is filled with dark dust and glowing gas. The strange shapes originate from fine interstellar dust reacting in complex ways with the energetic light and hot gas being expelled by the young stars. The region just below S Mon, the bright star in the above picture, is nicknamed the Fox Fur Nebula for its color and texture. The blue glow directly surrounding S Mon results from reflection, where neighboring dust reflects light from the bright star. The more diffuse red glow results from emission, where starlight ionizes hydrogen gas. Pink areas are lit by a combination of the two processes. S Mon is part of a young open cluster of stars named NGC 2264, located about 2500 light years away toward the constellation of Monoceros, just north of the Cone Nebula. View more jaw-dropping photos at *http://www.cfht.hawaii.edu/HawaiianStarlight/*

MORE LINKS:

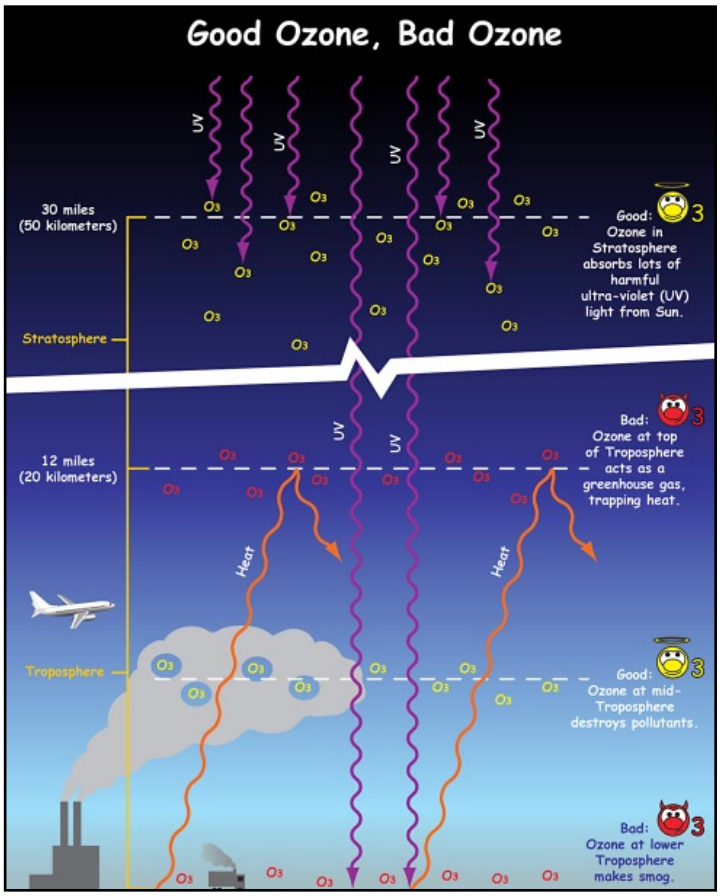
Especially for Educators:

SpacePlace's teacher classroom materials and activities: *http://spaceplace.nasa.gov/en/educators*

More materials from the Seeing in the Dark Website: *http://www.pbs.org/seeinginthedark/for-teachers/*

World Wide Telescope

If you have a fast computer and DSL or cable, try this for some awesome space exploration: *http://worldwidetelescope.org.* My 5-year-old laptop with XP worked fine, just a little slow.



Ozone behaves differently at different altitudes in the atmosphere. High in the stratosphere and at mid-troposphere it has positive effects on life at the surface. At the top of the troposphere ozone is a greenhouse gas and at the surface it makes smog.

NASA SpacePlace

Ozone, the Greenhouse Gas

We all know that ozone in the stratosphere blocks harmful ultraviolet sunlight, and perhaps some people know that ozone at the Earth's surface is itself harmful, damaging people's lungs and contributing to smog.

But did you know that ozone also acts as a potent greenhouse gas? At middle altitudes between the ground and the stratosphere, ozone captures heat much as carbon dioxide does.

In fact, pound for pound, ozone is about 3000 times stronger as a greenhouse gas than CO2. So even though there's much less ozone at middle altitudes than CO2, it still packs a considerable punch. Ozone traps up to one-third as much heat as the better known culprit in climate change.

Scientists now have an unprecedented view of this mid-altitude ozone thanks to an instrument aboard NASA's Aura satellite called the Tropospheric Emission Spectrometer—"TES" for short.

Most satellites can measure only the total amount of ozone in a vertical column of air. They can't distinguish between helpful ozone in the stratosphere, harmful ozone at the ground, and heat-trapping ozone in between. By looking sideways toward Earth's horizon, a few satellites have managed to probe the vertical distribution of ozone, but only to the bottom of the stratosphere.

Unlike the others, TES can measure the distribution of ozone all the way down to the heat-trapping middle altitudes. "We see vertical information in ozone that nobody else has measured before from space," says Annmarie Eldering, Deputy Principal Investigator for TES.

The global perspective offered by an orbiting satellite is especially important for ozone. Ozone is highly reactive. It is constantly being created and destroyed by photochemical reactions in the atmosphere and by lightning. So its concentration varies from region to region, from season to season, and as the wind blows.

Data from TES show that ozone's heat-trapping effect is greatest in the spring, when intensifying sunlight and warming temperatures fuel the reactions that generate ozone. Most of ozone's contribution to the greenhouse effect occurs within 45 degrees latitude from the equator.

Increasing industrialization, particularly in the developing world, could lead to an increase in mid-altitude ozone, Eldering says. Cars and coal-fired power plants release air pollutants that later react to produce more ozone.

"There's concern that overall background levels are slowly increasing over time," Eldering says. TES will continue to monitor these trends, she says, keeping a careful eye on ozone, the greenhouse gas.

Learn more about TES and the science of ozone at: http://*tes.jpl.nasa.gov/*. Kids can get a great introduction to good ozone and bad ozone at *http://spaceplace.nasa.gov/en/kids/tes/gases*.

—Article provided by JPL/NASA

YA Information

Meetings: 7:30 PM the second Friday of each month of the school year, at Apple Blossom School, 700 Water Trough Road, Sebastopol, in the Multipurpose Hall. Open to all Sonoma County students. Telescope viewing is held in the upper parking lot after the meeting. Directions: From Hwy. 116 in Sebastopol, go west onto Bodega Ave. Continue almost two miles to Water Trough Rd. Turn left and go about 1/3 mile to the school, on your right.

YA ELECTED OFFICERS

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Recorder: Open

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Sonoma County Astronomical Society
P.O. Box 183
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Sonoma Skies
June 2008

JUNE 11

Ben Pietsch

Seeing Differently

Sonoma County Astronomical Society MembershipApplication/Renewal

The $25.00 Annual Membership fee for 2008-2009 is due June 1.

Please complete this form and give it to Walt Bodley with your check, payable to "SCAS," at the next meeting, or mail them to: SCAS, P.O. Box 183, Santa Rosa, CA 95402

❑ **New** ❑ **Renewal** (If renewing, provide name only, plus any information that has changed).

Name: _____

Address: _____

City/State/Zip: _____

Telephone: _____ Email: _____

❑ Check here if you are willing to receive the newsletter via email only. Save a tree, keep your dues low!

Your renewal dues include membership in the Astronomical League, our monthly newsletter Sonoma Skies, discounted subscriptions for Sky and Telescope and Astronomy magazines, great guest speakers at our monthly meetings, and opportunities to meet new and interesting people who share your interest in many aspects of astronomy and science.