SNAKE RIVER SKIES

A PUBLICATION OF THE MAGIC VALLEY ASTRONOMICAL SOCIETY

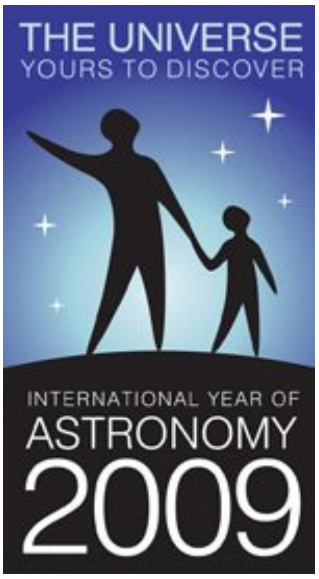
April 2009 Monthly Newsletter

Monthly Meeting

Our monthly meeting will be this Saturday, April 11 at 7:00 p.m. in the Rick Allen Room of the Herrett Center for the Arts and Science on the Campus of the College of Southern Idaho in Twin Falls.

Our speaker this month will be John Hall.

Following will be our monthly star party at the Centennial Observatory, which begins at 8:30.



Dark Sky Nights in a new location are coming soon. Hopefully by the end of the month. Check your e-mail for more in-formation.

Bruneau Dunes Observatory

Editor's Note: This story is from Odo Siahaya who operates the telescope at Bruneau Dunes Observatory. Odo is relating his experiences on opening day of 2009.

Friday evening…. A boy scout group of fifteen kids and about four leaders came down the walk from the parking lot to the observatory plaza. I had been expecting them since they had contacted us earlier that day about having a presentation that would cover the astronomy merit badge requirements. Earlier I had asked the leaders to come an hour before the usual program at which time I would do the program tailored to there specific needs. Also, I was anticipating a good size crowd for the general public meeting since the park campsites were totally sold out with an overflow in the equestrian campsites. After all, this was the last weekend of spring break. The weather was so-so with a high cirrus clouds and a not-so-good forecast by the Sky Clock.

I directed the scouts into the observatory to show them the various types of scopes and talk about the operation of them. Knowledge of telescopes is one of the requirements for their merit badge. They sat down on the floor with their backs leaning against the wall and more or less listening to my talk. One scout asked if the building could rotate since he had noticed the narrow opening in the roof. While talking to them I walked over to the console and casually grabbed the controller and held it behind my back. Then I said "yes, the building can rotate" and at the same time I pushed the button on the controller momentarily. Since they were all leaning against the wall and partially sitting on the steel drive- lip that extends from the wall under the carpet, they all moved with the wall, of course not suspecting anything…! It sure got their attention! ☺

From the observatory we went into the Steele Reese auditorium to do the PowerPoint presentation. In the mean time a number of "regular" visitors had arrived as well and decided to join this presentation as well, which later turned out to be a good thing. The presentation was basically a slightly modified general presentation about the history of astronomy. After that we projected Starry Night for that night on the screen. While I was trying to advance the time a couple of hours to show them how the Big Dipper rotates through the night, something strange happened in that the time would jump back and forth. I attributed it to a "glitch" in the system and went on. the interpretive specialist of the Park and also our boss

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How Low Can It Go? Sun Plunges into the Quietest Solar Minimum in a Century

The sunspot cycle is behaving a little like the stock market. Just when you think it has hit bottom, it goes even lower.

2008 was a bear. There were no sunspots observed on 266 of the year's 366 days (73 percent). To find a year with more blank suns, you have to go all the way back to 1913, which had 311 spotless days. Prompted by these numbers, some observers suggested that the solar cycle had hit bottom in 2008.

Maybe not. Sunspot counts for 2009 have dropped even lower. As of March 31st, there were no sunspots on 78 of the year's 90 days (87 percent).

It adds up to one inescapable conclusion: "We're experiencing a very deep solar minimum," says solar physicist Dean Pesnell of NASA's Goddard Space Flight Center in Greenbelt, Md.

"This is the quietest sun we've seen in almost a century," agrees forecaster David Hathaway of NASA's Marshall Space Flight Center in Huntsville, Ala.

Quiet suns come along every 11 years or so. It's a natural part of the sunspot cycle, discovered by German astronomer Heinrich Schwabe in the mid-1800s. Sunspots are planet-sized islands of magnetism on the surface of the sun, and they are sources of solar flares, coronal mass ejections, and intense UV radiation. Plotting sunspot counts, Schwabe saw that peaks of solar activity were always followed by valleys of relative calm—a clockwork pattern that has held true for more than 200 years.

The sunspot cycle from 1995 to the present. The jagged curve traces actual sunspot counts. Smooth curves are fits to the data and one forecaster's predictions of future activity. Credit: David Hathaway, NASA/MSFC The current solar minimum is part of that pattern. In fact, it's right on time. But is it supposed to be this quiet?

Measurements by the Ulysses spacecraft reveal a 20 percent drop in solar wind pressure since the mid-1990s—the lowest point since such measurements began in the 1960s. The solar wind helps keep galactic cosmic rays out of the inner solar system. With the solar wind flagging, more cosmic rays penetrate the solar system, resulting in increased health hazards for astronauts. Weaker solar wind also means fewer geomagnetic storms and auroras on Earth.

Careful measurements by several NASA spacecraft have also shown that the sun's brightness has dimmed by 0.02 percent at visible wavelengths and a whopping 6 percent at extreme UV wavelengths since the solar minimum of 1996. These changes are not enough to reverse global warming, but there are some other, noticeable side-effects.

Earth's upper atmosphere is heated less by the sun and it is therefore less "puffed up." Satellites in Earth orbit experience less atmospheric drag, extending their operational lifetimes. That's the good news. Unfortunately, space junk also remains in orbit longer, posing an increased threat to useful satellites.

An artist's concept of NASA's Solar Dynamics Observatory. Bristling with advanced sensors, "SDO" is slated to launch later this year--perfect timing to study the ongoing solar minimum. Credit: NASA Finally, radio telescopes are recording the dimmest "radio sun" since 1955. After World War II, astronomers began keeping records of the sun's brightness at radio wavelengths, particularly 10.7 cm. Some researchers believe that the lessening of radio emissions during this solar minimum is an indication of weakness in the sun's global magnetic field. No one is certain, however, because the source of these long-monitored radio emissions is not fully understood.

All these lows have sparked a debate about whether the ongoing minimum is extreme or just an overdue market correction following a string of unusually intense solar maxima.

"Since the Space Age began in the 1950s, solar activity has been generally high," notes Hathaway. "Five of the ten most intense solar cycles on record have occurred in the last 50 years. We're just not used to this kind of deep calm."

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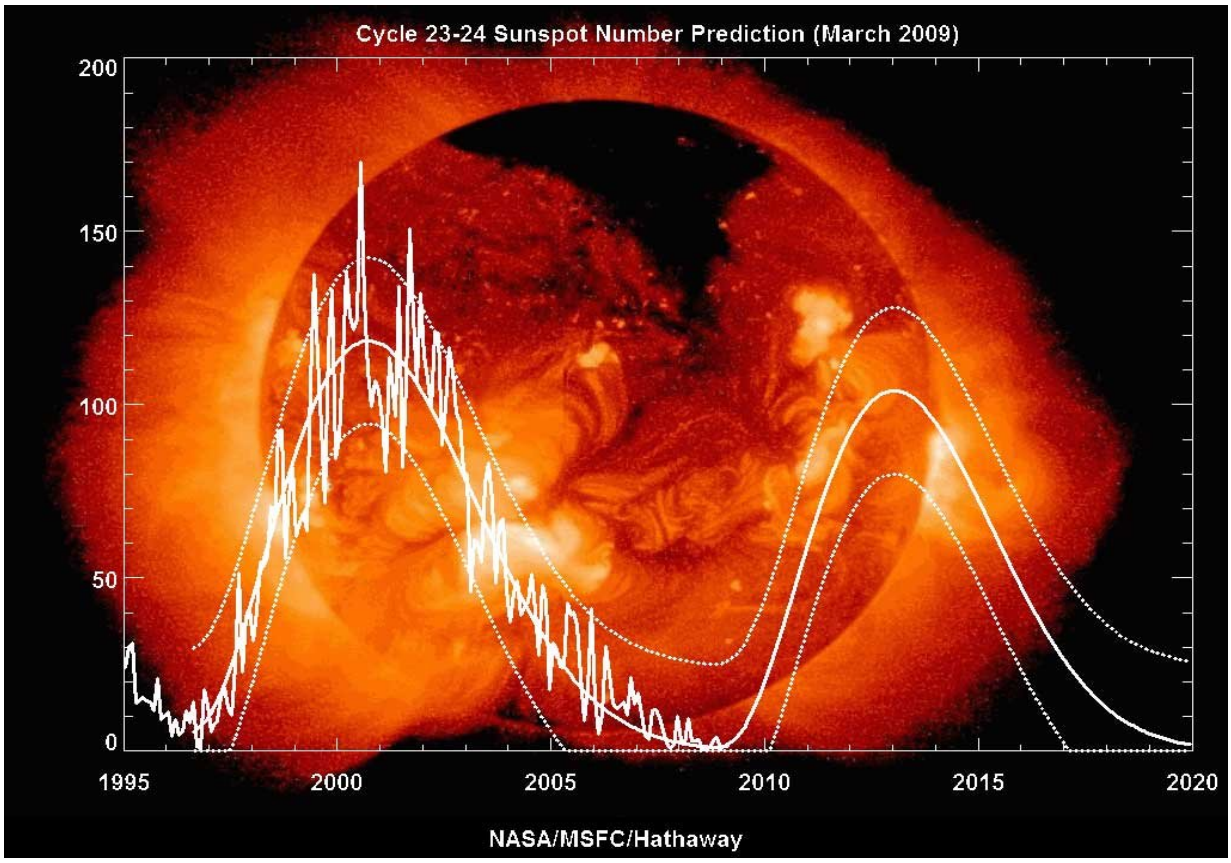
Deep calm was fairly common a hundred years ago. The solar minima of 1901 and 1913, for instance, were even longer than what we're experiencing now. To match those minima in depth and longevity, the current minimum will have to last at least another year.

In a way, the calm is exciting, says Pesnell. "For the first time in history, we're getting to observe a deep solar minimum." A fleet of spacecraft — including the Solar and Heliospheric Observatory (SOHO), the twin probes of the Solar Terrestrial Relations Observatory (STEREO), and several other satellites — are all studying the sun and its effects on Earth. Using technology that didn't exist 100 years ago, scientists are measuring solar winds, cosmic rays, irradiance and magnetic fields and finding that solar minimum is much more interesting than anyone expected.

The "blankest years" of the past century. Vertical bars in this histogram represent the number of days in each year that the sun was blank--i.e., had no sunspots. Credit: Tony Phillips Modern technology cannot, however, predict what comes next. Competing models by dozens of solar physicists disagree, sometimes sharply, on when this solar minimum will end and how big the next solar maximum will be. The great uncertainty stems from one simple fact: No one fully understands the underlying physics of the sunspot cycle.

Pesnell believes sunspot counts should pick up again soon, "possibly by the end of the year," to be followed by a solar maximum of below-average intensity in 2012 or 2013.

But like other forecasters, he knows he could be wrong. Bull or bear?



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From the dawn of humankind to a mere 400 years ago, all that we knew about our universe came through observations with the naked eye. Then Galileo turned his telescope toward the heavens in 1610. The world was in for an awakening.

Saturn, we learned, had rings. Jupiter had moons. That nebulous patch across the center of the sky called the Milky Way was not a cloud but a collection of countless stars. Within but a few years, our notion of the natural world would be forever changed. A scientific and societal revolution quickly ensued.

In the centuries that followed, telescopes grew in size and complexity and, of course, power. They were placed far from city lights and as far above the haze of the atmosphere as possible. Edwin Hubble, for whom the Hubble Telescope is named, used the largest telescope of his day in the 1920's at the Mt. Wilson Observatory near Pasadena, California, to discover galaxies beyond our own.

Hubble, the observatory, is the first major optical telescope to be placed in space, the ultimate mountaintop. Above the distortion of the atmosphere, far far above rain clouds and light pollution, Hubble has an unobstructed view of the universe. Scientists have used Hubble to observe the most distant stars and galaxies as well as the planets in our solar system. From far to near, from the earliest moments in the universe to current sandstorms on the surface of Mars... Hubble's launching in 1990 marks the most significant advance in astronomy since Galileo's telescope. Our view of the universe and our place within it has never been the same. Hubble's latest solar arrays (installed during Servicing Mission 3B) cover 36 square meters (384 square feet) -- equal to the area of a highway billboard.

The telescope's 17 years' worth of observations have produced more than 30 terabytes of data, equal to about 25 percent of the information stored in the Library of Congress.

Hubble weighs 24,500 pounds -- as much as two full-grown elephants.

Hubble's primary mirror is 2.4 meters (7 feet, 10.5 inches) across -- taller than retired NBA player Gheorghe Muresan, who is 2.3 meters (7 feet, 7 inches) tall. Muresan is the tallest man ever to play in the NBA.

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During its lifetime Hubble has made about 800,000 observations and snapped about 500,000 images of more than 25,000 celestial objects.

Hubble is 13.3 meters (43.5 feet) long -- the length of a large school bus.

Hubble does not travel to stars, planets and galaxies. It snaps pictures of them as it whirls around Earth at 17,500 mph. The telescope has made just more than 100,000 trips around our planet, racking up about 2.4 billion miles. That mileage is slightly more than a round-trip between Earth and Saturn.

Each day the orbiting observatory generates about 10 gigabytes of data, enough information to fill the hard drive of a typical home computer in two weeks.

The Hubble archive sends about 66 gigabytes of data each day to astronomers around the world. Astronomers using Hubble data have published nearly 7,000 scientific papers, making it one of the most productive scientific instruments ever built.

About 4,000 astronomers from all over the world have used the telescope to probe the universe.

About the image on the previous page.

On April 1-2, the Hubble Space Telescope photographed the winning target in the Space Telescope Science Institute's "You Decide" competition in celebration of the International Year of Astronomy (IYA). The winner is a group of galaxies called Arp 274. The striking object received 67,021 votes out of the nearly 140,000 votes cast for the six candidate targets. Arp 274, also known as NGC 5679, is a system of three galaxies that appear to be partially overlapping in the image, although they may be at somewhat different distances. The spiral shapes of two of these galaxies appear mostly intact. The third galaxy (to the far left) is more compact, but shows evidence of star formation. Two of the three galaxies are forming new stars at a high rate. This is evident in the bright blue knots of star formation that are strung along the arms of the galaxy on the right and along the small galaxy on the left. The largest component is located in the middle of the three. It appears as a spiral galaxy, which may be barred. The entire system resides at about 400 million light-years away from Earth in the constellation Virgo.

Hubble's Wide Field Planetary Camera 2 was used to image Arp 274. Blue, visible, and infrared filters were combined with a filter that isolates hydrogen emission. The colors in this image reflect the intrinsic color of the different stellar populations that make up the galaxies. Yellowish older stars can be seen in the central bulge of each galaxy. A bright central cluster of stars pinpoint each nucleus. Younger blue stars trace the spiral arms, along with pinkish nebulae that are illuminated by new star formation. Interstellar dust is silhouetted against the starry population. A pair of foreground stars inside our own Milky Way are at far right.

Test Your Knowledge

How many new instruments will astronauts add to the Hubble Space Telescope during the STS-125 mission?

STS-125: The Final Shuttle Mission to Hubble Space Telescope is scheduled for launch on May 12th 2009 and has already begun the journey to the launch pad. Over the course of five spacewalks, Astronauts will install two new instruments, repair two inactive ones, and perform the component replacements that will keep the telescope functioning at least into 2014. The effort-intensive, rigorously researched, exhaustively tested mission also involves diverse groups of people on the ground throughout the country.

I'd say we have certainly gotten our money's worth on this one. —Editor

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The Earth is blue. ... How wonderful. It is amazing."—Gagarin, to ground control

Yuri Gagarin was the first man in space. He traveled aloft on 12 April 1961, launching to orbit aboard the *Vostok 3KA-2* (Vostok 1).

Twenty years later on 12 April 1981, the US Space Shuttle Columbia (STS-1) lifted off from launch pad 39A at Kennedy Space Center and orbited the earth 37 times for its 54.5 hour mission.

Yuri's Night is a celebration of humanity's achievements in space. Usually celebrated on 12 April, this year it will be celebrated from April 4th through April 12th. Our monthly star party is on the 11th. Because of Easter, the events run all week.

Bruneau Dunes Observatory Conclusion.

After the meeting I found out that from Darby, another seasonal scope operator, that Lori, the interpretive specialist of the Park and also our boss, was playing a trick on me by moving the curser keys to change the time on me which of course made the entire sky move accordingly! ☺

Towards the end of my presentation, but not quite done, Lori comes in the door and waving her hands to motion to me at the front of the auditorium that I have to quit. I do tend to get long-winded. (My wife used to do the same when I have had to speak in church some times) Well, the moment the scouts had vacated the room a whole crowd of people rolled into the auditorium until we had brought in extra chairs and kids (and adults) sitting on the floor. So this is a situation when you don't want glitches, but unfortunately they do seem to happen at such times as these… When I came to the point where I was going to play a DVD about the Phoenix Lander, and said "go ahead Darby" nothing happened… Darby was supposed to turn on the DVD player in back of the room, but she had left to help with the crowd outside. So …. I climbed over people' s legs in the isle and made it to the back, and then to climb over the same legs back to the front to finish the talk.

All in all we had 110 counted and paying people that night. Lori had to do a second program, while Doug (also a seasonal operator), Darby and I handled the crowd outside with a C-8 and a C-11 and in the observatory with the 25". Fortunately one of our volunteers came and manned one of our 10" Dobs. The sky cleared by viewing time, contrary to what the Sky Clock had predicted. Our attendance is usually in the range of 50 to 80. Even last night when there was no viewing at all, still 45 people showed up for the program. If there are a few holes, we will get at least our 10" Dobs out and try to show the people some significant object.

Currently we have three paid part-time seasonal employees at the observatory and our supervisor, Lori Brick, who is full time staff at the Park. We have several volunteers on the list who are more or less regular, depending on their work schedule. We charge visitors to the observatory $3.00 per person for anyone six or older. We do not charge this fee if there is no viewing, but we will still do our programs and show an extra movie in our surround-sound auditorium. During my talks I also make mention and show a couple of slides of the Centennial Observatory as one that is high-tech **and** is totally handicapped accessible and therefore can take their wheel chair bound friends there.