



First Light

The Newsletter of the Cape Cod Astronomical Society



January 2007

Vol. 18 No. 1

Moocusser's 21 st Century Almanac			
By Jim Carlson			
Full Moon – Wed. January, 03 at 08:57 EST			
Last Quarter – Thu. January, 11 at 07:46 EST			
New Moon – Thu. January, 18 at 23:02 EST			
First Quarter – Thu. January, 25 at 18:03 EST			
Object	Jan. 01 (EST)	Jan. 16 (EST)	Jan. 31 (EST)
Sun	R: 07:08 S: 16:21	07:05 16:36	06:54 16:55
Mercury	R: 07:03 S: 15:58	07:37 16:59	07:44 18:15
Venus	R: 08:15 S: 17:33	08:15 18:11	08:04 18:49
Moon	R: 14:13 S: 05:33	05:15 13:44	15:12 06:13
Mars	R: 05:35 S: 14:42	05:27 14:28	05:15 14:18
Jupiter	R: 04:42 S: 14:07	03:57 13:19	03:11 12:30
Saturn	R: 19:48 S: 09:42	18:44 08:41	17:39 07:40
Uranus	R: 10:16 S: 21:23	09:18 20:27	08:21 19:32
Neptune	R: 09:14 S: 19:24	08:17 18:28	07:19 17:31
Pluto	R: 05:43 S: 15:46	04:47 14:49	03:50 13:52
January 2007 Events (UT)			
03 – Uranus at greatest southern heliocentric latitude. Earth at perihelion (91,399,727 miles).			
04 – CCAS meeting in the observatory. Jim Carlson will demonstrate how to estimate the surface temperature of a star using B-V photometry. The meeting will begin promptly at 7:30. Bring a friend. ☺			
04 – Quadrantid meteors peak at about 1:00 UT (20:00 EST on Jan. 3 rd)			
05 – Jupiter 5° north of Antares (not visible). Moon 1.8° north of M44 (visible at 05:00 EST).			
06 – Saturn 0.9° south of the Moon (not visible).			
07 – Regulus 1.2° south of the Moon (visible at 00:00 EST on the 7 th). Mercury at superior conjunction.			
10 – Moon at apogee (251,242 miles).			
11 – Spica 1.1° north of the Moon (not visible at 15:00 EST).			

15 – Antares 0.5° north of the Moon (not visible). Jupiter 6° north of the Moon (not visible).
17 – Mercury at greatest southern heliocentric latitude. Mars 5° north of the Moon (not visible).
18 – Venus 1.4° south of Neptune at 18:00 UT (not visible).
19 – Venus at greatest southern heliocentric latitude.
20 – Venus 0.8° north of the Moon (not visible).
22 – Uranus 0.4° south of the Moon (not visible). Moon at perigee (227,997 miles).
27 – Moon 0.9° north of M45 (not visible).

Sources: TheSky6, Software Bisque
Observer's Handbook 2007 Royal Astronomical Society of Canada

The times of rise, transit, and set are for the days listed. On January 1st, for example, Saturn will transit the meridian at 02:47, set at 09:42, and rise at 19:48 EST.

January 4th Meeting

The program for the January meeting of the Cape Cod Astronomical Society will be on the measurement of the surface temperature of stars using B-V photometry. Jim Carlson, director of The Schmidt observatory, will explain the theory and demonstrate the process of this approach. Those in attendance will have the opportunity to do a temperature measurement.

The meeting will begin in the newly renovated Dennis-Yarmouth High School library. After a brief business meeting, we will take a short walk out to the The Schmidt for the remainder of the meeting. Don't miss this one; it's your chance to do some technical astronomy.

Astro Trivia

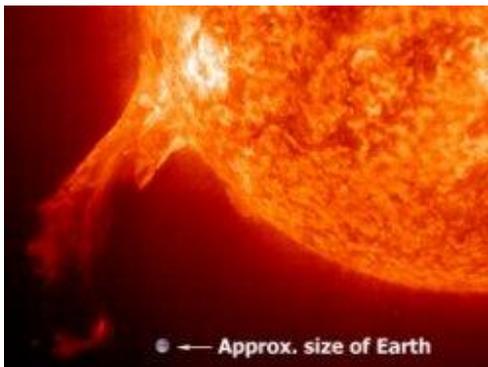
The January trivia question is "Why is the Night Sky Dark?" (Olber's paradox).

NASA News Release

Dec. 21, 2006: Evidence is mounting: the next solar cycle is going to be a big one.

Solar cycle 24, due to peak in 2010 or 2011 "looks like its going to be one of the most intense cycles since record-keeping began almost 400 years ago," says solar physicist David Hathaway of the Marshall Space Flight Center. He and colleague Robert Wilson presented this conclusion last week at the American Geophysical Union meeting in San Francisco.

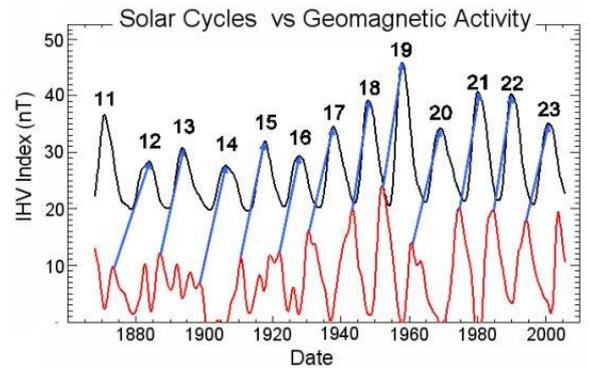
Right: (Ed: Below) An erupting solar prominence photographed by the Solar and Heliospheric Observatory (SOHO). [[More](#)]



Their forecast is based on historical records of geomagnetic storms.

Hathaway explains: "When a gust of solar wind hits Earth's magnetic field, the impact causes the magnetic field to shake. If it shakes hard enough, we call it a geomagnetic storm." In the extreme, these storms cause power outages and make compass needles swing in the wrong direction. Auroras are a beautiful side-effect.

Hathaway and Wilson looked at records of geomagnetic activity stretching back almost 150 years and noticed something useful: "The amount of geomagnetic activity now tells us what the solar cycle is going to be like 6 to 8 years in the future," says Hathaway. A picture is worth a thousand words:



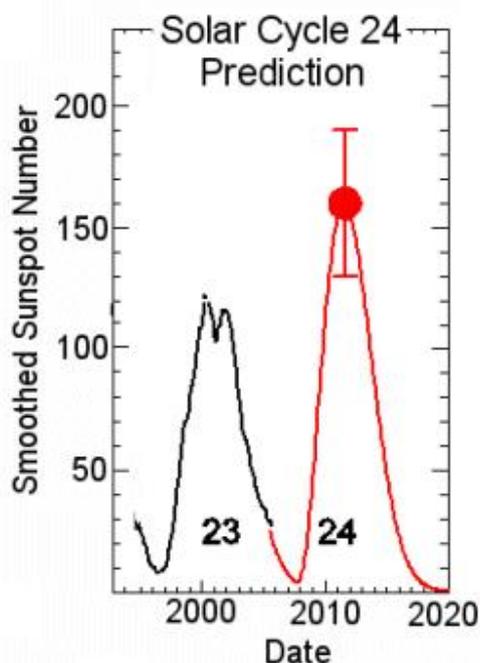
Above: Peaks in geomagnetic activity (red) foretell solar maxima (black) more than six years in advance. [[More](#)]

In the plot, above, black curves are solar cycles; the amplitude is the sunspot number. Red curves are geomagnetic indices, specifically the Inter-hour Variability Index or IHV. "These indices are derived from magnetometer data recorded at two points on opposite sides of Earth: one in England and another in Australia. IHV data have been taken every day since 1868," says Hathaway.

Cross correlating sunspot number vs. IHV, they found that the IHV predicts the amplitude of the solar cycle 6-plus years in advance with a 94% correlation coefficient.

"We don't know why this works," says Hathaway. The underlying physics is a mystery. "But it does work."

According to their analysis, the next Solar Maximum should peak around 2010 with a sunspot number of 160 plus or minus 25. This would make it one of the strongest solar cycles of the past fifty years—which is to say, one of the strongest in recorded history.



Left: (*Ed: Above*) Hathaway and Wilson's prediction for the amplitude of Solar Cycle 24. [[More](#)]

Astronomers have been counting sunspots since the days of Galileo, watching solar activity rise and fall every 11 years. Curiously, four of the five biggest cycles on record have come in the past 50 years. "Cycle 24 should fit right into that pattern," says Hathaway.

These results are just the latest signs pointing to a big Cycle 24. Most compelling of all, believes Hathaway, is the work of Mausumi Dikpati and colleagues at the National Center for Atmospheric Research (NCAR) in Boulder, Colorado. "They have combined observations of the sun's 'Great Conveyor Belt' with a sophisticated computer model of the sun's inner dynamo to produce a physics-based prediction of the next solar cycle." In short, it's going to be intense. Details may be found in the Science@NASA story [Solar Storm Warning](#).

"It all hangs together," says Hathaway. Stay tuned for solar activity.

APOD'S

The previous volume of First Light provided the URL to the Astronomy Picture of the Day. For those of you who have not visited this site over the last month, here is a sample of what you have been missing.



Dec. 1 NGC1097 R. Jay Ga Bany



Dec. 7 M77 Ken Crawford



Dec. 28 Moon Over Andromeda Adam Block & Tim Pucket

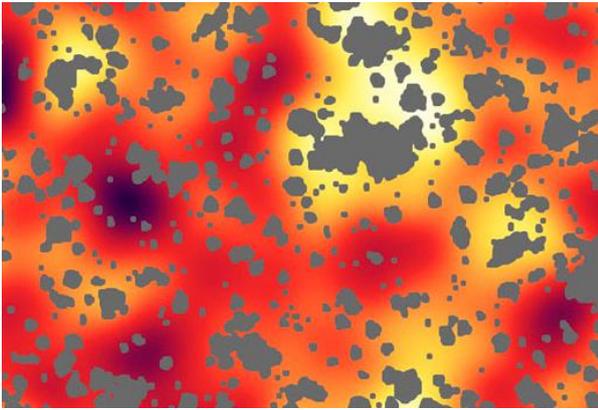
(*Ed: The Moon and M31 are on the same scale.*)



Jan. 1 Witch's Broom T. A. Rector

A Star of Our Own

The image below, of M27, was made by Jim Carlson using the 16" telescope at The Schmidt. Most of Jim's work at the observatory deals with research on variable stars and asteroids and educational programs for Dennis-Yarmouth high school students. This image shows that he can do pretty pictures. Keep it up Jim.



Jan. 2 A. Kashlinsky, et al

Ignore the gray splotchs, they are areas where foreground stars from the Milky Way have been removed from the image. The remainder of the image represents the universe from the time of the first generation of stars, shortly after the Big Bang. The bright areas are believed to be images of stars from that first generation.



M27 Jim Carlson

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The **Cape Cod Astronomical Society** meets at 7:30 pm on the first Thursday of every month at the Dennis-Yarmouth Regional High School in Yarmouth, Massachusetts. Meetings are open to the public. Membership dues are \$30 for adults, \$15 for students in two year colleges, no charge for students in K-12 schools.

Cape Cod Astronomical Foundation

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