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ARLP016 Propagation de K7RA

ZCZC AP16
QST de W1AW
Propagation Forecast Bulletin 16 ARLP016
>From Tad Cook, K7RA
Seattle, WA April 17, 2015
To all radio amateurs

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Solar activity increased this week. Average daily sunspot numbers increased from 50.1 last week (April 2-8) to 65.6 in the recent (April 9-15) period. Average daily solar flux rose from 118.4 to 132.5. Geomagnetic indexes also increased.

The latest prediction shows solar flux at 150 on April 17, 155 on April 18-20, 160 on April 21-24, 115 on April 25-26, then 120, 125 and 130 on April 27-29, 125 on April 30 through May 5, 130 on May 6, 135 on May 7-11, and 130 on May 12-14.

Predicted planetary A index is 15 on April 16, 8 on April 17-20, 5 on April 21-22, 8 on April 23-24, 10 on April 25, 8 on April 26-28, then 12, 18 and 12 on April 29 through May 1, 8 on May 2-9, 5 on May 10-12, then 15, 20 and 12 on May 13-15, and 8 on May 16-21.

You can download and examine my personal archives of these forecasts, updated daily at <http://www.filedropper.com/filemanager/public.php?service=files&t=326dd41340bab1066cf91d13df36b8fd> for the flux values and <http://www.filedropper.com/filemanager/public.php?service=files&t=be2a0a69fb6392907dc3d9a017dcace1> for the Ap index. It is interesting to see how these forecasts shift over time.

F.K. Janda, OK1HH sent his geomagnetic forecast for the next few weeks. He sees quiet to active conditions on April 17, disturbed conditions April 18, active to disturbed April 19-20, quiet to unsettled April 21-23, quiet April 24, quiet to active April 25, active to disturbed April 26, mostly quiet April 27, quiet April 28, quiet to unsettled April 29, active to disturbed April 30, mostly quiet May 1-3, quiet May 4-6, quiet to unsettled May 7, quiet to active May 8, mostly quiet May 9, quiet May 10-11, active to disturbed May 12, and disturbed again on May 13.

On April 16 at 2353 UTC the Australian Space Forecast Center warned that a solar wind stream from a coronal hole has been more significant and sustained than anticipated, but is expected to slowly subside today.

Tomas Hood, NW7US sent a link to a video with the following commentary:

<http://g.nw7us.us/5yrsofSunBySDO>

"This video features stunning clips of the Sun, captured by SDO from each of the five years since SDO's deployment in 2010. In this movie, watch giant clouds of solar material hurled out into space, the dance of giant loops hovering in the corona, and huge sunspots growing and shrinking on the Sun's surface.

"February 11, 2015 marked five years in space for NASA's Solar Dynamics Observatory, which provides incredibly detailed images of the whole Sun 24 hours a day. February 11, 2010, was the day on

which NASA launched an unprecedented solar observatory into space. The Solar Dynamics Observatory (SDO) flew up on an Atlas V rocket, carrying instruments that scientists hoped would revolutionize observations of the Sun.

"April 21, 2015 marks the five-year anniversary of the Solar Dynamics Observatory (SDO) First Light press conference, where NASA revealed the first images taken by the spacecraft. Since then, SDO has captured amazingly stunning super-high-definition images in multiple wavelengths, revealing new science, and captivating views.

"Capturing an image more than once per second, SDO has provided an unprecedentedly clear picture of how massive explosions on the Sun grow and erupt. The imagery is also captivating, allowing one to watch the constant ballet of solar material through the Sun's atmosphere, the corona.

"The imagery in this 'highlight reel' provide us with examples of the kind of data that SDO provides to scientists. By watching the Sun in different wavelengths (and therefore different temperatures, each 'seen' at a particular wavelength that is invisible to the unaided eye) scientists can watch how material courses through the corona. SDO captures images of the Sun in 10 different wavelengths, each of which helps highlight a different temperature of solar material. Different temperatures can, in turn, show specific structures on the Sun such as solar flares or coronal loops, and help reveal what causes eruptions on the Sun, what heats the Sun's atmosphere up to 1,000 times hotter than its surface, and why the Sun's magnetic fields are constantly on the move.

"Coronal loops are streams of solar material traveling up and down looping magnetic field lines). Solar flares are bursts of light, energy and X-rays. They can occur by themselves or can be accompanied by what's called a coronal mass ejection, or CME, in which a giant cloud of solar material erupts off the Sun, achieves escape velocity and heads off into space.

"This movie shows examples of X-ray flares, coronal mass ejections, prominence eruptions when masses of solar material leap off the Sun, much like CMEs. The movie also shows sunspot groups on the solar surface. One of these sunspot groups, a magnetically strong and complex region appearing in mid-January 2014, was one of the largest in nine years as well as a torrent of intense solar flares. In this case, the Sun produced only flares and no CMEs, which, while not unheard of, is somewhat unusual for flares of that size. Scientists are looking at that data now to see if they can determine what circumstances might have led to flares eruptions alone.

"Scientists study these images to better understand the complex electromagnetic system causing the constant movement on the Sun, which can ultimately have an effect closer to Earth, too: Flares and another type of solar explosion called coronal mass ejections can sometimes disrupt technology in space as well as on Earth (disrupting shortwave communication, stressing power grids, and more). Additionally, studying our closest star is one way of learning about other stars in the galaxy.

"Goddard built, operates and manages the SDO spacecraft for NASA's Science Mission Directorate in Washington, D.C. SDO is the first mission of NASA's Living with a Star Program. The program's goal is to develop the scientific understanding necessary to address those aspects of the Sun-Earth system that directly affect our lives and society."

If you would like to make a comment or have a tip for our readers, email the author at, k7ra@arrrl.net.

For more information concerning radio propagation, see the ARRL Technical Information Service web page at <http://arrl.org/propagation-of-rf-signals>. For an explanation of the numbers used in this bulletin, see <http://arrl.org/the-sun-the-earth-the-ionosphere>. An archive of past propagation bulletins is at <http://arrl.org/wlaw-bulletins-archive-propagation>. More good information and tutorials on propagation are at <http://k9la.us/>.

Archives of the NOAA/USAF daily 45 day forecast for solar flux and planetary A index are at <http://www.filedropper.com/filemanager/public.php?service=files&t=326dd41340bab1066cf91d13df36b8fd> and <http://www.filedropper.com/filemanager/public.php?service=files&t=be2a0a69fb6392907dc3d9a017dcace1>. Click on "Download this file" to download the archive and view in spreadsheet format.

Monthly propagation charts between four USA regions and twelve overseas locations are at <http://arrl.org/propagation>.

Instructions for starting or ending email distribution of ARRL bulletins are at <http://arrl.org/bulletins>.

Sunspot numbers for April 9 through 15 were 37, 34, 74, 64, 68, 97, and 85, with a mean of 65.6. 10.7 cm flux was 113, 115.1, 122.9, 133.9, 141.3, 146.8, and 154.7, with a mean of 132.5. Estimated planetary A indices were 12, 34, 20, 4, 8, 13, and 29, with a mean of 17.1. Estimated mid-latitude A indices were 11, 21, 14, 3, 12, 9, and 20, with a mean of 12.9.

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