Ham Hum

June 2015

The official newsletter of
The Hamilton Amateur Radio Club (Inc.)
Branch 12 of NZART - ZL1UX
Active in Hamilton since 1923

Hamilton Amateur Radio Club Inc.
Serving the Hamilton Community for over 90 Years
ZL1UX

Next Meeting 17th June : 18:30

Club Dinner—Roast Dinner Shop—Nawton Shopping Centre

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From the Editor

This months meeting will be replaced by the club dinner as per the cover page. Note the time change to 6:30pm (18:30).

I think a big thank you needs to go out to all who helped with the NZART AGM & Conference over at Te Rapa Racecourse. I don't know the names of everyone involved, so I'll keep this kinda generic. It was an amazing event, lovely weather, excellent speakers and wonderful food. Thank you all.

Photos of conference are at :-

Taken by me (ZL1DGK) -

https://www.flickr.com/photos/zl1dgk/sets/72157653815279151

and taken by Stephen (ZL1TPH, BreakIn editor)
https://www.flickr.com/photos/zl1dgk/sets/72157653581490640

On page 11 is a membership form for our club (Hamilton Amateur Radio Club—Branch 12 of NZART). If you don't want to tear out that copy, please ask our secretary (ZL1PK) at the next General Meeting for a form to fill out.

Next Committee Meetings - 3rd June and 1st July

Propagation de K7RA

06/05/2015

For seven days from May 28 through June 3, average daily sunspot numbers dropped from 56.1 the previous week to 34.3. Average daily solar flux barely changed from 97.6 to 97.8 over the same two weeks. But both numbers show a rising trend in recent days.

Predicted solar flux is 125 on June 5, 130 on June 6, 135 on June 7-11, then 130, 120 and 110 on June 12-14, 100 on June 15-16, 95 on June 17-22, 90 on June 23-25, 95 on June 26-28, 100 on June 29, then peaking at 120 on July 7-8 and dropping back below 100 after July 13.

Predicted planetary A index is 5, 8 and 12 on June 5-7 then 15, 25 and 15 on June 8-10, then 10, 5 and 8 on June 11-13, then 15 and 12 on June 14-15, and 5 on June 16 through July 3, then 10, 25, 20 and 12 on July 4-7.

OK1HH predicts the geomagnetic field will be quiet to unsettled June 5, quiet to active June 6-9, disturbed on June 10, quiet to unsettled June 11, mostly quiet June 12, quiet on June 13, active to disturbed June 14, quiet to active June 15-16, quiet on June 17-21, quiet to unsettled on June 22-25, quiet to active June 26, active to disturbed June 27, quiet June 28-30, and mostly quiet on July 1.

OK1HH predicts increasing solar wind on June 12, June 16-17 and June 27-28, with reduced prediction reliability during the latter two periods.

On May 28 the daily sunspot number was 11, the lowest non-zero sunspot number possible. This means there was just one sunspot group visible. There are no sunspot numbers between 1 and 10, because there is a value of 10 for each sunspot group, and a value of 1 is added for every sunspot in the group.

The last time the daily sunspot number was 11 was July 16, 2014 and the following day the sunspot number was zero. Note that this was just a few months after the peak of cycle 24, which I reckon to be around February and March 2014 using our three month moving average.

Prior to that we look back to January 14-15, 2011 to find the sunspot number at 11 on both days, on the rising side of cycle 24.

Look here for a long range forecast of smoothed sunspot numbers: **http://1.usa.gov/1HOVIDP** . These are International Sunspot numbers, on a different scale from the ones we present in this bulletin. Note it shows the current cycle peaking in March and April 2014, just like our 3-month moving averages of daily

sunspot numbers. Four years in the future we see the next cycle minimum in summer 2019.

We keep track of a 3-month moving average of sunspot numbers to spot trends and figure our cycle peaks and minima. At the end of May we now know the most recent 3-month average.

The average centered on December 2014 through April 2015 is 107.8, 98.2, 78.1, 68.2 and 72.4, so we saw a small uptick in the latest numbers. Now to make us all feel better, I will cherry pick data. The monthly sunspot averages for March, April and May 2015 were 61.7, 72.6 and 83. No foolin'!

Check out "Best NASA Footage of Giant Sunspots" here: **http://www.fromquarkstoquasars.com/best-nasa-footage-giant-sunspots/** . Be sure to click each image to get a better look, and take the video sequence up to full HD resolution by clicking the gear in the lower right corner and selecting Quality: 1080 or 720.

Steve Sacco, NN4X, of Saint Cloud, Florida passed along an interesting article about plasma tubes. Don't miss the comments:

http://io9.com/large-plasma-tubes-confirmed-to-exist-above-the-earths-1708434105

Jeff Hartley, N8II, of Shepherdstown, West Virginia sent this report:

"It has been a fun week on the radio with exceptional polar openings on 15 meters, the WPX CW contest and a 6 meter opening on double hop to VE5, UT, CO, AZ, and CA on Tuesday evening followed by a good Caribbean opening to Cuba, KP4, FG, and HI3 Wednesday morning.

"Considering the solar flux has hovered just below or above 100, the polar path openings morning and evening have been amazing on 15 meters in the past week. Having the North Pole illuminated 24 hours a day makes for some great polar openings. The solar flux level seems to matter much less for good openings during the summer months than the rest of the year. And the K index has been low.

"During the WPX contest May 30-31, conditions on 15 meters may have been a bit below normal Saturday, but there was still plenty of DX to be worked and Sunday was considerably better except for a lack of strong JA signals from 0000Z-0200Z. Around 0200Z, my JA vs. Chinese QSOs were running neck and neck, very surprising. The band was open well to SE Asia and China every morning and

evening. I worked about 20 total Chinese QSOs including several never heard before with prefixes such as BH4, BG3, BG6, BG8, and BG9 as well as working YE1, YB2, YC1, XW1 (heard every morning and evening), XV9, HS4, HS0, E21, 9V1, 9V50, and JT5. Many Far East signals were S9 or better!

“In addition the South Pacific was loud all the way out to VK and ZL the first evening. I worked the Azores around 0200Z with no northern EU then, but right before the band closed I made long path EU QSOs with S50 and UR. Saturday morning at 1200Z started with only Eastern EU to Central Asia coming through, with western EU finally loud around 1245Z.

“Stations in 7Z1 (Saudi Arabia), 4L8, and two A65 in the UAE were worked. By 1800Z, there were still plenty of loud big gun EU stations, but northern EU was gone along with Eastern EU north of UR and UA6.

“By 2100Z, near midnight in Eastern EU, conditions had improved with loud signals from all over EU including Scandinavians, then signals began fading fast around 2200Z.

“Sunday was even better in our morning into the whole northern hemisphere including loud SE Asians and JAs and even the very poorly equipped EU stations were good copy from 1200Z-1500Z. EU was fading out by 2100Z, but I finished the last 15 minutes running JAs.

“Conditions into Asia seemed even better in the late morning of June 2, working very loud prefixes YC8, YB0, 7K4 (Japan), JH1, and BD7. Late morning on June 3 was also good with strong signals from EU Russia and RX0SA on 15 CW.”

Last week during the Seattle International Film Festival I attended a screening of *The Russian Woodpecker*, a documentary about the Soviet cold war era Duga 3 over-the-horizon HF RADAR that plagued HF radio users all over the world during the 1970s and 1980s. Like many of the festival films, the film maker attended the first showing and answered audience questions afterward.

The film was factual, but of course part of the story were the conspiracy theories which naturally arise in a society in which information is tightly controlled. The director told us he used a small helicopter drone to capture the wonderful high resolution close-up footage of the massive antenna system, which sits within the Chernobyl Exclusion Zone in Ukraine.

Among the impressive hardware seen in this film, some of my favorites were the large black rotary dial telephones left behind in the facility. I would love to have one, and still have a landline to hook it to.

See:

http://www.sundance.org/projects/the-russian-woodpecker

https://www.youtube.com/watch?v=9rd4ARsbg_0

For more information concerning radio propagation, see the ARRL Technical Information Service 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/w1aw-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 in downloadable spreadsheet format at http://bit.ly/1IBXtnG and http://bit.ly/1KQGbRm .

Click on "Download this file" to download the archive and ignore the security warning about the file 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 May 28 through June 3 were 11, 23, 27, 47, 38, 39, and 55, with a mean of 34.3. 10.7 cm flux was 93, 92.3, 95, 94.3, 100.4, 101, and 108.5, with a mean of 97.8. Estimated planetary A indices were 7, 7, 5, 5, 8, 3, and 4, with a mean of 5.6. Estimated mid-latitude A indices were 8, 5, 5, 6, 9, 4, and 5, with a mean of 6.

NZ to phase-out 25 kHz Land Mobile Radio (LMR) channels

On 1 November 2015, all 25 kHz LMR licences operating in frequencies below 470 MHz (E, C and D bands) will be revoked (except for licences used for SCADA and Data services in C and D band).

These channels are being phased out to promote more efficient use of LMR bands,

reduce congestion, and align New Zealand with international practice.

Affected licensees were informed of the phase-out deadline by letter, sent in November 2010.

Further information, can be found on the RSM site at FAQs > Licenses.

{This process has been ongoing since 1992 and effects all land mobile bands using 25 kHz channels and analogue. These are required to move to 12.5 kHz channels—Editor}

The Solar Cycle Turned Sideways

Madhulika Guhathakurta and Tony Phillips. Published 1 May 2013. Citation: Guhathakurta, M., and T. Phillips (2013), The Solar Cycle Turned Sideways, Space Weather, 11, 212–213, doi:10.1002/swe.20039.

{This is really an academic paper, however the figure later in the article is very interesting I think—Editor}

Discovered more than 150 years ago and carefully studied ever since, the solar cycle is nevertheless, in one key way, widely misunderstood.

Many people and even some scientists embrace a simple, binary view of solar activity: Solar maximum is a time of action, marked by massive explosions and dangerous space weather that can affect engineered systems on Earth and in space, while solar minimum is a time of quiet, when almost nothing happens.

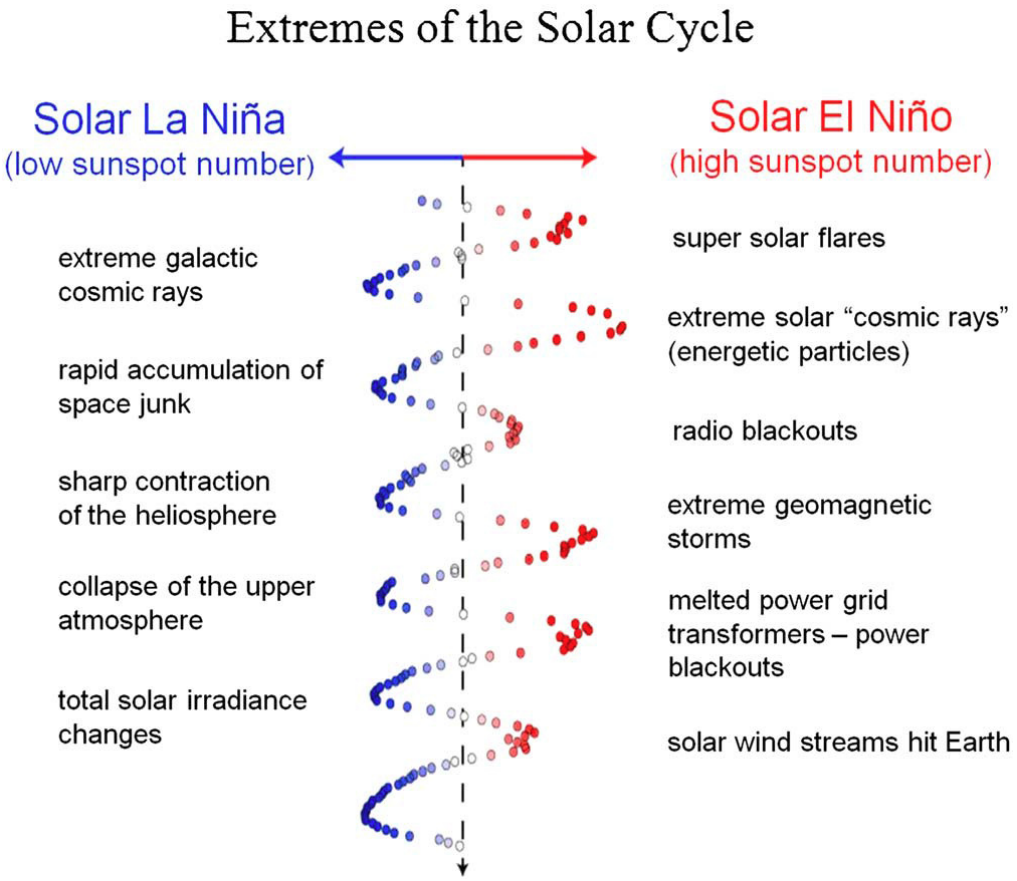
In fact, the situation is more complex . . . and more interesting. Solar Min and Max are opposite extremes of a great stellar rhythm. Solar activity never stops; it just changes form as the pendulum swings. To visualize this, we turn the solar cycle sideways:

In the graphic, sunspot counts are plotted horizontally instead of vertically. Large sunspot numbers are on the right, small sunspot numbers are on the left. This rotated framework erases the concept of Solar Min and Solar Max, and replaces it with a terrestrial analog: La Niña and El Niño.

La Niña and El Niño are opposite extremes of a great Pacific oscillation. Every 2–7 years, surface waters across the equatorial Pacific Ocean warm up (El Niño) and

then they cool down again (La Niña). Meteorologists struggle with a misunderstanding among some laypeople, who believe that El Niño brings wet, stormy weather, while La Niña brings a dry calm. In fact, each condition has its own dis-

tinct regional effects which are, like the extremes of the solar cycle, varied and complex. In southern California, for instance, El Niño years can bring heavy winter rainfall and floods; across the country, the very same El Niño pattern keeps New England warm and dry. In Ecuador and Peru, El Niño delivers good weather for farming. Fishermen hate it though, because their catch plummets at the same time that crop yields soar. On the other side of the Pacific, Australia experiences El Niño as a time of drought and wildfires—the exact opposite of the southern California imprint.



La Niña tends to reverse these trends, but not exactly. While the sea surface temperature anomalies of El Niño and La Niña are practically mirror images of one another, the consequences are not. Earth's weather system is devilishly complex, and no 2 years react the same way to an El Niño or La Niña perturbation.

So it is with the solar cycle. Each extreme stirs up a unique mix of space weather that affects different parts of the Earth-Sun environment, and engineered systems, in varied and complex ways.

Consider the following:

During Solar La Niña (Solar Min), cosmic ray levels surge. Galactic cosmic rays coming from outside the solar system must propagate upstream against the solar wind and a thicket of solar magnetic fields. During the La Niña phase of the solar cycle, solar wind pressure decreases and Sun's magnetic field weakens, making it easier for cosmic rays to reach Earth. Because cosmic rays are so potent—a single relativistic iron nucleus can easily shatter a strand of human DNA—Solar La Niña is a dangerous time for astronauts.

Sun's ElNiño phase (SolarMax) brings cosmic ray counts down, but solar flare activity surges. Solar explosions spray the solar system with X-rays, high energy protons, and billion-ton clouds of electrified plasma known as coronal mass ejections. This is scant relief for astronauts.

Solar El Niño affects many technologies. Ham radio operators grapple with radio blackouts. Airline traffic controllers are sometimes forced to divert international flights away from polar routes. A 2008 report by the National Research Council (NRC) warned that "extreme geomagnetic storms can cause worldwide power outages, water shortages, and disruptions to financial markets", among other things.

Sun's extreme ultraviolet (EUV) radiation is an excellent example of the solar cycle's back-and-forth character. During sunspot peak years (Solar El Niño), EUV output is strong. EUV radiation heats Earth's upper atmosphere, increasing aerodynamic drag on low-orbiting satellites. Satellites, including the International Space Station, tend to fall back to Earth during this time, which vexes satellite operators. On the other hand, space junk tends to fall back to Earth, too, which keeps the orbital environment clean.

During years of lower sunspot number (Solar La Niña), Sun's EUV output drops, and the upper atmosphere begins to cool and contract. With sharply lower aerodynamic drag, satellites have less trouble staying in orbit—a good thing. On the other hand, space junk tends to accumulate, making the space around Earth a more dangerous place.

Figure 1. Illustration shows smoothed monthly sunspot counts from the past six solar cycles plotted horizontally instead of vertically. High sunspot numbers are in red and on the right, low sunspot numbers are in blue and on the left. Associated with each high and low sunspot numbers are different space weather impacts experienced at Earth.

The solar cycle could be entering a phase with a stronger-than-usual "La Niña" character. Following a century-level solar minimum during 2008–2009, Solar Cycle 24 has risen up—but only enough to become the weakest cycle in more than 50 years. Total solar irradiance, which always experiences an uptick around Solar-

Max, has increased only half as much as in the three previous cycles, while UV/EUV irradiances (key drivers of space weather) are up only 50%–70%. These low numbers are not indicators of "quiet," however. As the solar cycle turned sideways shows, solar variability always has the potential to have a major impact on Earth and humanity.

Acknowledgments. Thanks to Robert J. Leamon for assistance in preparing Figure 1.

Reference

National Research Council (2008), Severe Space Weather Events—Understanding Societal and Economic Impacts: A Workshop Report, National Academy Press, Washington, DC, pp. 144 .

Madhulika Guhathakurta is the Lead Program Scientist for "Living with a Star" program at NASA's headquarters in Washington D.C.

Tony Phillips is the Editor at Science@NASA, NASA headquarters.

Three Common Mistakes When Using Metric Units

{This is primary for those in the USA, but I thought it might be useful here as well—Editor}

A while back, I had someone point out a few errors I made concerning the use of metric units. This caused me to review the SI system to make sure I had it correct. (I am sure I'll continue to screw up a few things but, hey, life is a journey.)

The *International System of Units*, universally abbreviated SI (from the French *Le Système International d'Unités*), is the modern metric system of measurement. For a thorough treatment of the topic, take a look at the National Institute of Standards and Technology (NIST) publication: Guide for the Use of the International System of Units (SI). A shorter and easier-to-read document was written by Charles Poynton: Writing SI units and symbols.

But more to the point, here are three common mistakes I often see occurring in ham radio literature:

Using mHz instead of MHz to indicate megahertz (one million hertz). Upper

HAMILTON AMATEUR RADIO CLUB
NZART BRANCH 12
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*CITY: ..... *POSTCODE: .....

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NZART Member NZART Member Number .....

Affiliated to Branch: ..... *Branch 12 member since: .....

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case M indicates mega, while lower case m indicates milli (one thousandth). In ham radio usage, we rarely speak of frequencies in mHz. Note that I wrote mega with a lower case m even though the abbreviation has a upper case M. The unit of hertz is with a lower case h but when abbreviated as Hz, it should be upper case.

Using KHz or khz instead of kHz to indicate kilohertz (one thousand hertz). Lower case k should be used for kilo but upper case H is used for hertz. It is common to see upper case K used to indicate 1024 in digital systems.

Using M instead of m to indicate the unit of meter. The proper way to refer to the wavelength of the 144 MHz ham band is 2m, not 2M. Similarly, the abbreviation for kilometers is km, not kM or KM. The abbreviation for centimeter is cm.

Units that are based on a person's name use an upper case letter in the abbreviation. For example, ampere, volt, watt and hertz are abbreviated as A, V, W and Hz respectively. When the unit is spelled out, it is left lower case (go figure).

While the world does keep on turning when we make these mistakes, accuracy and understanding is improved by proper usage. Did I miss any other common SI errors?

73, Bob K0NR

Upcoming Happenings & Events

Date	*Happenings & Events*
1st June	HF Net, 3.575 MHz, 19:30
2nd June	VHF Net, 146.525 MHz, 20:00
5th June	**NZART HQ-Infoline**
6-7 June	**NZART Hibernation Contest**
8th June	HF Net, 3.575 MHz, 19:30
9th June	VHF Net, 146.525 MHz, 20:00
15th June	HF Net, 3.575 MHz, 19:30
16th June	VHF Net, 146.525 MHz, 20:00
17th June	**Club General Meeting (Club Dinner)**
19th June	**NZART HQ-Infoline**
22nd June	HF Net, 3.575 MHz, 19:30
23rd June	VHF Net, 146.525 MHz, 20:00
28th June	**NZART Official Broadcast**
29th June	HF Net, 3.575 MHz, 19:30
30th June	VHF Net, 146.525 MHz, 20:00

3rd July—NZART HQ-Infoline

15th July—Club General Meeting

17th July—NZART HQ-Infoline

26th July—NZART Official Broadcast

1-2 August—NZART Brass Monkey Contest

7th August—NZART HQ-Infoline

8th August—Hamilton Market Day

21st August—NZART HQ-Infoline

30th August—NZART Official Broadcast

3-4 October—NZART Microwave Contest

5-6 December—NZART Field Day Contest

6-7 February 2016—NZART DX Weekend Contest

27-28 February 2016—NZART Jock White Memorial Field Days Contest

2-3 April 2016—NZART Low Band Contest

21-22 May 2016—NZART Sangster Shield Contest

4-5 June 2016—NZART Hibernation Contest

For more information on any of the above please contact myself or any committee member.

Club Information

Contacts :-

Business Meeting:	1930 First Wednesday of each month except January 88 Seddon Road, Hamilton
General Meeting:	1930 Third Wednesday of each month (except Jan) 88 Seddon Road, Hamilton
Homepage:	http://www.zl1ux.org.nz
eMail:	branch.12@nzart.org.nz
HF Net:	3.575MHz LSB 1930 Mondays
VHF Net:	146.525MHz simplex 2000 Tuesdays
2m Repeater:	145.325MHz -600kHz split
STSP Repeaters:	146.675MHz -600kHz split 438.725MHz -5 MHz split
ATV Repeater:	Off air pending channel changes

Cover Photo: A General Radio Oscillator spotted at NZART Conference (Thanks ZL1IC).

Sender	Hamilton Amateur Radio Club (Inc) PO Box 606 Hamilton 3240