Regulus 2021 May

Newsletter of The Royal Astronomical Society of Canada - Kingston Centre
Celebrating our 60th anniversary 1961-2021 kingston.rasc.ca

A Galaxy a Day Project- Stephen Craig

It all started with a short email in late March 2021: "I just thought of an interesting project. If there is enough interest I could post a galaxy photo a day for a full year. But only if there is enough interest. I will start with the Messier galaxies and then proceed on through the NGC galaxies. The first is M31 done with my DSLR. " There WAS interest!

To date, Stephen has posted a Galaxy a Day for 37 days and counting… and a few other special images as well. They were made available to the RASCKC email distribution list, but also posted to our Facebook Page, along with short descriptions for each. A sample selection of 39 images have been recreated on the last page of this months newsletter.

The ***2021 RASC General Assembly*** will be a virtual paid event that all members have just recently received email details about.
For more information see the website at https://www.rasc2021ga.ca/

THE STARS BELONG TO EVERYONE
JUNE 25TH - 28TH 2021

FEATURING KEYNOTE SPEAKER EMILY CALANDRELLI
ALSO FEATURING SPEAKERS AARON PERSAD, KATE RUSSO, KATIE MACK & KATE HOWELLS

MEETINGS

RASC-KC Wednesday Weekly Social videoconference. 7pm Eastern all weeks except the 2nd Wednesday of the month. For members and their guests. Email list subscribers receive the link weekly 1 or 2 days beforehand. **Note** it is the same link for 2021Jan-June!
Next Social:: Wed 2021 May 05

RASC-KC Regular Monthly Meeting -
2nd Wednesday of the month 7pm Eastern. Zoom for members and Youtube live stream for the public. Members receive email registration link about 1 week beforehand. For Youtube.com search for RASC Kingston.
Note This is a unique link for each meeting

Next: Wed 2021 May 12
Guest Speakers: Mark Coady and Rick Wagner

In this issue

President's Tidbits for May 2021- Kim Hay

May is here, and though the calendar says winter is over, Old Man Winter still seems to be peeking around the corner. We received snow in mid April and again at the end of April. Most of the latter half of April we have had a lot of cloud and rain, or someone has bought some astronomical equipment, but we will get May flowers.

May has quite a few events for us to observe. The Sun has been producing lots of CME's and some even impacting Earth. We may see more action on the Aurora front. The Eta-Aquariid meteor shower with its peak on May 5-6th and there is a Total Lunar Eclipse May 26, 2021. Check the 2021 Observer's Handbook page 126 for more information and times. Rick Wagner will give us a rundown of May Events at the meeting.

On the National front, the new Membership Database called Driven is being migrated over the weekend of April 30 to May 3rd. If you notice anything different of off when you're looking up your information, please notify mempub@rasc.ca or Phil Groff at phil@rasc.ca

If you belong to any RASC email lists (the RASC KC is run outside of this) , please check them come Monday, as only registered emails hooked up to those members accounts will be migrated over. You may need to contact mempub@rasc.ca if the link is not hooked up to the lists.

This is a great time to start observing. There are many RASC Observing programs to choose from. Moon at Noon is on Thursday's 12:00 EDT off the RASC website. This is working with the Explore the Moon observing program. A new program of Double Stars has also been launched. Go to https://www.rasc.ca/certificate-programs

Science Rendezvous is virtual this year and Queen's University is running a Calendar of Events from May 1st-16th http://www.sciencerendezvous.ca/event_sites/queens-university/
International Astronomy Day has some Virtual events being held on Saturday May 15, 2021. This is on Facebook and is being presented by OAOG- Ottawa Valley Astronomy and Observers Group and the RASC Ottawa Centre. We would all love to do these events in person, but with the municipal and provincial COVID guidelines we are unable too.

At our May ZOOM meeting on May 12, 2021 7:00 pm, we will get the inside scoop on the Leeside Observatory by Rick Wagner, and the Light Pollution Victories in Peterborough by Mark Coady. I hope to see you there, if not then at our members Wednesday night Socials via ZOOM.

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In the Sky This Month - May 2021 – Rick Wagner

03 May - Moon 4º south of Saturn in the morning sky
Last Quarter Moon 15:50EDT
04 May - Moon 5º south of Jupiter
05 May - η Aquariid meteors peak, best before dawn, lots of Moon interference, poor shower in the northern horizon.
11 May - New Moon 15:00EDT
12 May - Venus (mag -4) 1.2º right of a very thin crescent Moon (about 29 hours after New) about 5º above the west-northwestern sky about 1/2 hour after sunset; look for Mercury 9º to Venus's upper left
13 May - Mercury (mag 0) 3º right of a thin crescent Moon low in the west-northwestern sky shortly after sunset
19 May - First Quarter Moon
26 May - Full Moon at 07:14EDT28 May - Mercury (mag 2.3) and Venus (mag -3.8) 0.4º apart in the west-northwestern sky shortly after sunset. Venus will be obvious to the naked eye, Mercury, 275 times fainter may need binoculars.

Skyward for May2021 By David H. Levy.

A long time ago, while I was writing my biography of Clyde W Tombaugh, discoverer of Pluto, I learned from him that he had discovered other objects during his long search at the Lowell Observatory in Flagstaff, Arizona. He found many asteroids during his time at Lowell Observatory, at least one comet, and, surprisingly enough, one nova. In February 1986, I visited Flagstaff in an effort to locate the nova that he found. It was a painstaking, tedious task but I loved it anyway. Because Clyde had been so careful recording his observations from each photographic plate onto the envelopes surrounding that plate, I had only to read through all the notes from each envelope. On one of the envelopes covering the year 1931, I saw the nova on a plate dated March 23 of that year. He remarked that must be "quite an interesting star to brighten from fainter than fifteenth magnitude in less than a day."

I later found nine other observations of this star while going through old plates at the Harvard College Observatory, and then I reported them all to Brian Marsden, then director of the Central Bureau for Astronomical Telegrams. He said, "I will announce it, but not yet."

"Why not?" I asked.

"Because you are an amateur astronomer."

Them's fighting words. But before I had a chance to use them, he said, "If you were a professional astronomer, you would never look at the field again, and that would be the end of it. But as an amateur astronomer, you have a lovely 40 centimeter (16-inch) telescope with which you can observe the field every night. When the star erupts again, you will catch it, and then I will announce it as a current item!"

Six months later, on March 23, 1990, I saw the star in outburst with that telescope. It was 59 years to the day after Clyde's discovery, and I was thrilled to let the discoverer know of it. The observation and history were announced in a subsequent announcement card. Since the I have seen the star in outburst over and over again, and one of those sightings was on another March 23, which by this time had assumed more than one new significance: it is also the discovery date of our most famous comet, Shoemaker-Levy 9. It is also our wedding anniversary.

TV Corvi is now my favourite variable star. On each clear night I check the field. One time I caught the star so early in its brightening that I was able to create a movie of the event. When there is an always welcome outburst, it is fun to say hello to my old friend, and I really have a feeling that the star answers me, from the depths of space, with a cosmic "hi there!" right back.

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Facebook Group:
facebook.com/groups/681409686039729/

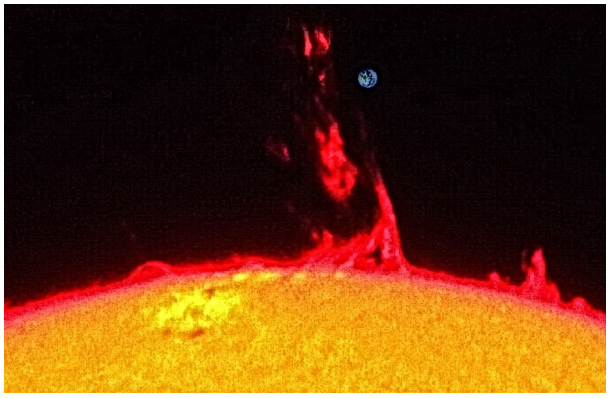
Solar Observing and Imaging, Why? By Hank Bartlett

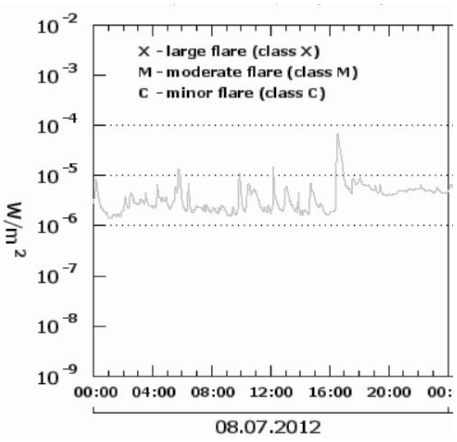
We are now over a year into solar cycle 25 (cycle 24 ended Dec 2019), spots and flares are going to become not only more common but have a higher baseline of x-ray therefore resulting in C, M and eventually X class flares. The long solar minimum that bridges cycles together ended in May of 2020 so it is upward from there for the next five or more years until the peak of solar maximum for this cycle. If you ever thought of becoming a solar observer/imager now is the time to start honing your skills for the coming SOLAR MAX.

We all know that astronomy can be a rather unpredictable hobby as far as weather and sky conditions, solar observing/imaging adds the variant of changes on the solar surface as well. Although there are days the sun seems stagnant it is indeed of course an alive and constantly changing body at the heart of our solar system. Our ability to visually observe these changes on a minute-to-minute basis is what drove me to become a solar observer/imager. Also, no nights, no fumbling in the dark!

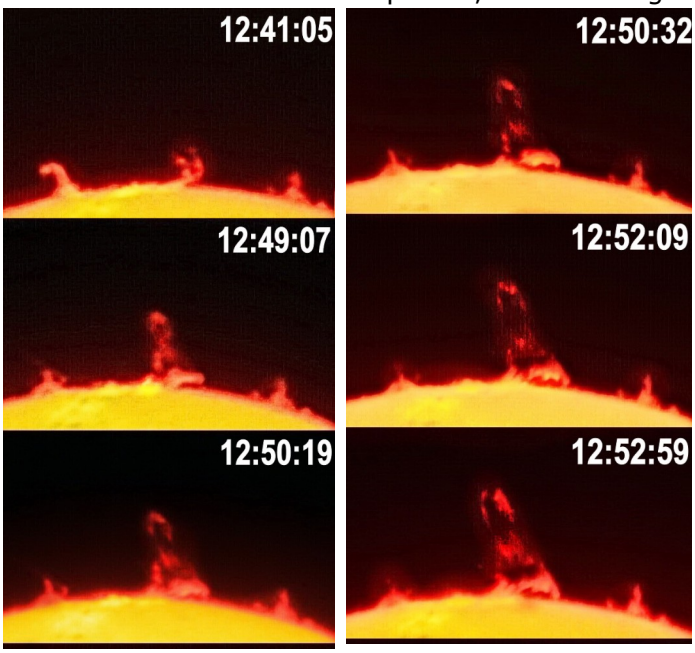
In July of 2005 I first observed the sun in h-alpha at Queens University, then in May of 2007 I took delivery of my first of four Coronado SolarMax telescopes, I still have two (SMIII70DS & SM40).

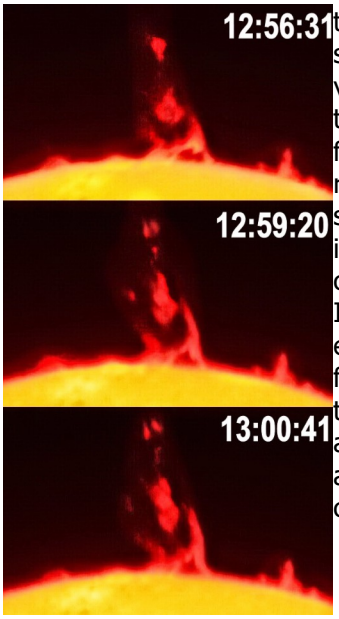
0n July 8, 2012 AR1515 erupted with an M6.9 flare lasting 19 minutes causing a prominence eruption off the west limb of the sun. I observed that ejected prominence in real time, initially it was just a bump next to a bright glow, a glow so bright I knew a flare was about to happen. I ran into the house to get my dslr, the action had already started by the time I mounted the camera on my SolarMax60. Below is my final image of the observing session with an earth inset for scale.





My heart was pounding hard and fast with excitement as I watched this prominence extend, twist into a figure 8 over 100,000km long and eventually reach a full imaged length of over 200,000km into solar space. As I switched from eye to camera to eye some moments were not captured, I was willing





to make the image sacrifice for actual visual observation that I will never forget or likely repeat. Here is the series of captured images enhanced for clarity in this media. In the eyepiece the explosion of violent filaments forming this prominence appeared as dainty at times as candyfloss…

The ever-changing state of the solar surface is why I observe good old "Sol" our friend, our life giving protector and the master of our fate and future.

Minutes of The RASC-KC Regular Monthly Meeting (via zoom) of Wednesday March 10th 2021

The tenth Regular Meeting since the onset of the COVID-19 pandemic, was held remotely with Zoom video conferencing software and started at 19:00EST
45 people were in virtual attendance

Kim Hay Started the meeting at 19:02 EST and welcomed everyone with season greetings. The YouTube live stream and session recording were started. All participants were muted so that the presenters could be heard without interruption.

Kim introduced herself and the executive team members.

Kim presented the Agenda for tonight's meeting

Kim announced the following:

- This year the Kingston centre is celebrating 60th anniversary
- Fall'N'Stars is scheduled for Sept 10-12th 2021
- Science Fair is scheduled for March 22-26
- Malcolm Park received RASC Astroimager - Wide Field Certificate
- National council meeting was on Sunday March 7th

John Hurley announced the following

- National AGM virtually on 25-27th June
- Expected update on nova program
- New computer system will be available soon

Bruce Elliott announced the following

- First online Science Fair requiring huge efforts
- The chief judge emphasized on everyone getting positive experience
- First access to titles and abstracts on March 18th
- Look for and Filter astronomy related projects then rank them

Kim handed over to David Levy

David presented a poem from 1295CE by Dante Alighieri called La Vita Nuova (New Life)

Kim gave a brief biography for Dave Lane

Kim handed over to Dave Lane

Dave presented his Mini-Robotic Observatory project

- Project motivation
- Project timeline and progress
- Design goals and requirements
- How to use Mission Control software
- First design attempts and progress
- Demonstration video of assembly, components and functionality
- Technical Specifications of used components
- Live queue feature demo
- New Live Observing feature
- How does the project work?
- Examples of previous observations
- Live Observing demo attempt
- Invitation to use the mini-robotic observatory
- Q&A session

Kim handed over to Hank Bartlett

Hank presented Hank's Sun Spot

- February 20th,26th, March 2nd, 7th, 9th solar images

- Banding issue with different white balance settings

Kim handed over to Rick Wagner who presented What's up in the sky?

Rick presented his widefield images for the RASC Astroimager widefield certificate.

Kim announced the upcoming regular meeting sessions schedule and speakers

Kim handed over to Dave Lane once again to do the Live Capture feature demo

Dave started a Live Capture session on the MRO

- Tour on the portal interface and usability
- Snapshot and capture of M35 and M42
- Q&A session

Kim stopped the meeting at 21:03

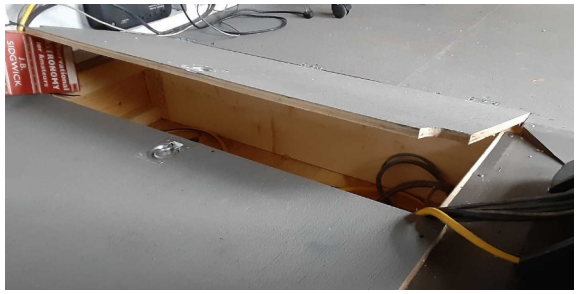
Meeting minutes prepared by Asser ElGindy 2021-03-12

Leeside Observatory Construction -by Rick Wagner

Leeside Observatory was constructed in 2015 to house the 0.4m f/5 Newtonian telescope and equatorial mount donated to me by Paul Boltwood. I will describe the telescope, mount, and steel pier in a separate article.

Concrete Pier
The first job was to build a concrete pier for the telescope. A hole 1.5m square was dug by hand 1.4m deep or down to bedrock, whichever came first. To help secure the pier from any shifting I drilled a half-dozen holes into the granite and epoxied rebar loops into them then poured the concrete over top. The base for the pier is a 1.5m x 1.5m x 0.6m steel-reinforced pad in the bottom of the hole. Then a 60cm x 60cm x 1.8m concrete block pier filled with concrete and rebar was constructed on the pad. A 25cm thick concrete cap was poured on top of the concrete block. Embedded ~35cm into the top cap are four 1" threaded rods which carry the steel pier. Total weight of the pier is ~7 tonnes. The remainder of the hole was back-filled to near the surface then covered with 10cm of rigid foam insulation extending out 60cm from the pier to reduce penetration of the cold. The insulation was then covered with a few inches of sand. Five cm of similar insulation wraps the pier where it extends from the ground.

The Building
The building design is a roll-off roof design based on the Sky Shed with some modifications. It has been sized to give about 30cm clearance from the telescope wherever it points (except near the north horizon where it should never



have been pointing anyway.)

The building is set on 12" diam concrete piers, one at each corner, which also reach well below the frost line or to bedrock.

On the concrete piers are short 6x6 pressure-treated posts which are notched 1.5" deep on the outer faces to carry the 2x10 inner rim joists. Additional rim joists wrap around the

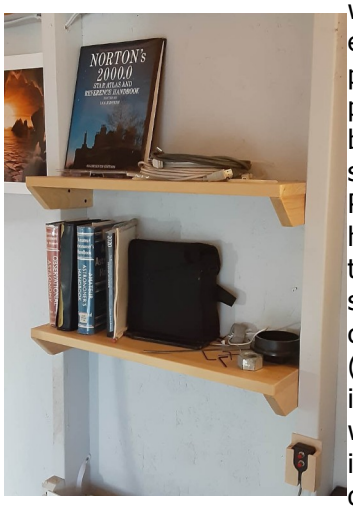
outside for extra strength under the walls. Floor joists are 2x10s roughly 16” on centre (spacing adjusted to fit around the pier and support the edges of the pieces of decking) with blocking every 1m. Framing was doubled all around the pier. There is a 5cm gap between the floor joists and the concrete pier. Decking is 5/8" exterior grade T&G plywood. I installed bottoms in the two joist bays north of the pier to serve as cable runs from the pier to the wall. (My previous observatory used central vacuum tubing which worked great but the connectors and cables to the Boltwood telescope are too large and it’s easier to add/remove these large stiff cables without having to pull them through a pipe.) The flooring on these two sections is installed with hinges for access. The whole floor was covered with Deck-Over rubberized coating with traction grit to protect the plywood. Aluminum flashing was bent and fitted to cover the gap between the floor and the pier to prevent access by insects and animals.

The walls are 2x4 stud construction with OSB panels. 1x3 strapping was applied vertically to the outside and vinyl board-and-batten siding was applied. The gap between the OSB and the vinyl allows a upward cooling flow of air inside the walls greatly reducing heat build-up in the observatory. The temperature in the observatory is never more than a couple of degrees above the outdoor temperature. The door is made of 2x6 pine assembled with loose splines and battens on the inside face. Regular residential deadbolt provides security and a door handle rather than a knob can be opened with an elbow when carrying equipment. Two small windows were installed in the south wall with removable interior shutters. These are primarily for appearance sake but also provide light for daytime work in the observatory. The interior was painted a pale grey which bounces and scatters light around the observatory making it much easier to work in there. The area is dark enough that the light colour doesn’t impact observing at all.

The roof rolls on commercial grade garage door wheels and tracks. The tracks are installed along the top inside of the walls and extend out to the north along 4x4 rails. The roof is constructed of 2x6 rafters with 2x4 purlins between them. The decking is 6mm plywood with strapping over top and steel roofing fastened to the strapping. Again, the air gap between the two prevents heat build-up. There is a 25cm square louver in each gable to prevent any moisture build-up and the openings around the outrigger rails and garage door tracks are covered in carefully fitted aluminum flashing to keep animals out. I installed a heavy screw-eye in the ridge beam so the roof can be used as a movable gantry for lifting the components of the mount into place. Other screw-eyes, pulleys, and d-rings in the roof provide for two slings to mount and dismount the heavy OTA by one person. The outrigger rails for the roof are 4x4 with 2x6 knee braces mortise and tenoned, glued, and screwed in. They are long enough to allow the roof to open well past the north wall. The posts rest on 60cm square patio blocks supported by scaffolding jacks which allow leveling the rails to the building. During winter the rails are covered with strips cut from a tarp to keep snow and ice off the rails and out of the tracks.

Electrical

I dug a 1m deep trench from the shop to the observatory and installed armoured 12/3 cable according to code to provide 120V to the observatory. There is a duplex receptacle on each wall plus one on the pier. Four white LED lights were installed on the walls near the corners and a red LED rope light on a dimmer switch is strung around the inside top of the wall. All the computer equipment and the pier outlet are plugged into a power bar with an individual switch for each outlet. Power to the various heaters and fans on the telescope is supplied by several chassis power supplies (12V, 15V, 24V) built into a control panel with a switch and LED indicator for each device.



IT
The computer is an Intel NUC with 8GB RAM and 512GB SSD running MS Windows 10 Pro and an inexpensive 24" monitor hung on the wall above it. The NUC has not been entirely satisfactory as it has proved impossible to get audio drivers to work (so no audible alarms for problems) and some software is quite flaky. I'm not sure if the flakiness results from the computer itself or is just the usual inadequacies of Windows. Almost all observing is done from my office accessing the observatory computer with VNC.

Up until recently I had been depending on wifi (ASUS USB-AC56 adapter with high-gain antenna) to connect to my home network which has been fully satisfactory. However I want to add a Raspberry Pi-based weather station (under construction) and a surveillance camera to be able to watch the telescope both of which need to be network accessible. To accommodate them I have installed powerline adapters across my network and will add a network switch in the observatory.

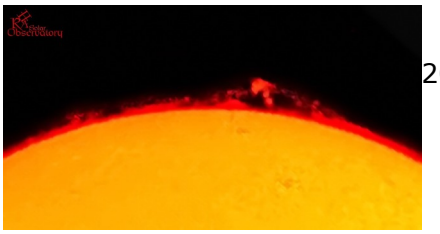
Amenities
Two small shelves have been installed between the wall studs to hold reference books, binoculars, and tools. A half-dozen small drawers for small parts will be built and installed in the near future. A small desk and chair are in the corner for occasional operation of the telescope on-site.

Lessons Learned
The white lights installed on the walls are very bright which is great for being able to see what I'm doing on the telescope but they tend to blind me when I'm looking towards the walls, particularly the one which is just above my monitor.
I should have set the wall outlets back against the sheathing rather than flush with the studs as that would move the plugs/wires a little deeper into the wall where bumping them would be less of a problem. An extra outlet near the desk would have been nice.

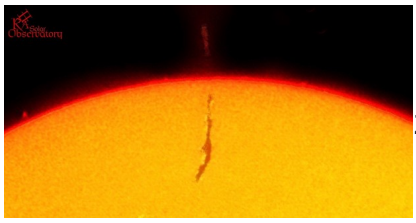
RASC-KC Solar Cycle 25 Monthly Review – Hank Bartlett

A review of solar activity and images during the past month
by RASC-KC solar observers.

We are now 16 months into solar cycle 25 which began in December 2019. This cycle is expected to peak in 2025 so it had better start kicking up some dust. So far the first two weeks of the month have seen only two spots, AR12813 & 814. That does not mean there has not been some good prominence activity to make things a little more exciting.



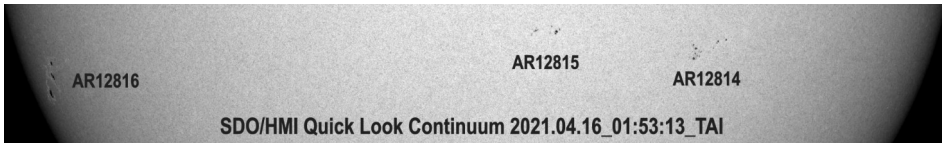
2021 04 06



2021 04 08

It is rare there is nothing of interest to image, unless of course it is the clearest/steadiest air in months, then the sun will be barren. The visible portion of the filament/prominence on the right measures about 300,000km in length but also rises about 100,000km above the solar limb then arcing back to the surface at an unknown distance over the edge. The protrusions along the side of this filament are like feet anchoring and bridging it across the solar landscape much like the Roman aqueducts, however the hydrogen of these ducts is considerably hotter and more volatile.

Today, the 15th of April could be a changing day for solar activity as there is now 3 sunspot groups across the southern hemisphere and the spot advancing from the SE limb has 3 good size cores.

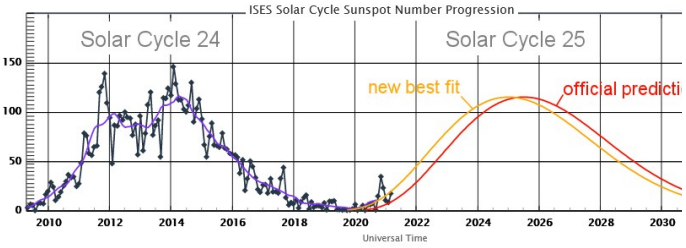


The image above looks great and the new cores

are dark and bold, BUT, here is the next day in H-alpha which shows more about the characteristics of these spot groups with regard to energy. The brighter regions in 814 and 815 show signs of higher energy, these brighter areas are likely Ellerman Bombs or micro-flares of short duration (5 minutes) populating the plage but constantly erupting. 816 however at the time of this image has a low level of activity even though it has larger dark cores.

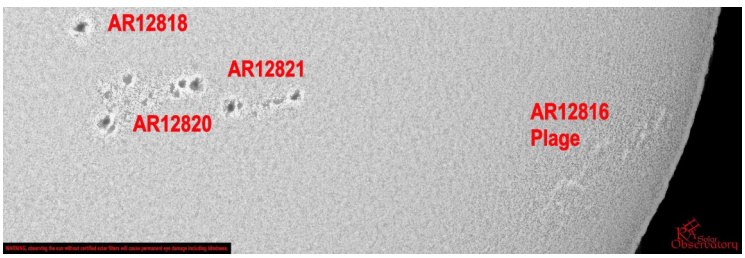
Now read this new information from Dr Tony Phillips (see full article at April 16 2021 www.spaceweather.com)

April 16, 2021: You probably think Solar Cycle 25 is a dud. Think again. Despite long stretches of spotless quiet, the new solar cycle is actually running ahead of schedule. In this plot, the red curve shows NOAA's predicted sunspot counts for Solar Cycle 25; the orange curve shows the new best fit:



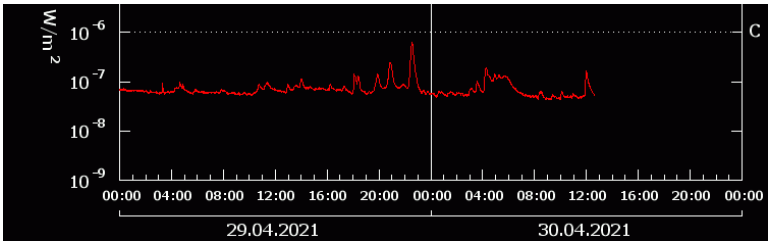
Above: Observed and predicted sunspot numbers.

3rd week activity picked up with the high point being an M1.1 flare, unfortunately this flare came near midnight UT (20210419 19:42EDT) too late for imaging from the RHA Obs. Four active regions appeared on the solar disc during the week and drove the baseline x-ray to around 10-6.5 average.



On April 22/23 AR12817 was rotating away over the western limb, combined with 2816 the two set off 17 C class flares in less than 43 hours. Sadly by the 27th we were riding a 10-7 baseline again but with a lovely chain of sun spots (almost resembling a horizontally flipped Cassiopeia) across the southern solar hemisphere...

This month we have had x-ray levels ranging from 10-7 to 10-4.9, activity is picking up! Sunspots have also been more plentiful with 9 spots from AR12813 to 821 inclusive. As the month comes to a close under still cloudy sky the trio of spots above are now rotating over the SW solar limb. I leave you with this crackling clip from the x-ray graph, we may be back in 10-7 but it is not smooth or flat.



References and credits for this article other than labelled images are - Wikipedia, Observer's Guide to the H-alpha Sun by Bob King and www.spaceweather.com

If you have any solar images during the month to contribute to RASC-KC Solar Cycle 25 Monthly Review forward it to rhaobs (at) gmail (dot) com along with exif and any other documentation about your observing session.

Hank Bartlett

The Fine Print:

Stephen Craig Galaxies

M31_DSLR_C

M33BBPx

M51Px

M58PX

M63PX

M64PX

M65

M66PX

M74PX

M77

M81B

M82B

M88PX

M90PX

M91PX

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M96

M98

M99

M100

M101-Px

M102

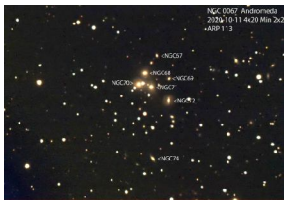
M104

M105

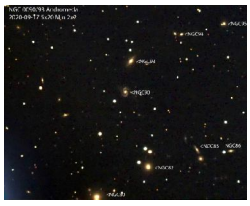
M106

M108B

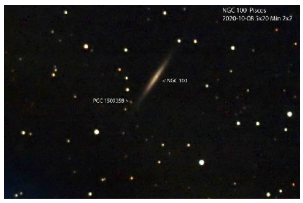
M109



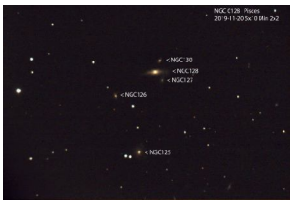
NGC0067A



NGC0090A



NGC0100A



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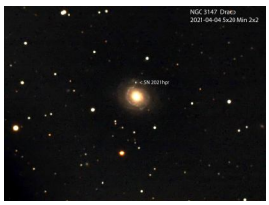

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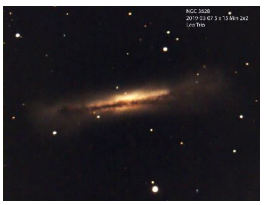

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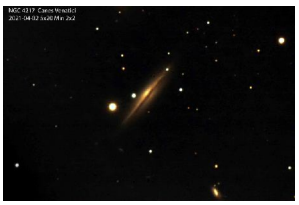

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