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* ISWI Newsletter - Vol. 16 No. 011 12 NOV 2024 *
* Editor: George Maeda, georgemaeda3[at]gmail.com
* Archive of back issues: ISWI Website https://iswi-secretariat.org/
* Send subscription request to: iswisupport@bc.edu
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Dear ISWI Newsletter Subscriber:

Reminder that the attachments for this newsletter are provided at the "website version" of this newsletter. It is one big PDF with everything. Accordingly,
please visit: https://iswi-secretariat.org/

The "email version" of the newsletter cannot accommodate all of the contributed attachment files.

Cordially,
George Maeda
Editor of the ISWI Newsletter, since 2009.

CONTENTS OF THIS ISSUE:

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[01]----------

RE: **Space Weather and Space Climate. A timeline.**
FROM: Frédéric Pitout https://www.univ-tlse3.fr/home
Date: 11 NOV 2024
To: ISWI NEWSLETTER.

Dear all,
I'm delighted to announce the publication of "Space Weather and Space Climate. A timeline", the English version of a book on space weather published in French in 2021. This English version has been revised and expanded by a dozen of international scientists and is free to download (in PDF format):
https://www.edp-open.org/books/edp-open-books/453-space-weather-and-space-climate-a-timeline

Best wishes, Frederic

[02]----------

RE: [Announcement] Last ISWI Seminar of 2024
FROM: Maria Graciela Molina
DATE: 11 Nov 2024
TO: ISWI Newsletter

Dear colleagues,

We are pleased to announce the next ISWI Webinar by Dr Ilya Usoskin scheduled for November 27th, 2024 at 3 PM Central European Time (9 AM EDT; 6:30 PM IST). This seminar will be the last one of 2024.

To register for the virtual seminar, please send an email to: iswisupport@bc.edu . Please include "ISWI Seminar Registration" in the subject line. There is a limit of 300 participants, so please register your interest as soon as possible.
The MS Teams link will be sent to registered participants 2 days before the event.

Looking forward to meeting you at the next ISWI seminar!
With kind regards,
Graciela Molina
on behalf of the ISWI Seminar Committee
https://iswi-secretariat.org/home-page/organization/iswi-webinar-committee/

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Title: **Rare and dangerous extreme solar eruptive events: A new phenomenon**
Speaker: Ilya Usoskin; University of Oulu

Abstract:
Solar energetic eruptive processes, such as flares and coronal mass ejections, are relatively well-studied during the past decades of direct observations. Although their maximum strength/energy is not constrained by direct data because of a too short period of observations, we know that extreme events do occur rarely on the Sun over the past millennia. This is known from both the multi-millennial data of extreme solar activity using cosmogenic-proxy data, and also a several-year survey of thousands of sun-like stars made with high-precision stellar photometry. With the available data, we can estimate the occurrence probability of extreme solar events, reconstruct their energy spectra and assess the dramatic terrestrial and societal impacts. We can also discuss whether these events are Black Swans or Dragon Kings. The consistency of different datasets on the average flux of solar energetic particles near Earth can be also assessed.

SEE: ISWI Seminar Series - Nov2024.pdf
001

Dra. María Graciela Molina
Associate Professor FACET -UNT
Researcher CONICET
Associated researcher INGV

[03]----------

CALLISTO status report/newsletter #100

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This report is number 100 after the 1st one on July 4th 2003 thus, this project is now running for 21 years and the network is still growing.

SEE: status_100V01.pdf
002

[04]----------

TO: Readers of the ISWI Newsletter
FROM: George Maeda, Editor, ISWI Newsletter
Date: 10 Nov 2024

Loyal readers:

You may heard of this book: **"The Sun Kings" by Stuart Clark,**
published in 2007 by the Princeton University Press.
I just read it. It is a good history book -- I can highly recommend it.

We all now take for granted the immense influence the Sun has on the Earth in terms of storms -- but there was a time (before the 1880s) when the notion was largely dismissed. For example, the celebrated Lord Kelvin tried to discredit the notion ... as did other prominent scientists of the Victorian era.

But the body of evidence supporting the notion gradually accumulated as more scientists used increasingly sophisticated instruments to observe the Sun and Earth ecosystem.
It was the start of space weather science.

Please see the attached 2-page PDF -- it is mainly the book blurb from the book publisher.
Cordially,
George

SEE: THE PRINCETON UNIV PRESS; The Sun Kings.pdf
003

[05]----------

Uranus Might Have Experienced a Freak Event When Voyager 2 Visited

Much of the understanding of the seventh planet comes from a brief flyby nearly 40 years ago, which researchers now say overlapped with an exceptional solar event.

By Jonathan O'Callaghan; THE NEW YORK TIMES
Nov. 11, 2024

Our understanding of Uranus might have been all wrong for nearly 40 years.

In January 1986, NASA's Voyager 2 spacecraft zoomed past Uranus as part of a grand tour of the outer solar system. That flyby, lasting just five hours, remains to date the only visit to Uranus by a spacecraft from Earth, with much of our understanding of the planet coming from that brief encounter.

Peculiarly, as Voyager 2 soared about 50,000 miles above the planet, it found that Uranus was quite different from other worlds in the outer solar system. In particular, its protective magnetic field, known as a magnetosphere, was devoid of plasma, something prevalent around other planets.

"We observed this empty magnetosphere," said Jamie Jasinski, a space plasma physicist at NASA's Jet Propulsion Laboratory. And its radiation belts, regions of the planet's magnetic field that trap high-energy particles, were surprisingly intense, something that "breaks current radiation belt theory," Dr. Jasinski said.

Now we may know why. In a paper published Monday in the journal Nature Astronomy, Dr. Jasinski and his colleagues suggest that Voyager 2's visit flyby occurred during an exceptional increase in solar activity, which caused shrinking of the planet's magnetosphere. That created conditions at Uranus that occurred just four percent of the time in the data that the team analyzed.

==========>>> **The rest is attached as PDF.**

See: NYT; the 5-hour fly by of Uranus in 1986; no plasma.pdf
004

Submitted by G.Maeda, Editor of the ISWI Newsletter.

[06]----------

First Images of the Sun's Flares Released From a New Space Telescope

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Forecasters will soon be able to use the instrument, a coronagraph, to better monitor the effects of solar storms.

27 Oct 2024; The New York Times

Before the northern lights fill the night sky on Earth with their eerie neon glow, a blast of electrified gas flares up from the sun's surface. And scientists are now getting a powerful new view of how those ejections move through the corona, the sun's tempestuous outer atmosphere.

On Tuesday (22 Oct), the National Oceanic and Atmospheric Administration unveiled the first imagery from its newest telescope in space. Meteorologists will use pictures from the device to help them better forecast space weather, including when you can expect to see auroras.

The rest of this article is here:
coronagraph of NOAA.pdf
005

Submitted by G.Maeda, Editor of the ISWI Newsletter.

**********[End of this issue of the ISWI Newsletter]**********

← The next ISWI Webinar

ISWI Webinar Series

November 27th, 2024
3PM Central European Time
(9AM EDT; 6:30PM IST)

Dr. Ilya Usoskin
University of Oulu

Rare and dangerous extreme solar eruptive events: A new phenomenon

Solar energetic eruptive processes, such as flares and coronal mass ejections, are relatively well-studied during the past decades of direct observations. Although their maximum strength/energy is not constrained by direct data because of a too short period of observations, we know that extreme events do occur rarely on the Sun over the past millennia. This is known from both the multi-millennial data of extreme solar activity using cosmogenic-proxy data, and also a several-year survey of thousands of sun-like stars made with high-precision stellar photometry. With the available data, we can estimate the occurrence probability of extreme solar events, reconstruct their energy spectra and assess the dramatic terrestrial and societal impacts. We can also discuss whether these events are Black Swans or Dragon Kings. The consistency of different datasets on the average flux of solar energetic particles near Earth can be also assessed.

Registration -> *iswisupport@bc.edu*

CALLISTO status report/newsletter #100

This report is number 100 after the 1st one on July 4th 2003 thus, this project is now running for 21 years and the network is still growing.

Several recent 1st lights

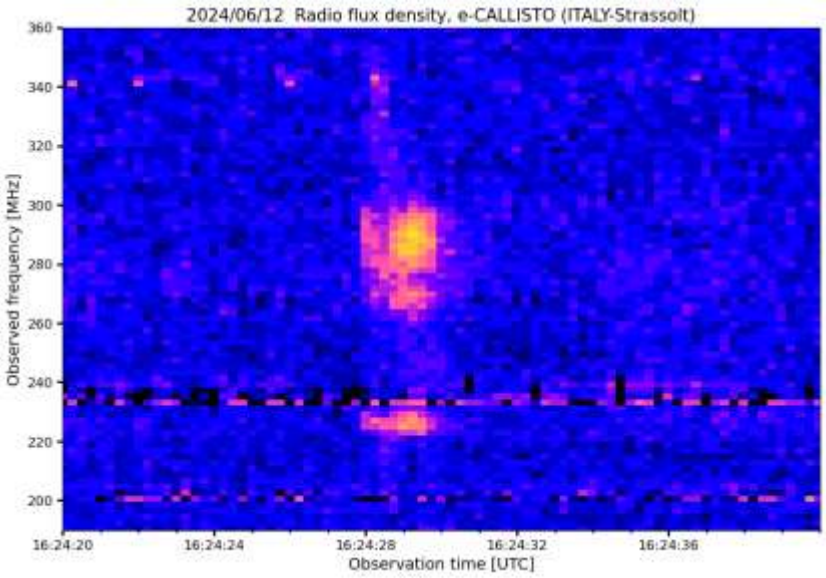

Fig. 1: 1st light from new station Strassolt in Italy
Contact: Alex Marassi <alessandro.marassi(at)inaf.it>

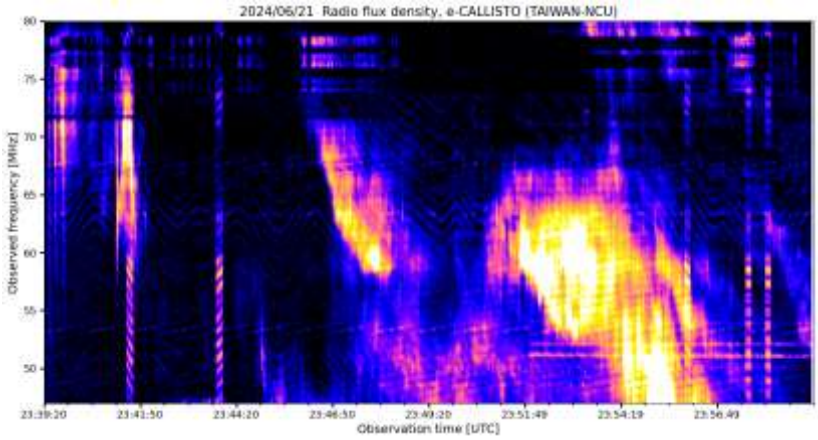

Fig. 2: 1st light from new station Taiwan-NCU
Contact: Ya-Hui Yang <yhyang(at)jupiter.ss.ncu.edu.tw>

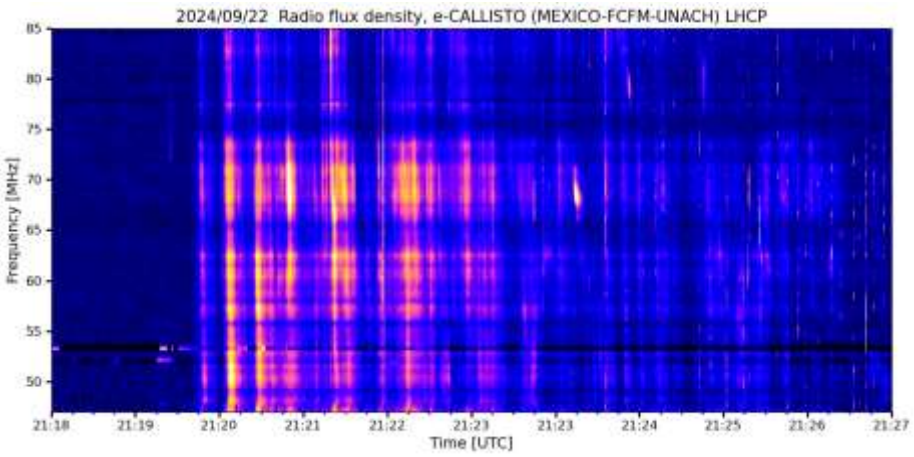

Fig. 3: 1st light from station MEXICO-FCFM-UNACH

Contact: Ernesto Aguilar Rodríguez<Ernesto(at)igeofisica.unam.mx>

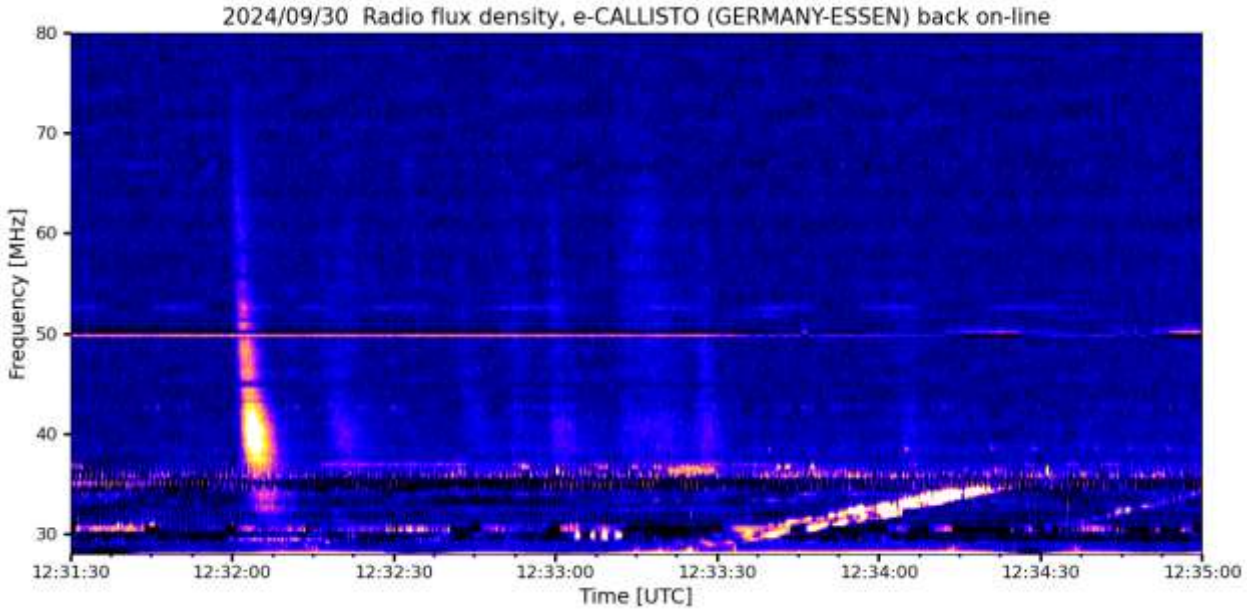

Fig. 4: 1st light from station ESSEN in Germany after years of maintenance break. Antenna biconical.
Contact: Jochen Plessmann <do1jpa(at)gmx.de>

Fig. 5: Group photo with LWA in Chiapas, Mexico. Contact: Ernesto Aguilar Rodríguez <Ernesto(at)igeofisica.unam.mx>

Fig. 5: Logarithmic periodic dipole array (LPDA) including front-end box containing low noise amplifier. Antenna with tracking system. Station: Croatia-Visnjan
Contact: Marko Radolović <mradolovic(at)gmail.com>

e-Callisto burst statistics October 2024

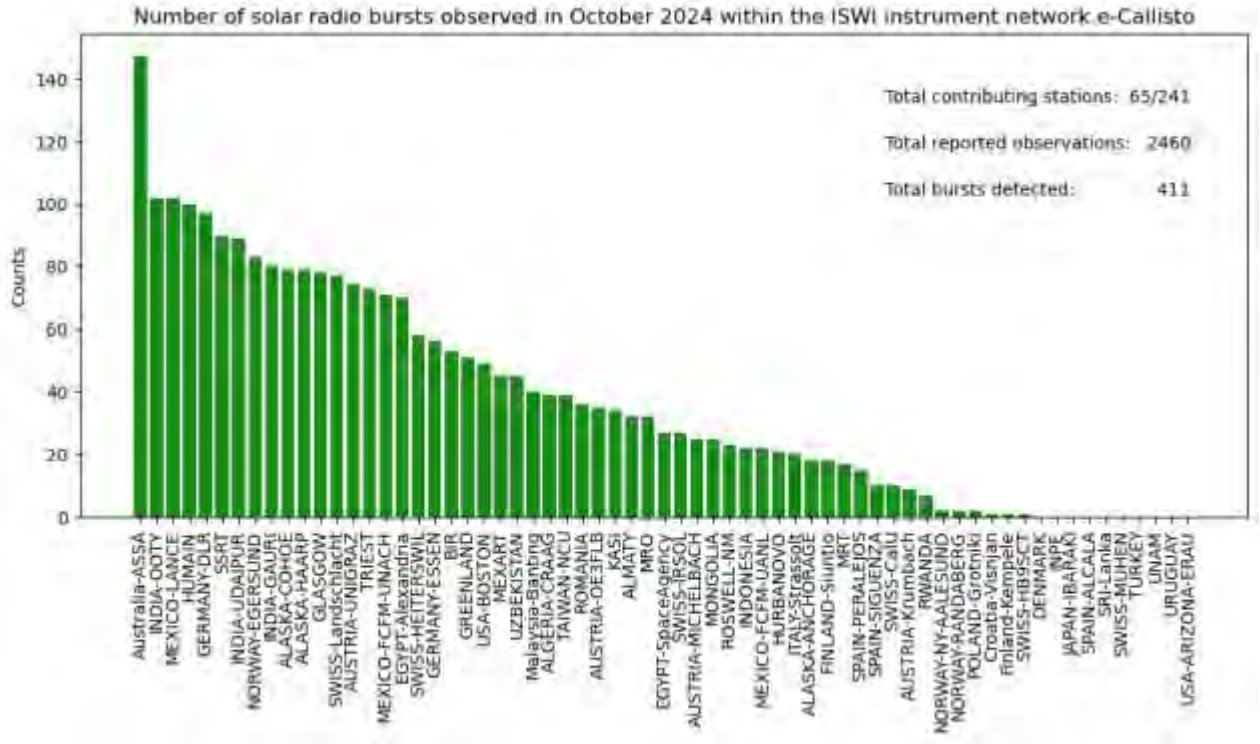

Fig. 6: Compilation of all visually detected bursts from all Callisto-stations which provide data to the e-Callisto network. There are clear 'winners' of the May-'competition', Australia-ASSA. Still eagerly looking for an AI-solution to automatically generate a burst-list and to save many hours day by day to perform this rather boring job, visual inspection of thousands of FIT-files.
Last 4 burst-plots are always available here: **https://e-callisto.org/Data/data.html**

CESRA NEWS

Data Release of Solar Radio Bursts observed by CBSm at the metric wavelength
by Yao Chen et al.
https://www.astro.gla.ac.uk/users/eduard/cesra/?p=3773

Energetics of compressive waves in the solar corona
by Francesco Azzollini et al
https://www.astro.gla.ac.uk/users/eduard/cesra/?p=3783

https://www.astro.gla.ac.uk/users/eduard/cesra/?p=3809

The angular and frequency dependence of solar radio burst rise and decay times using multi-spacecraft observations
by Nicolina Chrysaphi et al.
https://www.astro.gla.ac.uk/users/eduard/cesra/?p=3852

Time-Profile Study of Type III Solar Radio Bursts Using Parker Solar Probe
by Tulsi Thapa and Yihua Yan
https://www.astro.gla.ac.uk/users/eduard/cesra/?p=3848

Periods and frequency drifts of groups of narrowband decimetric spikes
by M. Karlický, J. Dudík and J. Rybák
https://www.astro.gla.ac.uk/users/eduard/cesra/?p=3860

Generation of Series of Meter/Decimeter III type Bursts During Thermal Phase of Solar Flare
by Meshalkina and Altyntsev
https://www.astro.gla.ac.uk/users/eduard/cesra/?p=3884

Recent papers

Drone-Based Antenna Beam Calibration in the High Arctic
https://arxiv.org/html/2407.00856v1

Regarding "Radio signature of the strong compression between a streamer and a coronal hole boundary" by Aguilar-Rodriguez et al
DOI: 10.3847/2041-8213/ad631b
The Astrophysical Journal Letters ad631b

Observation of an Extraordinary Type V Solar Radio Burst:
Nonlinear Evolution of the Electron Two-Stream Instability
Arnold O. Benz · Clemens R. Huber · Vincenzo Timmel · Christian Monstein
https://doi.org/10.1007/s11207-024-02395-8

AOB

- If you have some stuff to present to the Callisto community, please let me know
- CALLISTO or Callisto denotes to the spectrometer itself while e-Callisto denotes to the worldwide network.
- General information and data access here: https://e-callisto.org/
- e-Callisto data are hosted at University of Applied Sciences, Institute for Data Science FHNW in Brugg/Windisch, Switzerland. Additionally, data are available at ESA site here: ESA Space Weather Portal (https://swe.ssa.esa.int/).
- University of Alcalá in Spain is also hosting e-Callisto data here: http://212.128.70.189/ From now on Bussons Gordo Javier javier.bussons(at)uah.es from Alcalá is the new Co-PI and will support my activities related to CALLISTO instrument and e-Callisto network.
- In case you (as the responsible person for operating and maintenance of Callisto) are leaving the institute or, if you are retiring, please send me name and email address of the successor.
- New product available, a calibration unit for antennas with direct access to the dipoles, such as CLP-5130. Calibration only for frequencies below 900 MHz (due to low cost components)

More information here (see bottom of this page): https://e-callisto.org/Products/Products.html

Fig. 7: Calibration unit containing semiconductor switch and a noise source. Unit will be supplied with a calibration table and free Python script to control the unit as well as to calibrate FIT-files from CALLISTO.

Please do **NOT** respond to the email-address of the list-server where you have got this document from, it is a computer/robot. This computer will not give you any useful answer…
Respond instead directly to me at: cmonstein(at)swissonline.ch or to the new Co-PI javier.bussons(at)uah.es

If you do not want to receive this newsletter, please send me an email and we will take your address out of the database. On the other hand, if you think someone else might be interested in this kind of info, please let me know his/her email-address to be added to the database.

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PRINCETON UNIVERSITY PRESS

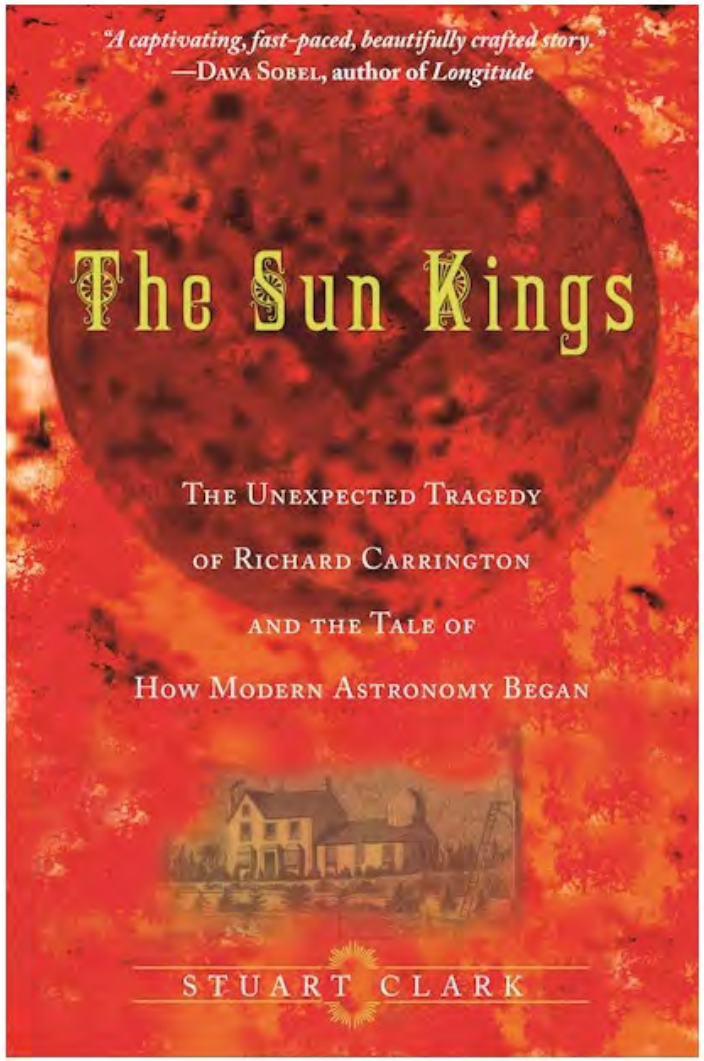
Books Resources Ideas

These two pages were prepared by George Maeda on 10 Nov 2024 for the Nov-2024 issue of the ISWI NEWSLETTER.

Physics & Astronomy

The Sun Kings: *The Unexpected Tragedy of Richard Carrington and the Tale of How Modern Astronomy Began*

Stuart Clark



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Paperback

Price: $28.95/£22.00
ISBN: 9780691141268
Published: Apr 12, 2009
Copyright: 2007
Pages: 224
Size: 6 x 9.25 in.

https://press.princeton.edu/books/paperback/9780691141268/the-sun-kings?srsltid=AfmBOoqZE7xP4jokUvW1iZlyJvevr3qH8YqJ6IrLeQ9kE0E-CJRMkBSp

In September of 1859, the entire Earth was engulfed in a gigantic cloud of seething gas, and a blood-red aurora erupted across the planet from the poles to the tropics. Around the world, telegraph systems crashed, machines burst into flames, and electric shocks rendered operators unconscious. Compasses and other sensitive instruments reeled as if struck by a massive magnetic fist. For the first time, people began to suspect that the Earth was not isolated from the rest of the universe. However, nobody knew what could have released such strange forces upon the Earth—nobody, that is, except the amateur English astronomer Richard Carrington.

In this riveting account, Stuart Clark tells for the first time the full story behind Carrington's observations of a mysterious explosion on the surface of the Sun and how his brilliant insight—that the Sun's magnetism directly influences the Earth—helped to usher in the modern era of astronomy. Clark vividly brings to life the scientists who roundly rejected the significance of Carrington's discovery of solar flares, as well as those who took up his struggle to prove the notion that the Earth could be touched by influences from space. Clark also reveals new details about the sordid scandal that destroyed Carrington's reputation and led him from the highest echelons of science to the very lowest reaches of love, villainy, and revenge.

The Sun Kings transports us back to Victorian England, into the very heart of the great nineteenth-century scientific controversy about the Sun's hidden influence over our planet.

Awards and Recognition

- Winner of the 2007 Best Professional/Scholarly Book in Cosmology and Astronomy, Association of American Publishers
- Shortlisted for the 2008 Royal Society Prizes for Science Books, General Prize

The New York Times https://www.nytimes.com/2024/11/11/science/uranus-voyager-2-flyby.html

Much of the understanding of the seventh planet comes from a brief flyby nearly 40 years ago, which researchers now say overlapped with an exceptional solar event.

004

Listen to this article · 4:52 min Learn more

By Jonathan O'Callaghan

Jonathan O'Callaghan previously reported on how Uranus got its color.

Nov. 11, 2024 Updated 11:31 a.m. ET

Our understanding of Uranus might have been all wrong for nearly 40 years.

In January 1986, NASA's Voyager 2 spacecraft zoomed past Uranus as part of a grand tour of the outer solar system. That flyby, lasting just five hours, remains to date the only visit to Uranus by a spacecraft from Earth, with much of our understanding of the planet coming from that brief encounter.

Peculiarly, as Voyager 2 soared about 50,000 miles above the planet, it found that Uranus was quite different from other worlds in the outer solar system. In particular, its protective magnetic field, known as a magnetosphere, was devoid of plasma, something prevalent around other planets.

"We observed this empty magnetosphere," said Jamie Jasinski, a space plasma physicist at NASA's Jet Propulsion Laboratory. And its radiation belts, regions of the planet's magnetic field that trap high-energy particles, were surprisingly intense, something that "breaks current radiation belt theory," Dr. Jasinski said.

Now we may know why. In a paper published Monday in the journal Nature Astronomy, Dr. Jasinski and his colleagues suggest that Voyager 2's visit flyby occurred during an exceptional increase in solar activity, which caused shrinking of the planet's magnetosphere. That created conditions at Uranus that occurred just four percent of the time in the data that the team analyzed.

"If we had arrived a week earlier, we would have had a completely different picture of Uranus," Dr. Jasinski said.

Fran Bagenal, an astrophysics and planetary science professor at the University of Colorado, Boulder, and a member of the Voyager program's plasma science team, said it was a "big surprise" when she saw Dr. Jasinski present the research at a conference this summer. "Why didn't we see this?" she said. "I was kicking myself. It was completely out of the blue."

The research could also spark important questions as scientists plan a possible return to this fascinating world by a NASA space probe.

A model of the Voyager spacecraft, Uranus's visitor. NASA

When Voyager 2 swooped past Uranus, Dr. Jasinski believes the planet was being hit by something called a co-rotating interaction region. This is a burst of activity from the sun's surface that sweeps out into space as the star rotates, ejecting long streams of plasma to the edge of the solar system. This phenomenon has been observed affecting other planets, such as Saturn. But it hadn't been considered for Uranus.

"Their result is solid," said Adam Masters, a space and planetary scientist at Imperial College London. "Everyone was focused on data taken near to the planet, but they looked back at data taken when the spacecraft was approaching and leaving the Uranus system."

Dr. Bagenal added that "it explains why the density that we saw was so low."

The solar activity would have increased the pressure of the solar wind on Uranus's magnetosphere by 20 times as much, Dr. Jasinski said, squashing it to just a fifth of its normal volume. This would explain both the decreased amount of plasma detected near Uranus, which would be trapped closer to the planet inside the magnetosphere, and the intensity of the radiation belts, which would have been filled with energetic electrons from the sun.

NASA is working on a mission to return to Uranus next decade. It plans to launch a spacecraft by 2032 that would orbit the planet for the first time and send a probe into its atmosphere. The new paper highlights just how little we know about the planet, and how

eager scientists are to return.

And scientists say there are good reasons to study Uranus and its fellow ice giant, Neptune: they provide a point of comparison for understanding many similar worlds around distant stars.

“The reason we care about Uranus and Neptune, and their quirky magnetic fields and interiors, is because the most populous class of exoplanets are super-Earths and sub-Neptunes,” said Heidi Hammel, an astronomer and planetary scientist at the Association of Universities for Research in Astronomy.

And many planetary scientists are enthusiastic about better understanding Uranus, which is particularly unusual in that it orbits on its side relative to the other planets, possibly the result of a giant impact early in its life. “It’s got extreme seasons, and the magnetic field is rotating at a very weird angle,” Dr. Masters said. Other questions abound, he added: Where did Uranus form? How does its atmosphere work? Do its moons conceal oceans like those around Jupiter, Saturn and Neptune?

“We have lots of mysteries we want to resolve,” he said.

Perhaps the planet, though, is slightly less unusual than Voyager 2’s flyby suggested. “This is why we need to go back,” Dr. Bagenal said.

The New York Times https://www.nytimes.com/2024/10/27/science/solar-flare-telescope-sun.html

First Images of the Sun's Flares Released From a New Space Telescope

Forecasters will soon be able to use the instrument, a coronagraph, to better monitor the effects of solar storms.

Listen to this article · 3:12 min Learn more

005

By Katrina Miller

Oct. 27, 2024

Before the northern lights fill the night sky on Earth with their eerie neon glow, a blast of electrified gas flares up from the sun's surface. And scientists are now getting a powerful new view of how those ejections move through the corona, the sun's tempestuous outer atmosphere.

On Tuesday, the National Oceanic and Atmospheric Administration unveiled the first imagery from its newest telescope in space. Meteorologists will use pictures from the device to help them better forecast space weather, including when you can expect to see auroras.

The new instrument is called the Compact Coronagraph, or CCOR-1. It launched in June aboard GOES-19, the newest of NOAA's fleet of weather satellites. The coronagraph can continuously monitor the sun, and it will send data to scientists on the ground every 15 minutes.

"The forecasts can always count on it," said James Spann, the senior scientist of space weather observations at NOAA, which operates the satellite. He added that CCOR-1 was the first coronagraph devoted to forecasting.

In the past, scientists have relied on imagery from satellites that are primarily used for longer-term scientific research, including an instrument on SOHO, the Solar and Heliospheric Observatory, a joint mission by NASA and the European Space Agency. But according to Dr. Spann, research satellites aren't designed for continuously gathering data, meaning that forecasters may be left blind to solar activity for hours.

CCOR-1 is one solution to that.

The coronagraph is essentially a solar telescope that observes the corona, the wispy, outer part of the sun's atmosphere. The corona is typically invisible from Earth, although it can be spotted during a total eclipse.

The new telescope uses a mask to block light from the sun, much like an eclipsing moon.

Explosions like the one caught by CCOR-1 are created by unstable contortions in the magnetic field of the sun, which cause it to expel hot plasma into its atmosphere. Sometimes these storms, called coronal mass ejections, are pointed toward Earth, generating scores of shimmering lights in our night skies.

"Aurorae are the most visible expression of space weather," Dr. Spann said. "It's like the icing on the cake."

But space weather can also have dire effects. Radiation from solar activity can harm astronauts on the International Space Station. It heats up Earth's atmosphere, affecting GPS satellites and other communications systems in orbit. It can also cause power grids to fail.

Earlier this month, NASA and NOAA announced that the sun had reached a peak in activity, which fluctuates in an 11-year cycle. A heightened number of solar storms could continue for the next year.

That makes it ever important for space weather forecasters to stay prepared, lest a particularly powerful blast of solar material knock out systems across a large portion of the world.

"It's not a matter of if," Dr. Spann said. "It's a matter of when a big one is going to occur."

Katrina Miller is a science reporter for The Times based in Chicago. She earned a Ph.D. in physics from the University of Chicago. More about Katrina Miller