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Article 1:

Fine structure in the ionospheric E-F valley revealed by the Sanya Incoherent Scatter Radar (SYISR)

Xu Zhou[1] and Xinan Yue[1]
[1]Astronomical Key Laboratory of Earth and Planetary Physics /Beijing National Observatory of Space Environment, Institute of Geology and Geophysics, Chinese Academy of Sciences (CAS), Beijing, China

Xu Zhou Xinan Yue

The lower ionosphere, especially the valley between the E- and F-layers (E-F valley), contains a variety of intriguing phenomena and also have significant impacts on radio communication and modern navigation. However, detecting the variability of the nighttime E-F valley is challenging for conventional ionosondes due to the low electron density and shielding by the high-density sporadic E (Es). Fortunately, the Sanya Incoherent Scatter Radar (SYISR), a modern phased array radar, has already been established and has started regular operation. The powerful measurement located in the low latitudes of East Asia (18.3°N, 109.6°E) can monitor the variability of the entire ionosphere with fine resolution

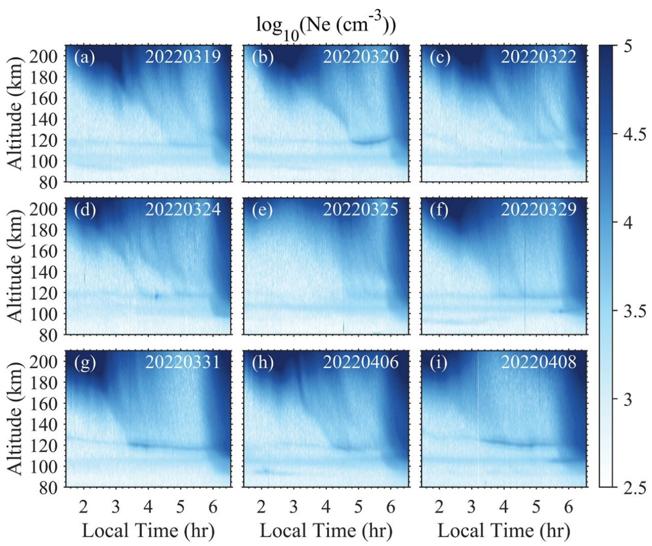

Figure 1. Individual cases of the "ionospheric drizzle" observed over Sanya.

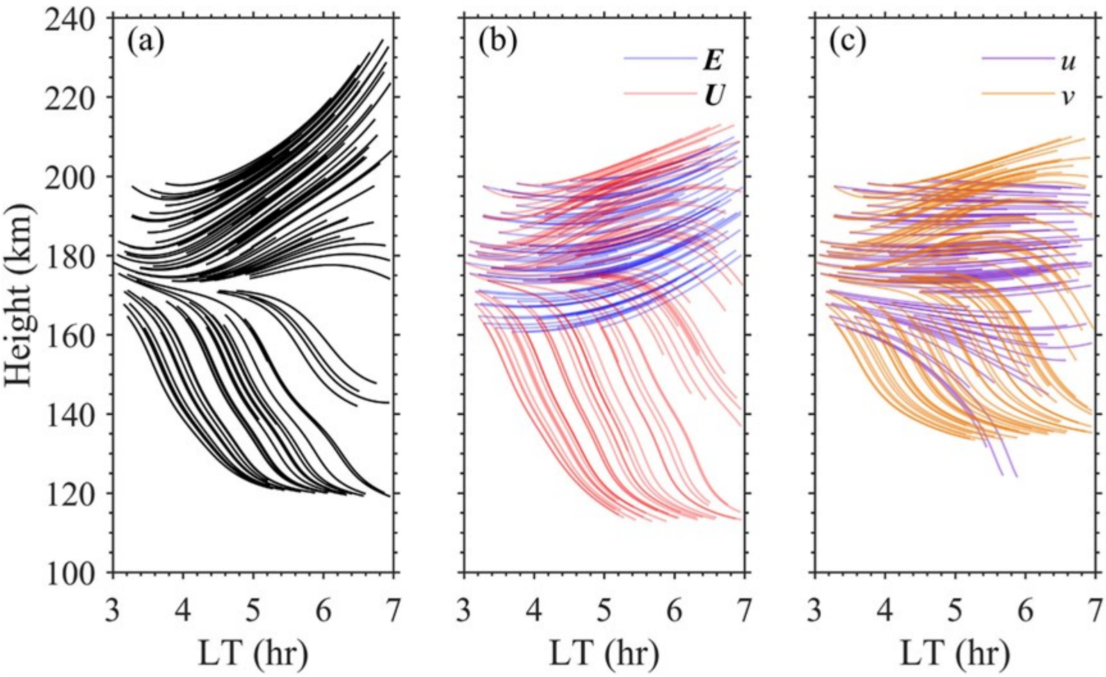

Figure 2. Testing particle trajectories in the plane of height and local time driven by (a) both neutral winds and E-fields, (b) solely factor of neutral wind (E-fields) plotted in red (blue) lines, and (c) zonal (meridional) winds plotted in purple (orange) lines.

and high sensitivity [1, 2]. In March–April 2022, a month-long continuous experiment profiled the ionosphere with the a density sensitivity of ~ 10^3 cm^{-3} and the resolution of 4.5 km vertically and 0.8 s temporally, thus providing an opportunity to shed light on what is happening in the E-F valley.

In this experiment, an intriguing phenomenon termed "ionospheric drizzle" was revealed, which manifests as plasma "streaks" that detach from the F-layer base and extend down to the Es layer, occurring around pre-dawn hours [3]. In Figure 1, the observed cases are displayed, including common features and individual variability. For all cases, the descent speed is ~10–20 m/s, and the plasma detached from the F-layer base generally takes over an hour to reach the Es layer at ~115–120 km. The electron density generally decreases by a factor of ten as the "ionospheric drizzles" descend before merging and enriching the Es layer. Not all cases manifest apparent periodical fluctuations at the F-layer base, and the magnitude of the influences on the Es layer are also varies.

Subsequently, a testing particle simulation was designed to elucidate the physical mechanism. A set of 100 individual ions was initially projected randomly distributed in 160–200 km heights with zero initial velocity. The ion trajectories were shown in Figure 2, and controlled simulations distinguished the effects of neutral winds and electric fields. The simulation showed that the neutral winds have the potential to generate a descending speed of ~10 m/s, which was similar in magnitude to the observations. Meridional winds play an important role in the plasma descent above 140 km, and zonal winds gradually take over below this level. The simulation also suggested that only the ion projected below ~170–180 km has the opportunity to descend further. At higher altitudes, the electrodynamical uplift becomes important. However, the triggering mechanism is still inconclusive and requires further investigation.

Overall, the SYISR ionospheric observations revealed an interesting phenomenon, "ionospheric drizzle", which is frequently observed in the E-F valley around dawn. The downward coupling process brings additional plasma to enhance the Es layer at ~115–120 km, thus having significance for space weather and solar-terrestrial physics.

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The first Solar Dynamics Observatory database in the Southern Hemisphere

Hannah Schunker[1], Simon O'Toole[2] and Raymond Burston[1]
[1]University of Newcastle, Newcastle, NSW, Australia
[2]Australian Astronomical Optics, Macquarie University, North Ryde, NSW, Australia


Hannah Schunker


Simon O'Toole


Raymond Burston

Introduction

NASA's Solar Dynamics Observatory [SDO, 2], launched in 2010, is a monitoring mission capturing full disk images of the Sun at a number of wavelengths with unprecedented spatial and temporal resolution. The Helioseismic and Magnetic Imager [HMI, 3] instrument onboard SDO observes the line-of-sight magnetic field, continuum intensity and Doppler velocity at the surface of the Sun in 4000×4000 pixel images every 45 seconds. The Atmospheric Imaging Assembly [AIA, 1] instrument observes the outer atmosphere of the Sun creating images at each of 10 different wavelengths every 10 seconds. The SDO has generated an enormous amount of data over its operational lifetime, making it necessary to store the data in a searchable database for efficient access.

The Data Record Management System DRMS was developed by the Joint Science Operations Center (JSOC) to archive and distribute data from the AIA and HMI instruments. The JSOC provides a remote version, NetDRMS, to non-JSOC institutions, so that those sites can take advantage of the JSOC-developed software to manage large amounts of solar data. The NetDRMS consists of two PostgreSQL databases and software to manage these components. Each data series contains the metadata in a searchable table (the DRMS) and points to the corresponding image FITS files stored in the associated Storage Unit Management System (SUMS).

The Australian Data Centre for SDO (OzSDO) is a NetDRMS installation, which primarily acts as a mirror for individual data series from the central SDO JSOC repository at Stanford. OzSDO downloads data-

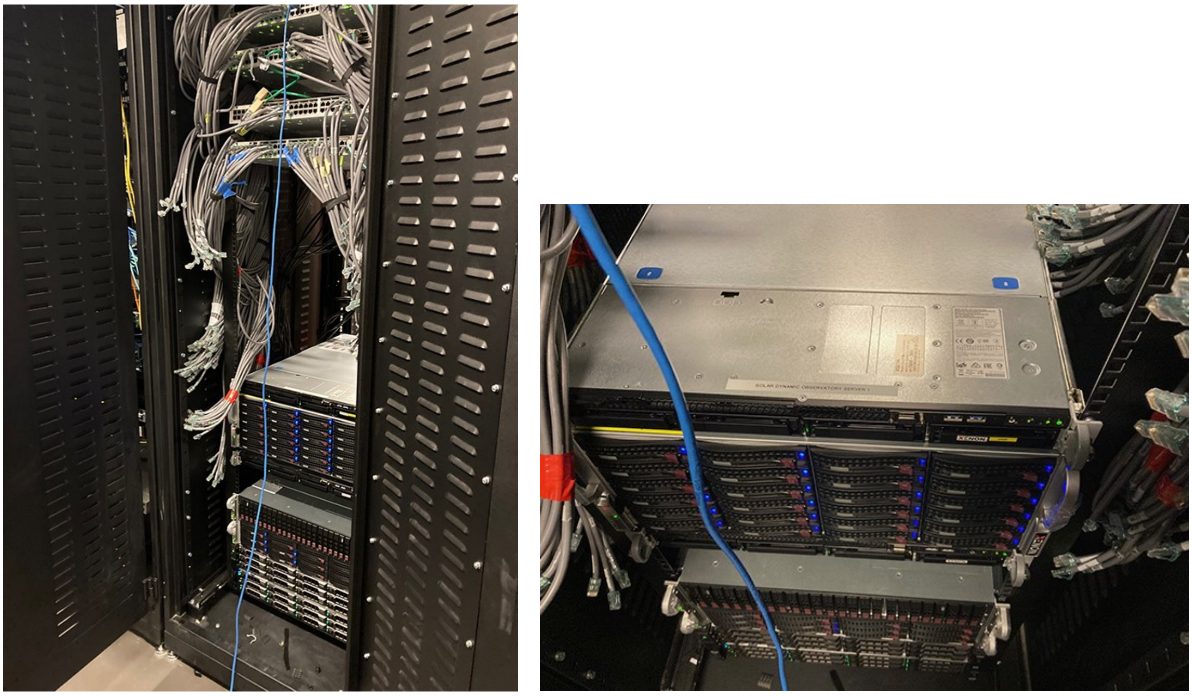

Figure 1. The first instalment of the hardware for Australian Data Centre for SDO, OzSDO, at Australian Astronomical Optics Data Central (Macquarie University) Australia (18 May 2023).

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base information and SUMS files for specified data series, and these files are then managed by the local SUMS. It currently contains the full meta-data for each of the HMI data series hmi.m_45s, hmi.v_45s, hmi.ic_45s, hmi.sharp_cea_720s, and aia.lev1, as well as the images for selected time periods under analysis. The NetDRMS at OzSDO is also capable of generating independent data series designed for post-processed data.

The hardware and infrastructure for the database is hosted at Australian Astronomical Optics Data Central at Macquarie University, a hub for telescope data in Australia. The OzSDO currently consists of a data server with 2 Intel Xeon Gold CPUs (32 cores), 128 GB RAM, 20 TB RAID5 HDD connected to a 216 TB data array and a compute server with two 3.1 GHz Intel Xeon Gold CPUs (32 cores total), 512 GB memory, and an additional 3.8 TB SSD local storage. We plan to expand the storage and compute capabilities over the next two years. Beyond 2027, it will be imperative to secure continued support to sustain the OzSDO service.

The advantage of hosting a local NetDRMS repository lies in the efficient read-write access for large-scale pipeline data analysis of SDO observations. However, it is not feasible to transfer and permanently store the complete catalogue of SDO observations. All analysis pipelines at the OzSDO must be designed to pull the necessary observations for a specific purpose, reduce the data for analysis, and when space is limited, purge the full disk observations from the local SUMS. Our immediate science goal is to build upon the SDO/HEARS [5, 4] data series, using helioseismology to understand the formation and evolution of magnetically active regions on the Sun. Access to the OzSDO is available to researchers in the Centre for Solar and Space Physics group at the University of Newcastle (Australia), and externally upon request.

The Solar Dynamics Observatory has been continuously collecting an enormous amount of high-resolution high-cadence observations for almost fifteen years. It is anticipated that observations will continue to be produced while the instruments remain functional. Having the first Solar Dynamics Observatory database in the southern hemisphere, places Australia in a position to exploit this extensive trove of solar observations. With comprehensive coverage spanning nearly two solar cycles, this extensive data series is ideally suited for constraining the physics driving the dynamics of solar magnetic activity, the solar cycle, and space weather.

Acknowledgements

The OzSDO was made possible with financial contributions by the SCOSTEP/ PRESTO 2023 database grant, the University of Newcastle's Women in Research 2022 program, and the Australian Research Council's Future Fellowship Award (project number FT220100330) and Discovery Project (project number DP230101240). We thank Art Amezcua and the SDO Team at Stanford University for their technical support in setting up the database. The authors acknowledge the Awabakal people and the Wallumattagal clan of the Dharug Nation, the traditional custodians of the unceded land on which we work and this database resides.

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Article 3:

The Importance of FAIRIES Observations with the LEONA Collaborative Network

Eliah F. M. T. São Sabbas[1, 2, 3]
[1]NASA Goddard Space Flight Center, Greenbelt, MD, USA
[2]The Catholic University of America, Washington, DC, USA
[3]National Institute for Space Research, São José dos Campos, São Paulo, Brazil

Eliah F. M. T. São Sabbas

About 30 years ago, humanity discovered that thunderstorms make more than lightning discharges, rain, and severe weather in the troposphere that impact us at the surface of the planet. By testing a low-light level camera for astronomical observations in 1989, researchers from Minnesota University recorded, for the first time, short duration plasmas in the upper atmosphere above thunderstorms [Franz et al., 1990], later named Sprites [Sentman et al. 1995]. Sprites were the first indication that the neutral Atmosphere, Ionosphere and Magnetosphere (AIM) system is electrodynamically coupled in an upward fashion. Sprites are only one type of Transient Luminous Events (TLEs) signaling this coupling, they are the most spectacular ones. All TLEs together, the most well-known being the halos, blue jets, gigantic jets and elves, span the whole region from the thundercloud tops to the bottom of the nighttime ionosphere (~15-105 km altitude). Shortly after we discovered the TLEs, we also found gamma-ray emissions from terrestrial origin in the data from Astrophysical satellites, whose sensors point to outer space [Fishman et al., 1994], the Terrestrial Gamma-Ray Flashes (TGFs). And, subsequently, that TGFs can create a cascade of energetic particles, including anti-matter, that propagate upwards to outer space and downwards to the ground: the High Energy Emissions from Thunderstorms (HEETs). The HEETs measured up to date are electron-positron pairs, neutrons, gamma-rays and X-rays. With measured energies from a few keV to 100 MeV, they are comparable to photons and other particles emitted by stars when they go supernovae, and the physics behind such energetic particles generation is still not completely understood. TLEs and HEETs are

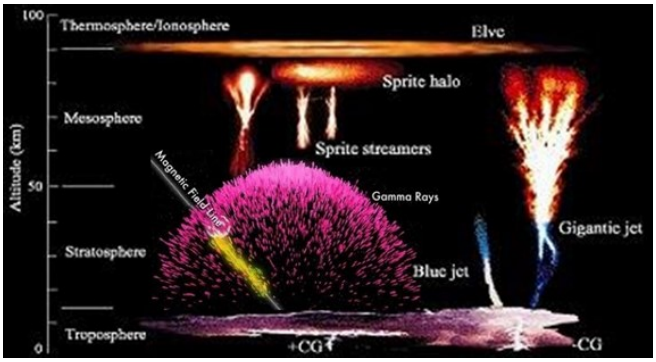

Figure 1. Illustration of main FAIRIES known to date (adapted from TARANIS team).

Figure 2. LEONA coverage since 2018: current stations (green), prospective (pink) and the newest one in the US (yellow, left).

the two types of E**F**fects Sign**A**l**I**ng the Elect**R**odynamic Coupl**I**ng between the Atmosphe**rE** and **S**pace (FAIRIES), illustrated in Figure 1. More recently, the UV spectrometer onboard NASA probe Juno showed TLE-like signatures in Jupiter [Giles et al., 2020], the first evidence that FAIRIES are not unique to Earth and may occur at any planet and moon with intense atmospheric electricity.

The discovery of FAIRIES revealed that transient plasmas and hard radiations produced in the neutral atmosphere of the Earth can contribute to space weather, given the modifications they create in the ionospheric electron density and magnetospheric particle population in the radiation belts. And since they are created by the meteorological systems' electrical activity, FAIRIES connect terrestrial weather and climate to space weather. This research becomes even more important in relationship with Climate Change. HEETs are ionizing radiation that may result in doses 100 times higher on people traveling in commercial airplanes than those recommended by the International Commission on Radiological Protection [*Dwyer et al., 2010; Desmaris*, 2015].

It was to investigate these contributions and to start accessing them quantitatively that the LEONA Net-

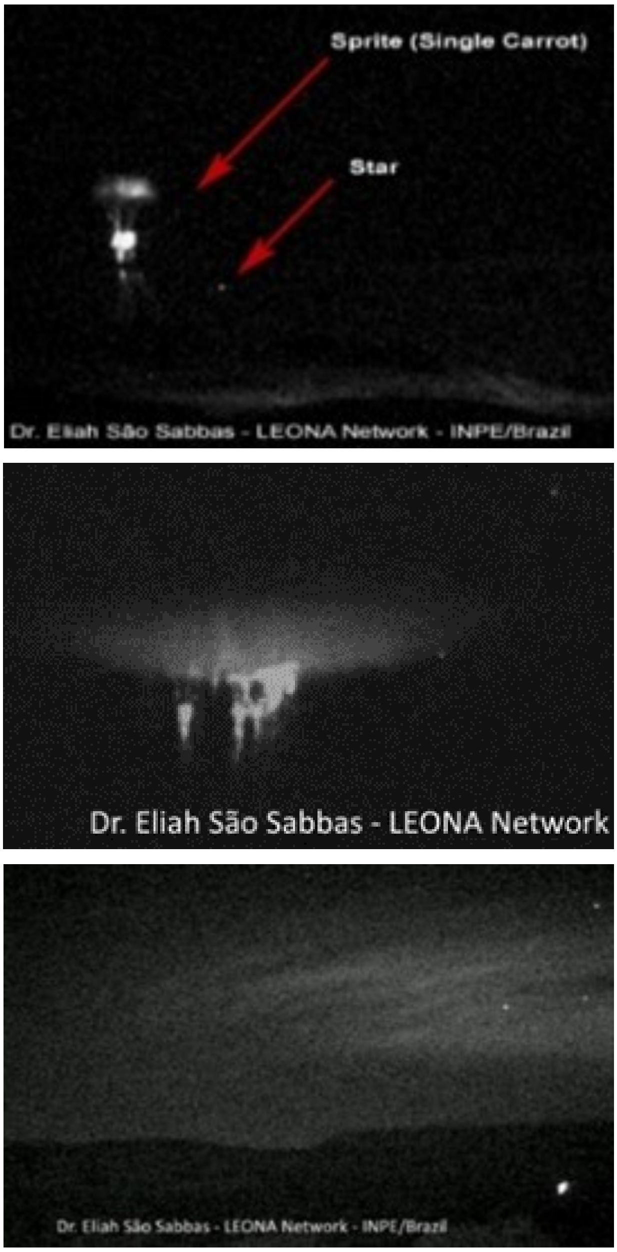

Figure 3. Examples of TLEs captured by LEONA: single carrot sprite in 2018, sprite-halo and elve in 2019.

work was created. LEONA is an acronym for *Transient Luminous Event and ThunderstOrm High Energy EmissioN CollaborAtive Network*. LEONA is a network of equipment and collaboration that was created in 2015 with the support of the São Paulo Research Foundation (FAPESP) in Brazil. LEONA has now 1 mobile HEET station with a neutron detector, and 8 ground-stations in South America, covering the region considered to be the home of the most severe thunderstorms in the world [*Zipser et al.*, 2006], therefore possibly the hottest FAIRIES region of the world [*São Sabbas et al.*, 2010], composed by Northern Argentina, Southern Brazil, Paraguay and Uruguay, and one station installed last year in New Mexico, USA, covering the region with the most intense convection in North America (Figure 2). Operated remotely from anywhere in the globe with internet connection by scientists and students that are part of the LEONA team, more than 1,000 Transient Luminous Events from more than 20 thunderstorms have been detected with the network equipment in these two American continents, South and North America, between 2018 and 2023 (e.g. Figure 3). In the long run, the data from this unique FAIRIES research platform will permit not only accessing the impact of FAIRIES in the Ionosphere and Magnetosphere, therefore their space weather contribution, but will also allow understating the similarity and differences between them in North and South America, the characteristics of the lightning and convective systems creating them in these two continents, their response to the solar cycle, and their climatology. The core of the LEONA network in South America also coincides with the heart of the South Atlantic Magnetic Anomaly (SAMA), which makes for a perfect natural laboratory to investigate space weather effects. The state-of-the-art knowledge generated by the analysis of the data collected with the LEONA network will significantly motivate FAIRIES inclusion in the Atmosphere-Ionosphere-Magnetosphere global models, such as the Whole Atmosphere Community Climate Model With Thermosphere and Ionosphere Extension (WACCMX), the Multiscale Atmosphere-Geospace Environment Model (MAGE) and others.

Acknowledgments:

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Highlight on Young Scientists 1:

Investigation of the Equatorial Ionosphere using HF Radar

Lalitha G Krishnan

Lalitha G Krishnan[1, 2]
[1]Vikram Sarabhai Space Centre, Thiruvananthapuram, Kerala, India
[2]University of Kerala, Thiruvananthapuram, Kerala, India

The complexity in accurately predicting the ionospheric dynamo region electric field arises on account of it being sensitive to perturbations from the lower atmosphere and magnetosphere. While the modulations in the tidal wind amplitudes & phases and the gravity wave activity originate from the lower atmosphere [1], the modulations in the field bought in by the Prompt Penetration Electric Field [2] and Disturbance Dynamo Electric Field [3] constitutes the magnetospheric contribution.

The continuous probing of this electric field is possible by means of backscatter radars. An indigenously developed coherent, monostatic and pulsed 18MHz HF radar was established at Thumba, India (8.5˚N, 77˚E and dip lat.=1.96˚N) thirty years ago [4]. This radar system underwent refurbishment recently and is being operated continuously during the daytime since July 2021. This is probably the only radar operating at HF frequency in the equatorial region for ionospheric studies. The transmitted signals are Bragg's scattered from the plasma irregularities having a scale size half the radar wavelength and embedded in the Equatorial Electrojet. The received signals are Doppler shifted depending upon the drift of these plasma irregularities. The east and west orientations of the radar beams help in separating out the zonal and vertical components of drift [5]. The zonal drift of the type-II plasma irregularities thus obtained is directly proportional to the dynamo region electric field [6]. The differences in HF radar measurements of drifts on a quiet and a magnetically disturbed day are illustrated in Figure 1. This radar is being used systematically to investigate the equatorial electrodynamics during varying geophysical conditions.

A collocated magnetometer and ionosonde aid and complement the radar-observed variability in the E -region and the understanding of its impacts in the F-region, respectively. Delineating the source of the perturbations by combining these observations with the model simulations and observations from multiple latitudes, therefore, is of particular interest.

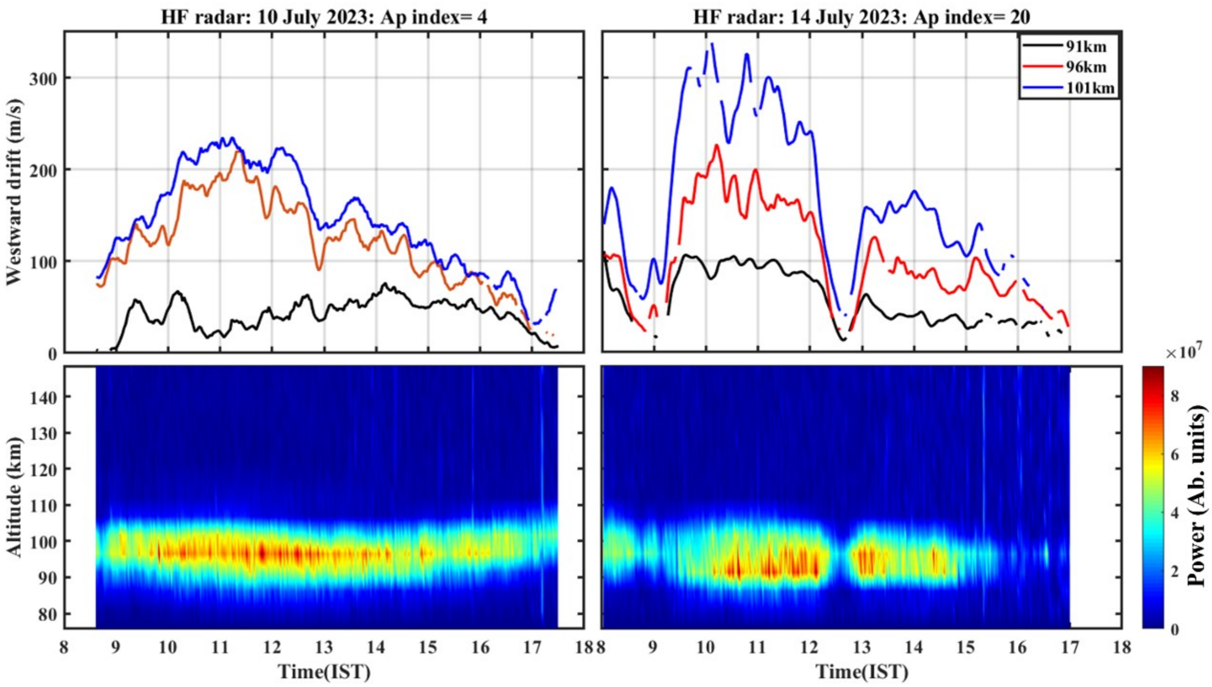

Figure 1. The temporal variation of daytime zonal drift derived from the doppler shift in the received signals and the strength of signals received on 10 July 2023 (quiet day) and 14 July 2023 (disturbed day).

Acknowledgements

I extend my gratitude to SCOSTEP Visiting Scholar program for providing me the opportunity to work with Dr. Kazuo Shiokawa, ISEE, Nagoya University, Japan. The visit had been for exploring the global aspects of the above-mentioned aspects of radar observations and extending the scope of my study. I also acknowledge Indian Space Research Organisation for providing research fellowship.

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Highlight on Young Scientists 2:

Probing the Sun's interior with inertial modes of oscillations

Yuto Bekki

Yuto Bekki[1]
[1]Max Planck Institute for Solar System Research, Göttingen, Germany

The Sun's interior can be studied with oscillations observed on the solar surface. The 5-min acoustic modes of oscillation have been used very successfully to measure, for example, the sound speed and the internal

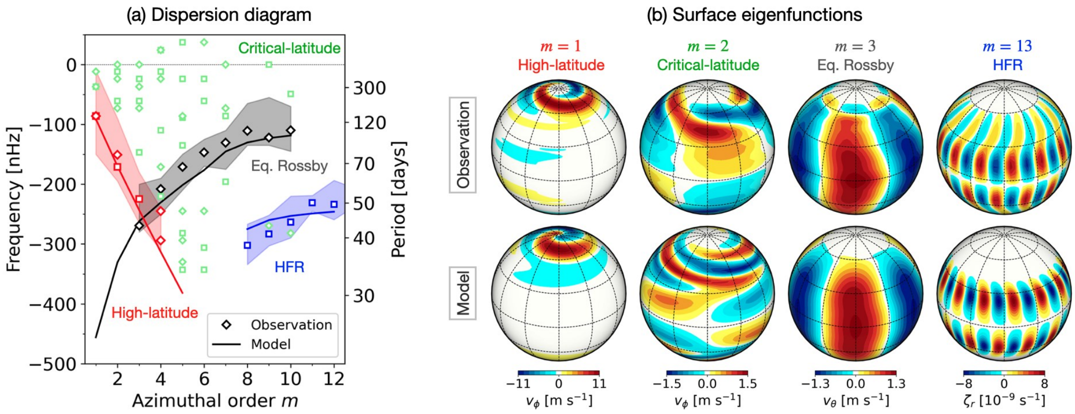

Figure 1. Observations and identification of the solar inertial modes. (a) Frequencies of the solar modes in the Carrington frame (rotating frame). The symbols show the observed frequencies of the high-latitude modes, the critical latitude modes (Gizon et al. 2021), the equatorial Rossby modes (Löptien et al. 2018), and the high-frequency retrograde modes (Hanson et al. 2022). The solid lines show the computed linear dispersion relations from the linear model. (b) Surface eigenfunctions of selected modes. Top and bottom rows show the observations (Gizon et al. 2021, 2024) and the model (Bekki et al. 2022a), respectively.

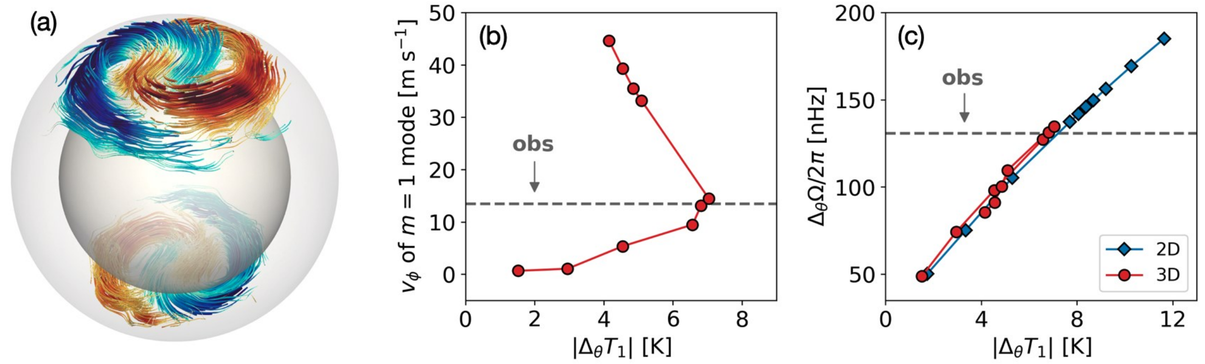

Figure 2. Results from nonlinear mean-field simulations by Bekki et al. (2024). (a) Visualisation of the streamlines of the baroclinically-unstable high-latitude inertial mode. (b) Relationship between the latitudinal temperature difference in the middle of the convection zone and the velocity amplitude of the m=1 baroclinically-unstable mode. (c) Relationship between the latitudinal temperature difference and the latitudinal differential rotation, showing that the Sun's differential rotation reaches its maximum allowed value (red symbols). The blue symbols

differential rotation. Dozens of low-frequency modes of inertial oscillations, whose restoring force is the Coriolis force, were recently observed (Löptien et al. 2018, Gizon et al. 2021). These modes have periods of order the solar rotation period. Their identification was made possible with a numerical computation of the linear eigenmodes of oscillations of the Sun's differentially-rotating convection zone (Bekki et al. 2022a, 2022b). Figure 1 compares the observed properties of solar inertial modes with those from our linear model.

Our model indicates that most solar inertial modes are linearly stable. Despite their small velocity amplitudes, these modes have significant diagnostic potential for probing the Sun's deep interior. Observations of solar inertial modes now allow us to constrain previously-inaccessible physical parameters, such as turbulent viscosity and superadiabaticity (Bekki et al. 2022a, Bekki 2024), which are hardly constrained by acoustic modes.

Furthermore, some inertial modes are found to play a significant role in the Sun's internal dynamics. Our recent study shows that the high-latitude inertial modes are baroclinically unstable and thus regulate the latitudinal temperature gradient by transporting heat toward the equator (Bekki et al. 2024). This negative feedback process controls the amplitude of differential rotation via the thermal wind balance, as depicted in Figure 2.

In summary, a series of our studies has paved a new way to probe the Sun's interior using inertial modes (see Gizon et al. 2024 for a review). We aim to further advance this new field of "inertial mode helioseismology" by analysing more observational data and refining numerical models.

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Meeting Report 1:

388 IAU Symposium- Solar and Stellar Coronal Mass Ejections

Grzegorz Michalek

Grzegorz Michalek[1]
[1]Catholic Astronomical Observatory of the Jagiellonian University

From May 5 to May 10, 2024, an international symposium organized by the Jagiellonian University under the patronage of IAU (388 IAU Symposium-Solar and Stellar Coronal Mass Ejections) was held in Krakow (https://iausymposium.zyrosite.com). Dr. Nat Gopalswamy, a scientist from NASA GSFC, served as the chairman of the scientific organizing committee. Around 140 participants that included scientists and students attended the conference in-person. A total of about 90 talks were delivered and 57 posters were presented. The first day of the conference was dedicated to a school for young scientists. It included seven specialist lectures. This school had 28 participants. Also, two popular science lectures were held. A major outcome of the IAU Symposium was community engagement and development of new collaborations among participants. which will enhance capacity building efforts, especially in developing countries. The Organizing Committee is grateful to IAU, The Ministry of Science and Higher Education Republic of Poland, SCOSTEP/PRESTO and NASA GSFC for supporting the conference activities.

Figure 1. A group photo of the participants of 388 IAU Symposium.

Meeting Report 2:

TRENDS 2024

Juan A. Añel

Liying Qian

Laura de la Torre

Juan A. Añel[1, 2, 3], **Liying Qian**[2, 4], **Laura de la Torre**[1, 2, 3]
[1]Local Organizing Committee
[2]Scientific Organizing Committee
[3]EPhysLab, CIM-UVigo, Universidade de Vigo, Ourense, Spain
[4]High Altitude Observatory, NCAR, Boulder, CO, USA

The 12th International Workshop on Long-Term Changes and Trends in the Atmosphere was held at Universidade de Vigo in Ourense, Galicia, Spain, with 75 scientists from around the world. The event focused on long-term atmospheric changes in the stratosphere, mesosphere, thermosphere, and ionosphere using satellite and ground-based observations and modeling. Sixty-one oral and poster presentations were delivered, with seventeen presented online in a hybrid format. All presentations were recorded and are available online for registered participants, along with slides and posters. The workshop's outcomes will be disseminated through a special issue in Annales Geophysicae to maximize their impact within the scientific community. More details and the full program can be found on the workshop's website: trends2024.uvigo.es.

Figure 1. Group photo of attendants to the workshop on the morning of Monday 6 May 2024.

Meeting Report 3:

The ESPD summer school

Istvan Ballai[1] and Mateja Dumbović[2]
[1]University of Sheffield, Sheffield, UK
[2]Hvar Observatory, Faculty of Geodesy, University of Zagreb

Mateja Dumbović

Istvan Ballai

The 1st European Solar Physics Division (ESPD) summer school intended to PhD students carrying out research in the field of solar and solar-terrestrial physics was organised in the period 29/04-03/05 2024 in Dubrovnik, Croatia. The theme of the school focussed on "Energisation and heating in the solar plasma", outlining the mechanisms which may operate to produce the solar wind, to heat the corona and to drive the transient events observed in the solar atmosphere, such as flares and coronal mass ejections. The school was organised by ESPD led by the president Istvan Ballai, with Mateja Dumbovic from Hvar Observatory Croatia as the main local organiser. The school hosted 10 lecturers and 31 students from 14 different countries and was sponsored by SCOSTEP and European Space Agency. More information can be found at the school website: https://oh.geof.unizg.hr/index.php/en/meetings/espd-school-2024

Figure 1. A group photo of the participants and some of the lecturers.

Meeting Report 4:

UN/Germany Workshop on ISWI

Daniela Banyś[1]
[1]German Aerospace Center (DLR), Neustrelitz, Germany

Daniela Banyś

The United Nations / Germany Workshop on the International Space Weather Initiative: Preparing for the Solar Maximum organized by the United Nations Office for Outer Space Affairs (UNOOSA), and supported by the Institute for Solar-Terrestrial Physics of the German Aerospace Center (DLR-SO) and the International Committee on Global Navigation Satellite Systems (ICG), was held in Neustrelitz, Germany from 10 to 14 June 2024. We thank SCOSTEP/PRESTO for their support and contribution to a successful workshop. With a total of 85 participants from over 30 different countries the workshop encompassed over 50 talks and 17 posters.

The aim of ISWI is to strengthen international coordination and cooperation on space weather products and services, e.g., deployment of instruments and supporting research in developing nations. It serves as platform for developing operational analysis, modelling, and forecasting methods. Further material can be found here: https://www.unoosa.org/oosa/en/ourwork/psa/schedule/2024/2024-iswi-workshop.html

Figure 1. Group photo of the excursion to the Historical Technical Museum in Peenemünde.

Meeting Report 5:

The Combined 9th Meeting on Vertical Coupling in the Atmosphere-Ionosphere System (VCAIS) and the 6th ANtarctic Gravity Wave Instrument Network Meeting (ANGWIN)


William Ward

William Ward[1] and the Scientific Organizing Committee
[1]University of New Brunswick, Fredericton, Canada

This year, the biennial Vertical Coupling in the Atmosphere-Ionosphere System (VCAIS and the Antarctic Gravity Wave Instrument Network Meeting (ANGWIN) groups joined for a meeting from June 2 -7 at the University of New Brunswick in Fredericton, NB , Canada. The objective of the meeting was to provide a venue for discussions and collaborations between scientists involved in studying the coupling and associated mechanisms linking the atmosphere, ionosphere and magnetosphere. The meeting was attended by over 30 participants (close to half were students or early career scientists). Five tutorial sessions were held which covered the observation techniques and phenomena of importance to understanding coupling processes linking the upper atmosphere/ionosphere to the lower atmosphere. 27 scientific papers were presented and a special issue for the meeting is being organised. The organizers are grateful for the financial support from SCOSTEP/ PRESTO/ IUGG/IAGA and the University of New Brunswick which made this meeting possible.

Figure 1. A group photograph of the participants at the VCAIS/ANGWIN Meeting in Fredericton, Canada (Missing L. Chang). (Photograph courtesy of A. Issawi.)

Upcoming meetings related to SCOSTEP

Conference	Date	Location	Contact Information
International Colloquium on Equatorial and Low Latitude Ionosphere (ICELLI) 2024	Jul. 29-Aug. 2, 2024	Ile-Ife, Nigeria	https://arcsstee.org.ng/international-colloquium/
XXXII IAU General Assembly	Aug. 6-15, 2024	Cape Town, South Africa	https://astronomy2024.org/
11th SCAR Open Science Conference	Aug. 19-23, 2024	Pucón, Chile	https://scar.org/scar-news/osc2024-draft-list
A COSPAR CAPACITY BUILDING WORKSHOP	Aug. 19-30, 2024	Samarkand, Uzbekistan	https://cospar2024samarkand.samdu.uz/index.php
THE ORGANISATION OF A SCIENTIFIC CONFERENCE: Second Solar MHD conference: Informing MHD simulations from observations	Sep. 2-5, 2024	Tenerife, Spain	https://pdg.sites.sheffield.ac.uk/seminars-and-conferences/solar-mhd-2024
16th International Workshop on Technical and Scientific Aspects of iMST Radar and Lidar (MST16/iMST3)	Sep. 9-13, 2024	Kühlungsborn, Rostock, Germany	https://www.iap-kborn.de/en/news/events/mst16/
ESPM-17	Sep. 9-13, 2024	Turin, Italy	https://indico.ict.inaf.it/event/2553/
2024 ISWI International School	Sep. 16-20, 2024	Kathmandu, Nepal	https://nps.org.np/
Space Weather and Upper Atmospheric Data analysis Training Workshop for East African Community	Sep. 23-27, 2024	Maseno, Kenya	
11th VERSIM Workshop	Sep. 30-Oct. 4, 2024	Breckenridge, Colorado, USA	https://ccar.colorado.edu/versim2024/
Organization of the Ninth International Space Climate Symposium (SC9)	Oct. 1-4, 2024	Nagoya, Japan	https://www.isee.nagoya-u.ac.jp/~spaceclimate9/
Solar cycle variability: From understanding to making prediction	Oct. 14-18, 2024	Nainital, India	
European Space Weather Week	Nov. 4-8, 2024	Coimbra, Portugal	https://esww2024.org/

Please send the information of upcoming meetings to the newsletter editors.

Announcement 1:

SCOSTEP 2024 Distinguished Scientist Award

SCOSTEP is pleased to announce that the

2024 Distinguished Scientist Award is given to

Professor Jie Zhang

George Mason University, Fairfax, VA, USA

Jie Zhang

Citation: Prof. Jie Zhang has made outstanding contributions to our understanding of the solar eruptions and coronal mass ejections, and their geoeffectiveness. He established a clear solar-terrestrial causal-effect chain for coronal mass ejections.

Prof. Jie Zhang obtained BSc in astronomy from the University of Nanjing, China in 1990, MSc in astrophysics from the Chinese Academy of Sciences in 1993, and PhD from the University of Maryland, USA in 1999. He is full professor at the Department of Physics and Astronomy of George Mason University.

He has made outstanding contributions to our understanding of the solar eruptions and their geoeffectiveness using EUV, white light and radio observations and in-situ solar wind plasma and magnetic field measurements. His research work has provided insights on the formation of flux ropes in coronal mass ejections (CMEs), the relationship between CMEs and flares, and solar and interplanetary causes of geomagnetic storms, and tackled many puzzles in the formation of the flux rope in CMEs, the relationship between CMEs and flares, and solar and interplanetary causes of geomagnetic storms. He established a clear solar-terrestrial causal-effect chain of CMEs. For the first time, he presented the clear temporal correlation between CMEs and flares, clearly depicting how the two most powerful solar eruptive phenomena are coupled. This finding was checked and confirmed by many follow-up studies. Another important contribution of Prof. Jie Zhang was on the solar and interplanetary sources of major geomagnetic storms. In addition to the aforementioned contributions, he also carried out many pioneer works on the formation of magnetic flux rope in the low corona during a CME, the eruptive and confined flares, the magnetic helicity budget for CMEs and so on. All these studies made significant contributions to the research field of solar-terrestrial physics and earned his high reputation in the community.

He has an excellent publication record with 8209 citations (h-index 46). His 2001 paper on the temporal relationship between CMEs and flares has nearly 800 citations. His 2005 paper on the solar and interplanetary sources of major geomagnetic stores has nearly 700 citations. He has a strong record of teaching students, and has mentored 13 PhD students. He is the associate chair of research at George Mason University Department of Physics and Astronomy. He also co-founded the Space Weather Laboratory at George Mason University.

He has provided excellent leadership and support to SCOSTEP, serving as the chair of SCOSTEP/VarSITI/ISEST program from 2013-2018. He is the current co-chair of SCOSTEP PRESTO program and serves as the vice chair of the COSPAR Commission (2020-2024).

For all of his accomplishments, Professor Jie Zhang has contributed at the highest level within the field of SCOSTEP science and he is most deserving of the SCOSTEP Distinguished Scientist Award.

Announcement 2:

SCOSTEP 2024 Distinguished Young Scientist Award

SCOSTEP is pleased to announce that the

2024 Distinguished Young Scientist Award is given to

Man Hua

Dr. Man Hua

UCLA, Los Angeles, CA, USA

Citation: Her work has made fundamental contributions to the understanding of the nature and interaction of various plasma waves by using complex numerical simulations of radiation belt dynamics with global diffusion codes and observations of plasma waves from spacecraft such as the Van Allen Probes.

Dr. Man Hua obtained B.Eng degree from the School of Electronic Information, Wuhan University, China, in 2016 and her PhD degree from the Department of Space Physics, Wuhan University in 2021. Since July 2021 she has been working as a postdoctoral scholar in the Department of Atmospheric and Oceanic Sciences, UCLA, Los Angeles, USA.

She received her PhD 3 years ago. Her work focuses on the Earth's Van Allen radiation belts. Her work has made fundamental contributions concerning the nature and interaction of various plasma waves by using complex numerical simulations of radiation belt dynamics with global diffusion codes and observations of plasma waves from spacecraft such as the Van Allen Probes. Her 2022 paper 'Upper Limit of Outer Radiation Belt Electron Acceleration Driven by Whistler-Mode Chorus Waves' addresses the question first posed in 1966: 'How intense could the radiation belt ever get?'. The answer was limited by observations available at the time. Dr. Hua developed a new theory testing using current and recent observations showing how and why the radiation belt fluxes achieve their uppermost values. Her exceptional research is highly productive with an excellent publication record. She has published 35 peer-reviewed research articles, with 13 as the lead author. These publications have more than 500 citations. She succeeded in winning an NSF grant, on which she is the principal investigator. She has won a number of awards including Best PhD Dissertation award (one of only five); outstanding final-year graduate student, IAGA early career award, Academic Star Award (1 of only 8, School of Electronic Information, Wuhan University), outstanding poster and student presentations Award, and UCLA Chancellor's Award for Postdoctoral Research. She is a member of the American Geophysical Union, European Geosciences Union and Chinese Geophysical Society.

For all of these accomplishments, Dr. Man Hua is most deserving of the SCOSTEP Distinguished Young Scientist Award.

The purpose of the SCOSTEP/PRESTO newsletter is to promote communication among scientists related to solar-terrestrial physics and the SCOSTEP's PRESTO program.

The editors would like to ask you to submit the following articles to the SCOSTEP/PRESTO newsletter.

Our newsletter has five categories of the articles:

1. Articles— Each article has a maximum of 500 words length and four figures/photos (at least two figures/photos). With the writer's approval, the small face photo will be also added. On campaign, ground observations, satellite observations, modeling, etc.
2. Meeting reports—Each meeting report has a maximum of 150 words length and one photo from the meeting. With the writer's approval, the small face photo will be also added. On workshop/conference/ symposium report related to SCOSTEP/PRESTO
3. Highlights on young scientists— Each highlight has a maximum of 300 words length and two figures. With the writer's approval, the small face photo will be also added. On the young scientist's own work related to SCOSTEP/PRESTO
4. Announcement— Each announcement has a maximum of 200 words length. Announcements of campaign, workshop, etc.
5. Meeting schedule

Category 3 (Highlights on young scientists) helps both young scientists and SCOSTEP/PRESTO members to know each other. Please contact the editors if you know any recommended young scientists who are willing to write an article on this category.

TO SUBMIT AN ARTICLE

Articles/figures/photos can be emailed to the Newsletter Secretary, Ms. Mai Asakura (asakura_at_isee.nagoya-u.ac.jp). If you have any questions or problem, please do not hesitate to ask us.

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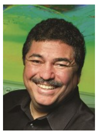
Editors:

Kazuo Shiokawa (shiokawa_at_nagoya-u.jp)
SCOSTEP President,
Center for International Collaborative Research (CICR),
Institute for Space-Earth Environmental Research (ISEE), Nagoya University,
Nagoya, Japan

Keith Groves (keith.groves_at_bc.edu)
SCOSTEP Scientific Secretary,
Boston College, Boston, MA, USA



Ramon Lopez (relopez_at_uta.edu)
PRESTO chair,
University of Texas at Arlington, TX, USA

Newsletter Secretary:

Mai Asakura (asakura_at_isee.nagoya-u.ac.jp)
Center for International Collaborative Research (CICR),
Institute for Space-Earth Environmental Research (ISEE), Nagoya University,
Nagoya, Japan