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* ISWI Newsletter - Vol. 16 No. 010 15 OCT 2024 *
* Editor: George Maeda, georgemaeda3[at]gmail.com
* Archive of back issues: ISWI Website https://iswi-secretariat.org/
* Archive of all ISWI webinars:
* https://www.youtube.com/playlist?list=PLaOqa4cng0GF3cKuj6Yz5kqG1BQ-Akkhr
* 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:

[08] SCHOOL IMAOC6: International Space Weather Initiative
. Maghreb Africa West and Central, Conakry
. 14-25 October 2024

[09] An Overview of Space Weather Research;
. Dr. Bob Weigel, Professor and Director of Space Weather Lab,
. George Mason University; presentation during ION GNSS+,
. 16 Sept 2024.

[10] Recording of a ISWI webinar is now available:
. Dr. Matthew West – *"Exploring the Middle Corona (the Second Coronal Transition Region)"*
. which took place on Wednesday, 25 September 2024.

[11] *"Northern Lights Animate Night Skies Around the Globe*",
. THE NEW YORK TIMES, 11 Oct 2024

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

This is the website for ISR:
https://www.bc.edu/bc-web/research/sites/institute-for-scientific-research.html

ISR runs a seminar series. It has roughly two seminars per month.

ISR is a two-hour train ride from where I live.
So I attended the opening seminar and created this photo report.

See the 10-page photo report:
PHOTO REPORT on the Boston College ISR seminar of 10 Oct 2024.pdf
001

All readers are invited to attend events and send in event photo reports.

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

FROM: Maria Graciela Molina
TO: ISWI Newsletter
DATE: Oct 10, 2024, 8:05 AM (23 hours ago)

Dear ISWI colleagues,

We are pleased to announce the next ISWI Webinar by Dr Raffaella D'Amicis scheduled for October 30th, 2024 at 3 PM Central European Time (9 AM EDT; 6:30 PM IST).

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.

Please remember that the seminars will be recorded. The playlist with the previous seminars, which will also include future sessions, can be accessed through the following link:
https://www.unoosa.org/oosa/en/ourwork/psa/bssi/iswi_webinars.html

Looking forward to meeting you in 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:
Is there a relationship between solar wind Alfvénic turbulence and magnetospheric dynamics? What Solar Orbiter observations can help with?

Speaker: Raffaella D'Amicis
Institute of National Astrophysics (INAF)
– Institute for Space Astrophysics and Planetology (IAPS)

Abstract:

The very first observations by Mariner 5 highlighted the presence of Alfvénic fluctuations in the solar wind identified as almost incompressible fluctuations accompanied by large correlations between velocity and magnetic field components as predicted by the Magnetohydrodynamics theory.

Alfvénic fluctuations are thought to play a major role in regulating wave-particle interactions, and determining the presence of anisotropies and beams in ion velocity distribution functions (VDFs) and ion drift. These are very common features in the solar wind, especially in the main portion of fast wind streams.
More generally, they are thought to be a fundamental element in different Heliospheric processes, such as solar wind heating and acceleration, energetic particle acceleration, and cosmic-ray propagation.

In addition, since the solar wind and the magnetosphere interact continuously, thus constituting a coupled system, Alfvénic fluctuations might also play a relevant role in the geomagnetic response, in the absence of solar transient events, although still determining strong variations in the geomagnetic field.

Within this context, after presenting previous statistical studies showing a relationship between Alfvénic turbulence and the geomagnetic response, we explore the possibility to take advantage of observations of Alfvénic solar wind streams by the ESA/NASA Solar Orbiter mission, with particular reference to periods of the orbit when the s/c crosses the Sun-Earth line. In these particular conditions, Alfvénic streams reaching the Earth are expected to be geoeffective. The combined observations by Solar Orbiter and s/c at L1 will allow to study the radial evolution of the turbulent features of Alfvénic streams and their geoeffectiveness.

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

See the 1-page event flyer:

Flyer for the ISWI webinar of 30 Oct 2024.pdf
002

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

This photo report covers the new installation of the MAGDAS magnetometer
in Indonesia during March of 2024. Members of the installation team
are:

From Host Institute (Brawijaya University, INDONESIA)
* Prof. Dr. Sukir Maryantos, Vice-Dean of the Faculty
  of Mathematics and Natural Sciences

From NRIAG (National Research Institute of Astronomy & Geophysics), EGYPT
* Dr. Emad Takla, PhD degree awarded by Kyushu University in 2012

From Kyushu University, JAPAN
* Dr. Shuji Abe, PI of the MAGDAS Project
* Mr. Tateishi Kouki, 2nd-year masters student
* Dr. Kirolosse Girgis, member of i-SPES

See the 17-page photo report:
Photo report of MAGDAS installation during March 2024 in Indonesia.pdf
003

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

Summary report about:
"*International Space Weather Initiative Europe-Africa*"

By:
Christine Amory-Mazaudier[1], Daniela Banys[2], Babatunde Rabiu[3]

[1] Sorbonne Université, Ecole polytechnique, InstitutPolytechnique de Paris, Université Paris Saclay, Observatoire de Paris, CNRS, Laboratoirede Physique des Plasmas (LPP), 75005 Paris, France

[2] German Aerospace Center(DLR) Institute for Solar-Terrestrial
Physics Space Weather Observations

[3] UN-ARCSSTE-E, Obafemi Awolowo University Campus, Ile Ife, Nigeria
(at the time of writing)

See the 26-page report:
ICMP_Brazil-2024.pdf
004

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

********** This is a request for information **********

FROM: PD Dr. Christian Bartsch

TO: George Maeda, ISWI Newsletter editor.
DATE: 7 Oct 2024

Dear George,

since many years we have been following the Nobeyama Solar Radio Observatory which is now unfortunately closed:

https://solar.nro.nao.ac.jp/index_nsro_last.html

For the evaluation and subsequent publication of our biological experiments on melatonin we would require older data which can be found on the ftp-server of Nobeyama:

ftp://solar-pub.nao.ac.jp/pub/nsro/

Unfortunately, our present Windows versions do not easily allow access to ftp-sites and we are not big computer experts.

Do you happen to know who could help us to obtain access to those unique solar data recorded at different GHz levels (1 - 17 GHz)? We have printed some of them out but would need full access since it looks that very high frequencies emitted by the sun correlate best with nocturnal melatonin.

Thanking you for any advice in this matter and with best regards from Germany

Christian

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

FROM: Prof. Babatunde Rabiu
TO: The ISWI Newsletter
DATE: 8 OCT 2024

Subject: Meeting Report on 2024 International Colloquium on Equatorial and Low Latitude Ionosphere (ICELLI)

Dear Wiseman,

The eighth edition of the International Colloquium on Equatorial and Low Latitude Ionosphere (ICELLI) was held as an hybrid event with physical event at the Mountain Top University, Prayer City, Ogun State, Nigeria, from 29 July to 2 August 2024. At prime, 25 physical and 49 virtual participants from 19 countries participated in the Colloquium which was co-organized by International Space Weather Initiative and other multiple organisations

The 8th edition like others, featured lectures, tutorials and hand on sessions on topics geared towards understanding of the Sun and its impact on space weather; the dynamics of the equatorial ionosphere, and how space weather impact on space-dependent technologies.

All lecture notes are available for downloading at:
https://mega.nz/folder/wzc1SI4a#P5lbLffUXHdPW4wFNYC_hA

A full report on the meeting is attached as pdf for wide circulation.

Thanks for consistency,
Babatunde

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Professor Babatunde Rabiu FAS
Research Director: National Space Research and Development Agency
Professor: Institute of Space Science & Engineering
African University of Science and Technology
Physical Address:
Obasanjo Space Centre,
Km 17 Umaru Musa Yar'Adua Road
Abuja 900107, FCT, Nigeria
Email: tunderabiu2@gmail.com; tunderabiu@yahoo.com
Telephone: +234 803 070 5787

See the full 17-page report on the meeting:
Report_ICELLI 2024_FINAL_Combined file.pdf
005

[07]----------

FROM: Prof. Rabiu
TO: ISWI Newsletter
DATE: 8 Oct 2024
Subject:
ISWI News: Dr. Daniel Okoh Receives AGU Africa Award
for Research Excellence in Space Science

Dear Wiseman,

Dr. Daniel Okoh, a researcher at the Space Environment Research Laboratory, National Space Research and Development Agency (NASRDA), has been awarded the prestigious Africa Award for Research Excellence in Space Science by the American Geophysical Union (AGU). This award, one of the highest honors for early/mid-career African scientists, recognizes Dr. Okoh's outstanding contributions to space weather research, particularly in ionospheric modeling and its applications for the African continent. The Award shall be officially presented at the Annual Conference of AGU holding in December 2024 at Washington DC, USA.

Detailed information about the award can be found in the attached pdf document.

Best regards
Babatunde

See the details of the award:
Okoh_AGU Award ISWI_Announcement_.pdf
006

[08]----------

Submitted by Dr Christine Amory.

SCHOOL IMAOC6: International Space Weather Initiative
Maghreb Africa West and Central, Conakry
14-25 October 2024

See the one-page flyer:
School-Guinea.pdf
007

[09]----------

Submitted by G. Maeda.

Dr. Bob Weigel, Professor and Director of Space Weather Lab, George Mason University, discussed aspects of space weather during ION GNSS+ conference in Baltimore, Maryland, on 16 Sept 2024.

See one-page photo report:
16-sept; Talk by Dr Bob Weigel.pdf
008

[10]----------

RE: ISWI Webinar 19, 25 September 2024 - RECORDING AVAILABLE
DATE: 27 Sept 2024

Dear ISWI participants,

The United Nations Office for Outer Space Affairs is pleased to inform you that the recording of the nineteenth webinar of the International Space Weather Initiative,

Dr. Matthew West – *"Exploring the Middle Corona (the Second Coronal Transition Region)"*

which took place on Wednesday, 25 September 2024, is now available on the YouTube channel of the Office:
https://youtu.be/n3YYYs_1pVs

The current, as well as all previous ISWI webinar sessions, can be accessed through the website of the Office at:
https://www.unoosa.org/oosa/en/ourwork/psa/bssi/iswi_webinars.html

Best regards,
Patrick Gindler
Executive Secretariat of the International Committee on Global Navigation Satellite Systems (ICG)
UNOOSA

[11]----------

Submitted by G. Maeda.

On 11 Oct 2024, **The New York Times** ran an article on the recent aurora shows around the world.

See selected photos from The New York Times:
NYT on aurora sights during the week of 7-OCT-2024.pdf
009

This is the link to the NYT article:
https://www.nytimes.com/2024/10/11/science/northern-lights-world-photos.html?searchResultPosition=1
But to read it you need to be a NYT digital subscriber.

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

PHOTO REPORT on the Boston College ISR seminar of 10 Oct 2024

BOSTON COLLEGE ISR
INSTITUTE FOR SCIENTIFIC RESEARCH

BOSTON COLLEGE

This 10-page document was created on 10-Oct-2024 by George Maeda (Editor of the **ISWI Newsletter**) after he attended this seminar on the Newton Campus of Boston College.

ABOUT PEOPLE EVENTS & CONFERENCES RESEARCH OUTREACH

ISR Seminars

SITES » INSTITUTE FOR SCIENTIFIC RESEARCH » EVENTS & CONFERENCES » ISR SEMINARS

EVENTS & CONFERENCES

- ISR Seminars
- Past ISR Events
- BSS2022
- IES2023

Current Seminars

The ISR Seminar Series typically takes place on **Thursdays at 10:30 a.m.**, in the ISR Conference Room, 202 Kenny Cottle Hall, 885 Centre St., Newton Campus of Boston College (click here for directions). Please join us for light refreshments at 10:15 a.m. To be added to the email announcements for the current series, contact Ted Beach (theodore dot beach at bc dot edu).

Please check back regularly as additional seminars may be added.

Upcoming Schedule

See the next page

https://www.bc.edu/bc-web/research/sites/institute-for-scientific-research/events-conferences/isr-seminars.html

Thu, 10 Oct 2024, 10:30a ET
Ionospheric Model Validation for High Frequency Communications
Dr. Greg Ginet, MIT-Lincoln Lab

THIS PHOTO REPORT COVERS THIS SEMINAR

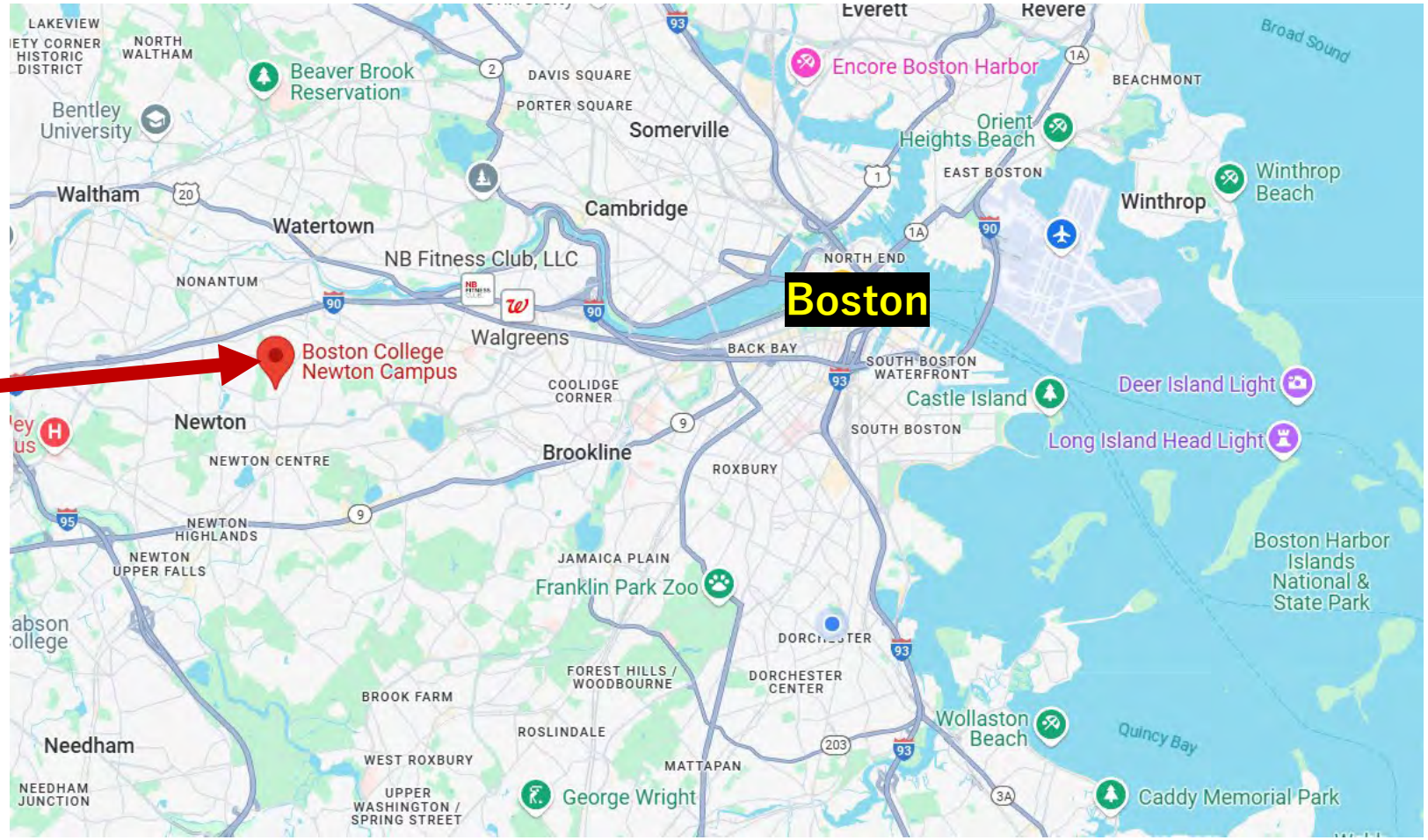
Also, here is a quick reminder of the remainder of our fall seminar series:

- **Thu, 24 Oct 2024, 10:30a ET**, *Data Visualization Research Support in the Earth Sciences*, Dr. Kate Willis, BC Data Visualization Lab
- **Thu, 07 Nov 2024, 10:30a ET**, [Topic: Plasma Physics], Prof. Oleg Batishchev, Northeastern University
- **Thu, 21 Nov 2024, 10:30a ET**, *Ionospheric Structures and Irregularities during Sudden Stratospheric Warming Events*, Dr. César Valladares, BC ISR
- **Thu, 05 Dec 2024, 10:30a ET**, AGU Preview, ISR Members

View the ISR brochure:
https://www.bc.edu/content/dam/files/research_sites/isr/pdf/brochure-final_20140813.pdf

The ISR seminars are held in this room:

Doherty Memorial Conference Room
Kenny Cottle Hall,
Newton Campus,
Boston College,
Boston,
Massachusetts,
USA



← The approach to Newton

George Maeda, Editor of the ISWI Newsletter

Photo of Pat Doherty

The Doherty Memorial Conference Room of ISR

LINCOLN LABORATORY

Dr. Gregory P. Ginet (MIT Lincoln Laboratory) delivers his talk:

"Ionospheric Model Validation for High Frequency Communications"

on 10 October 2024 from 10:30 to 11:30 AM.

← One of the slides

MIT Lincoln Laboratory

Dr. Ted Beach,
organizer of the
ISR seminar series

Lunch with the seminar speaker at the cafeteria of the *Boston College Law School*

End of the photo report

ISWI Webinar Series

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

Dr. Raffaella D'Amicis
Institute of National Astrophysics (INAF)

Is there a relationship between solar wind Alfvénic turbulence and magnetospheric dynamics? What Solar Orbiter observations can help with?

The very first observations by Mariner 5 highlighted the presence of Alfvénic fluctuations in the solar wind identified as almost incompressible fluctuations accompanied by large correlations between velocity and magnetic field components as predicted by the Magnetohydrodynamics theory.
Alfvénic fluctuations are thought to play a major role in regulating wave-particle interactions, and determining the presence of anisotropies and beams in ion velocity distribution functions (VDFs) and ion drift. These are very common features in the solar wind, especially in the main portion of fast wind streams.
More generally, they are thought to be a fundamental element in different Heliospheric processes, such as solar wind heating and acceleration, energetic particle acceleration, and cosmic-ray propagation.
In addition, since the solar wind and the magnetosphere interact continuously, thus constituting a coupled system, Alfvénic fluctuations might also play a relevant role in the geomagnetic response, in the absence of solar transient events, although still determining strong variations in the geomagnetic field.
Within this context, after presenting previous statistical studies showing a relationship between Alfvénic turbulence and the geomagnetic response, we explore the possibility to take advantage of observations of Alfvénic solar wind streams by the ESA/NASA Solar Orbiter mission, with particular reference to periods of the orbit when the s/c crosses the Sun-Earth line. In these particular conditions, Alfvénic streams reaching the Earth are expected to be geoeffective. The combined observations by Solar Orbiter and s/c at L1 will allow to study the radial evolution of the turbulent features of Alfvénic streams and their geoeffectiveness.

Registration -> *iswisupport@bc.edu*

← To get the telecon link, you need to register. The email address is given at the bottom of this flyer.

002

INAF
ISTITUTO NAZIONALE
DI ASTROFISICA

https://www.oas.inaf.it/en/

Photo Report of new MAGDAS station Installation in Cangar (CNG), Java Island, Indonesia 18-23 March 2024

003

Kirolosse M. Girgis

i-SPES, Kyushu University

Fukuoka, Japan

Installation Trip's Summary

The i-SPES center team from **Kyushu University** (**Japan**), in collaboration with **NRIAG (Egypt)**, installed a new MAGDAS station in Cangar (**CNG**), Java Island (**Indonesia**), hosted by the **Faculty of Mathematics and Natural Sciences at Brawijaya University** from March 18 to 23, 2024.

The **primary objective** is to **establish multi-disciplinary geophysical observations** in the **Volcano-Hosted Geothermal Area** of **Cangar**, utilizing gravitational, thermal, and magnetic measurements. This initiative aims to enhance international collaborative research through various areas of expertise.

Team Members:

- From Host Institute: Brawijaya University, **INDONESIA**

  Prof. Dr. Sukir Maryantos, Vice-Dean of the Faculty of Mathematics and Natural Sciences

- From NRIAG (National Research Institute of Astronomy and Geophysics), **EGYPT**

  Dr. Emad Takla, PhD degree awarded by Kyushu University in 2012

- From Kyushu University, **JAPAN**

  Dr. Shuji Abe, MAGDAS Project's PI

  Mr. Tateishi Kouki, M2 Student

  Dr. Kirolosse Girgis

Visit to Brawijaya University

Location Inspection

Antenna Fixation

Sensor and Pre-amp Huts construction




Pipe assembly to connect the huts to data logger hut

Construction of the bay and the hut covers

Adjusting the fixation of the pre-amp and the sensor

Construction of the hut cover and insulation

Hut insulation from rain

Finer sensor orientation adjustment

Final adjustments

Data Logger Readings

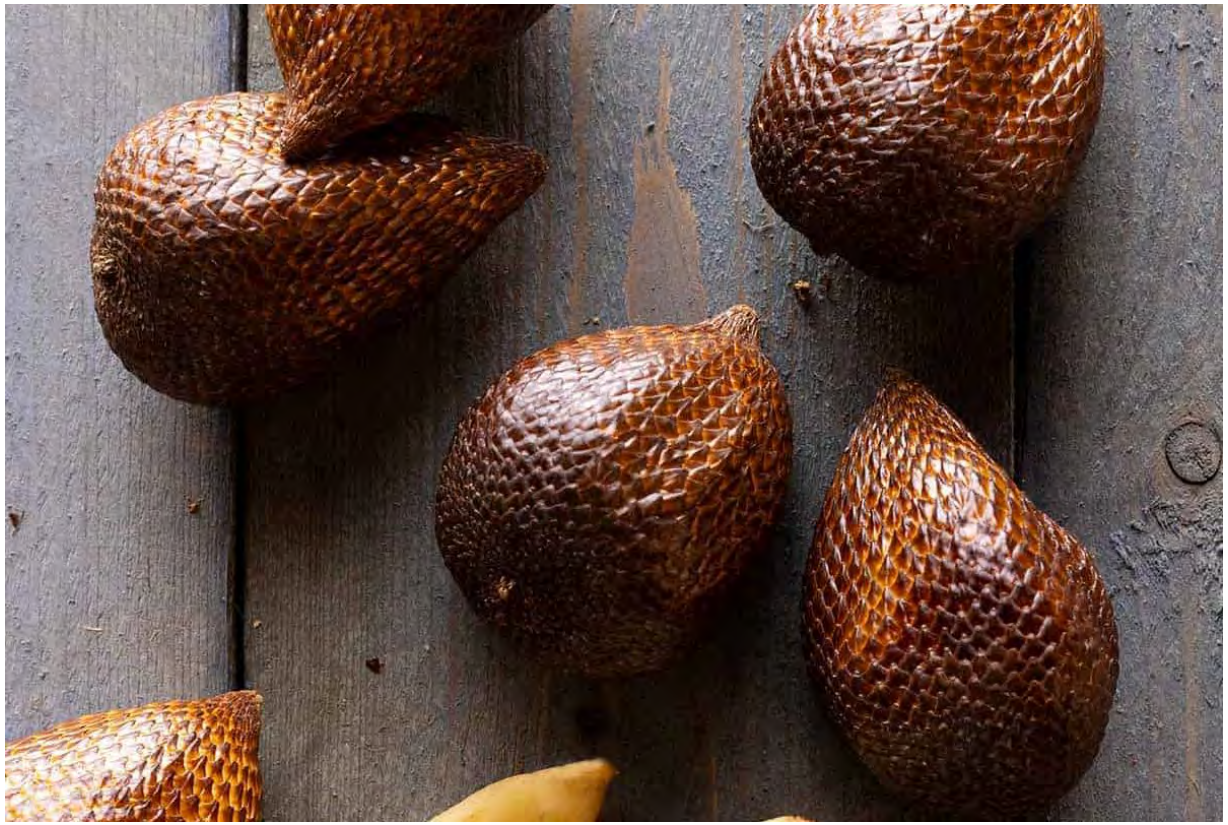
Group Photos

Left: Prof. Maryanto Sukir (Brawijaya U., Indonesia)
Right: Dr. Emad Takla (BRIAG, Egypt)

Left: Dr. Shuji Abe (Kyushu U., Japan)
Right: Mr. Tateishi Koki (Kyushu U., Egypt)

Popular Fruits in Indonesia

Snake Fruit known as “Salak”



Dorian Fruit

End of this photo report

004

International Space Weather Initiative Europe-Africa

Christine Amory-Mazaudier [1], Daniela Banys[2], Babatunde Rabiu[3]

[1]*Sorbonne Université, Ecole polytechnique, Institut Polytechnique de Paris, Université Paris Saclay, Observatoire de Paris, CNRS, Laboratoire de Physique des Plasmas (LPP), 75005 Paris, France*
christine.amory@lpp.polytechnique.fr

2. German Aerospace Center (DLR) Institute for Solar-Terrestrial Physics Space Weather Observations
daniela.banys@dlr.de

3. UniteUnited Nations African Regional Centre for Space Science and Technology Education - English, (UN-ARCSSTE-E), Obafemi Awolowo University Campus, Ile Ife, Nigeria
tunderabiu2@gmail.com tunderabiu@arcsstee.org.ng

Workshop ICMP – Brazil – 23-28 September 2024

OUTLINE

- Introduction : history
- Capacity Building in Africa
- Europe -ISWI
- Africa –ISWI
- Conclusion

This short presentation focuses on some initiatives in Africa and provides references for a more comprehensive understanding all the initiatives being carried out in Africa.

United Nations Space Science Initiative [1991-2012]

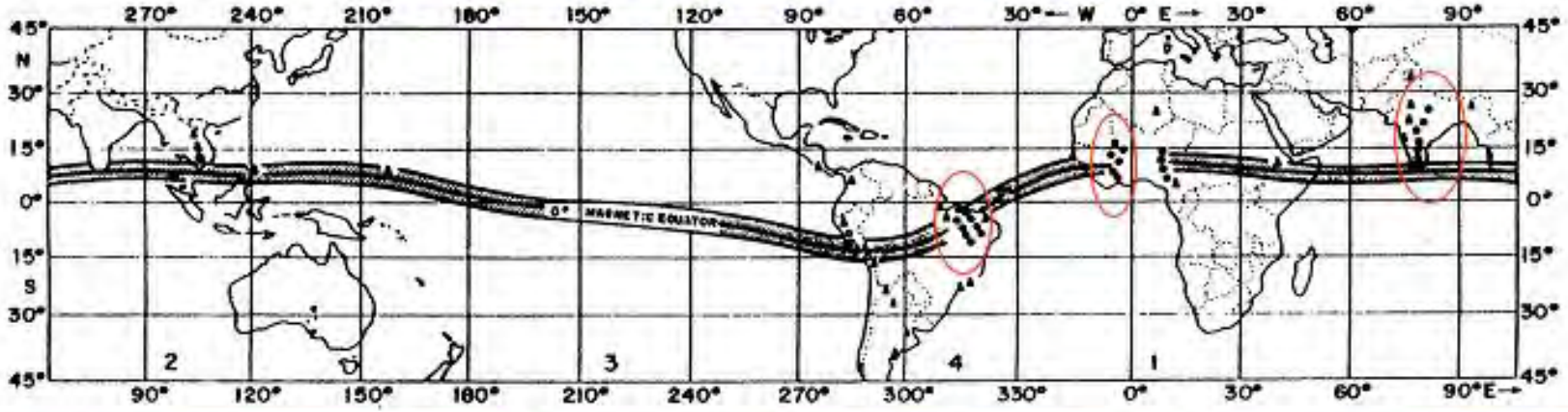
- **Scientific projects**
- 1992-1994: IEEY International Equatorial Electrojet Year
- 2005-2009: IHY International Heliophysical Year
- 2010-2012 : ISWI International Space Weather Initiative
- **Network**
- **Since 2012 : ISWI network in United Nations**

www.secretariat.org

~ 80 National coordinators (among 21 in Africa)

International Equatorial Electrojet Year 1992-1994

I. SAO PAULO - 1991



LEADERS : M.A. Abdu (Brazil)/ America, B.A. Arora (India)/Asia, A. Onwumechili and S. Ogunade (Nigeria)/Africa, O. Fambitakoye (Niger)/West-Africa/Europe

International Heliophysical Year 2007-2009

II. ADDIS ABABA - 2007

a turning point in the participation of African countries

WHOLE AFRICA

IHY-Africa
Space Weather Science and Education
Workshop Report

The Ethiopian Physical Society

in conjunction with

Addis Ababa University and Bahir Dar University

African Countries Represented (20): (72 representatives)

Algérie
Bénin
Burkina Faso
Cameroon
Cape Verde
Côte d'Ivoire
Démocratique République du Congo
Egypt
Ethiopia
Kenya
Liberia
Libya
Mozambique
Namibia
Niger
Nigeria
République du Congo
Sénégal
South Africa
Uganda

Other Nations Represented (9): (56 representatives)

Australia
Austria
Canada
France
India
Italy
Japan
UK
USA

African Regional Centre for Space Science and Technology in the French Language

In cooperation with the CRASTE-LF/ in Morocco
2011, 2015, 2017

schools

GIRGEA

Space Environment Research Laboratory, Abuja, Nigeria

Operated by the United Nations African Regional Centre for Space Science and Technology Education – English, Nigeria

Established in June 2015. Function as a Space Weather Monitoring Laboratory

Facilities

- GNSS Receivers
- all-sky Optical Imager,
- scintillation monitor,
- Fabry Perot Interferometer,
- HF Doppler Radar system
- Low cost GNSS receiver
- Cosmic Rays detector
- Space Weather Laboratory
- Magnetometers (MAGDAS & AMBER, out of operation, data available)

Contacts:

Babatunde Rabiu (tunderabiu2@gmail.com)

Daniel Okoh (okodan2003@gmail.com)

Scientific Conferences - Teen Ager => application GNSS

Secondary school Anyigba (Nigeria **2014**)

Success Academy Anyigba (Nigeria **2014**)

Isah memorial Islamic Academy Anyigba (Nigeria **2014**)

School Mt Amba /RDC -2014

St Marie /**Côte d'Ivoire 2013** (MAGDAS School)

AFRICAN COUNTRIES with PhD Scientists IN SPACE WEATHER : Blue
In red new countries without PhD scientists on Space Weather

Amory-Mazaudier, C., S. Radicella, P. Doherty, S. Gadimova, R. Fleury, B. Nava, E. Anas, M. Petitdidier, Y. Migoya-Orué, K. Alazo, and K. Shiokawa, Development of research capacities in space weather: A successful international cooperation, J. Space Weather Space Clim. 2021, **11**, 28, Published by EDP Sciences 2021, https://doi.org/10.1051/swsc/2021006

Schools and Workshop => in AFRICA : 37 among 73

- 5 IHY Schools (USA, India, Brazil, China, and Nigeria)
- 6 IHY Workshops (UAE, India, Japan, Bulgaria, Republic of Korea, and Zambia) 10 ISWI Workshops (Egypt, Nigeria, Ecuador, Japan, Ethiopia, USA, Italy, Azerbaijan, Austria, Germany)
- 12 ISWI Schools (Ethiopia, Slovakia, Indonesia, Kenya, Peru, India, Argentina, Azerbaijan, Portugal, Spain, Italy, Zambia, Nepal
- **SCOSTEP** Capacity building activities (Most ISWI activities)
- **ISWI** supported 3 **COSPAR** Capacity Building Workshops (School + data analysis) in Ethiopia, India, and Uzbekistan
- 5 schools on space weather (2012-2016), 7 workshops , each year (2015-2024), **NIGERIA**
- 2 ISWI schools and 1 IRI workshop (2024): **KENYA**
- 13 schools in Africa since 1995 (IEEY, IHY, ISWI)on Space Weather in Africa : RC, DRC, Morocco, Algeria, Senegal, Côte d'Ivoire, Egypt, and this year in Guinea Conakry + 5 schools in France for African students, **GIRGEA + ICG**
- **ICTP** : Workshop each year in Trieste + 2 schools in Rwanda and Kenya

atmosphere

MDPI

Review

The Status of Space Weather Infrastructure and Research in Africa

Paul Baki [1,*], Babatunde Rabiu [2], Christine Amory-Mazaudier [3], Rolland Fleury [4], Pierre J. Cilliers [5], Joseph Adechinan [6], Anas Emran [7], Aziza Bounhir [8,9], Claudio Cesaroni [10], J. Bienvenue Dinga [11], Patricia Doherty [12,†], Idrissa Gaye [13], Hassen Ghalila [14], Franck Grodji [15], John-Bosco Habarulema [5], Bruno Kahindo [16], Ayman Mahrous [17], Honoré Messanga [18], Patrick Mungufeni [19], Bruno Nava [20], Melessew Nigussie [21], Joseph Olwendo [22], Patrick Sibanda [23], René Tato Loua [24], Jean Uwamahoro [25], Naima Zaourar [26] and Jean-Louis Zerbo [27]

Atmosphere 2023, 14, 1791. https://doi.org/10.3390/atmos14121791

This article described all the instruments that worked during the IHY and ISWI projects as well as all the studies, projects, schools in African countries. **All the email contacts of African scientists are available.**

In Africa there were 10 PhD theses defended during the first decade (1991–2001), while 84 PhD theses were defended during the period 2001–2023. Presently, there are 68 PhD theses in progress.
All PhD student obtain positions in their countries.

Space Weather Activities in Europe

Daniela Banyś

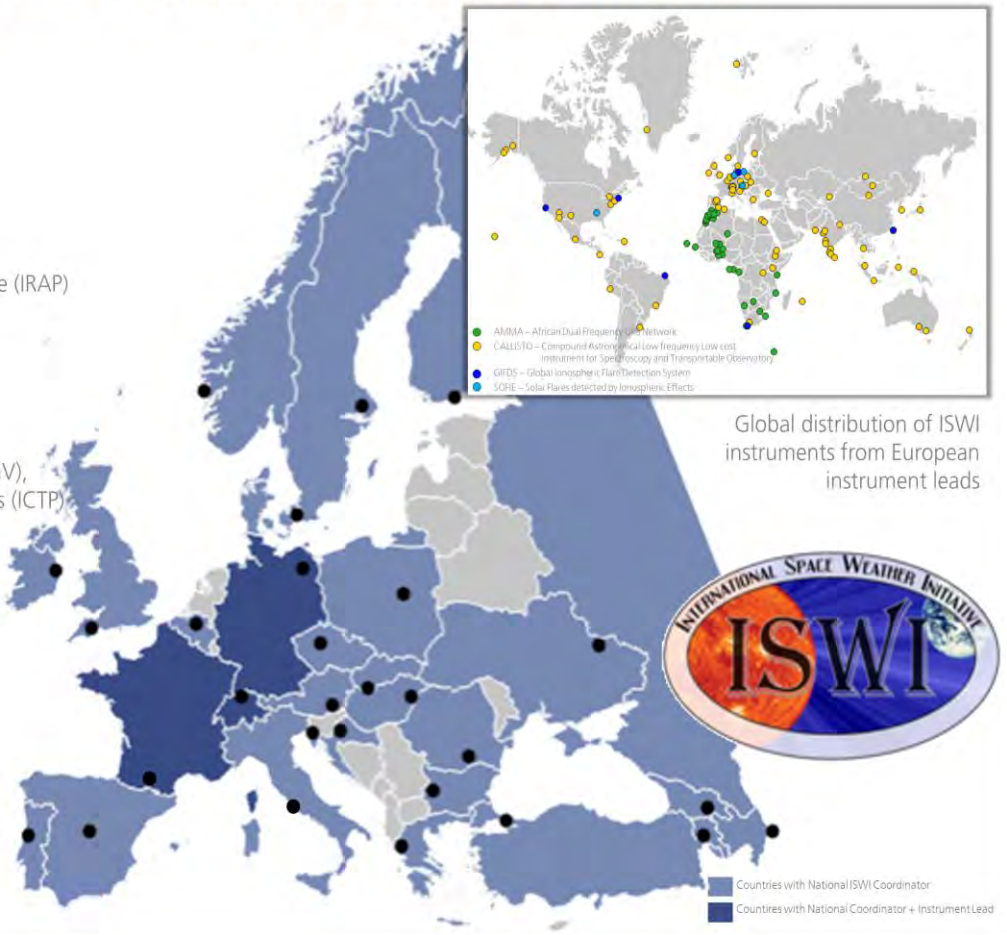
German Aerospace Center (DLR)
Institute for Solar-Terrestrial Physics
Space Weather Observations

E-Mail: daniela.banys@dlr.de

27 countries

European ISWI coordinators and ISWI instruments

Austria	Manuela Temmer, University of Graz
Azerbaijan	Elchin S. Babayev, Shemakha Astrophysical Observatory
Belgium	Giovanni Lapenta, Katholieke Universiteit Leuven
Bulgaria	Simeon Asenovski, Space Research and Technology Institute
Croatia	Dragan Roša, Observatory in Zagreb
Czech Republic	Dalia Buresova, Czech Academy of Sciences
Denmark	Klaus Galsgaard, Niels Bohr Institute
Finland	Ilja Honkonen, Finnish Meteorological Institute
France	Frederic Pitout, Institut de Recherche en Astrophysique et Planétologie (IRAP)
Georgia	Bidzina Shergelashvili, Ilia State University
Germany	Daniela Banyś, German Aerospace Center (DLR)
Greece	Alexander Nindos, University of Ioannina
Hungary	Judit Muraközy, Hungarian Academy of Sciences
Ireland	Peter Gallagher, Trinity College Dublin
Italy	Vincenzo Romano, Istituto Nazionale di Geofisica e Vulcanologia (INGV), Yenca Olivia Migoya Orué, International Centre for Theoretical Physics (ICTP)
Norway	Kjellmar Oksavik, University of Bergen (UiB)
Poland	Marek Stęślicki, Polish Academiy of Sciences
Portugal	Teresa Barata, Instituto de Astrofísica e Ciências do Espaço
Romania	Diana Besliu-Ionescu, Romanian Academy
Serbia	Nikola Veselinovic, Low Background Laboratory for Nuclear Physics
Slovakia	Ivan Dorotovič, Slovak Central Observatory
Spain	Consuelo Cid, Universidad de Alcala
Sweden	Hermann Opgenoorth, Swedish Institute of Space Physics
Switzerland	André Csillaghy, University of Applied Sciences Northwestern Switzerland (FHNW),
Turkey	Ali Kilcik, Akdeniz University
United Kingdom	Claire Foullon, University of Exeter
Ukraine	Oleg Litvinenko, Institute of Radio Astronomy NASU



www.iswi-secretariat.org

Missions

ESA's PROBA-3 Mission, a high precision formation flying of two small satellites, shall be launched in Summer 2024. The pair of satellites will study the Sun's faint corona and surrounding atmosphere, as well as using innovative technologies to measure the precise positioning of the two spacecraft.

ESA

ESA

GALILEO is the world's most precise satellite navigation system, serving general public under civilian control. As of December 2023, there are 23 launched satellites that operate in the constellation, five are not available. The first launch is planned for April, with the second launch anticipated in July/September, with two satellites carried per launch.

EarthCARE (Cloud, Aerosol and Radiation Explorer) is a joint venture between ESA and the Japan Aerospace Exploration Agency (JAXA) and expected to be launched in May. The satellite will investigate the role that clouds and aerosols play in reflecting incident solar radiation back into space and trapping the infrared radiation emitted from Earth's surface to better understand the evolution of Earth's temperature.

ESA

Project Highlights

PECASUS for ICAO, the **P**an-**E**uropean **C**onsortium for **A**viation **S**pace weather **U**ser **S**ervices *has been operating an* ***ICAO*** *global space weather center.* https://pecasus.eu/

ESA Space Safety Programme actively addresses user communities that are sensitive to space weather, such as spacecraft operations, power systems operations or airlines. The ESA SWE Service Portal provides access to a total of 29 user-tailored services that build on more than 300 individual products and tools! https://swesnet.busoc.be/

T-FORS aims to develop a Travelling Ionospheric Disturbances Forecasting System complementary to the ESA Space Weather services. https://t-fors.eu/

PITHIA-NRF, **P**lasmasphere **I**onosphere **Th**ermosphere **I**ntegrated Research Environment and **A**ccess services: a **N**etwork of **R**esearch **F**acilities, involves 12 nodes providing organized access to experimental facilities, FAIR data, standardized data products, training and innovation services. The 2nd PITHIA-NRF Training School will be held in KU Leuven, Belgium, from 5 to 9 February 2024. https://pithia-nrf.eu/

Get Together

ESWW bringing together the diverse groups in Europe working on different aspects of Space Weather and Space Climate: such as scientists, engineers, satellite operators, power grid technicians, communication and navigation specialists, people working in aviation, space weather service providers, STEM* practitioners. After a successful conference in Toulouse, ESWW 2024 will take place in Coimbra, Portugal. https://esww2024.org/

E-SWAN focuses on the organisation and/or co-organisation of conferences (e.g. ESWW) in Europe, and supports editorial/publication activities related to SWSC (e.g. journal, press releases). 18-19 November 2023, the first E-SWAN school on Space Weather Data, Models and Services took place at IRAP in Toulouse. https://www.eswan.eu/

URSI, the International Union of Radio Science, a non-governmental and non-profit organisation under the International Council for Science, is encouraging and coordinating international activities in the fields of radio science. The 4th URSI Atlantic Radio Science Meeting (ATRASC) will take place from 19-24 May 2024 in Gran Canaria, Spain. https://www.ursi.org/

ISWI, ISWI has established a platform that takes a bottom-up approach in order to produce space weather-literate communities, in particular in developing countries, enabling those communities to work together as a network to share ideas, information and data and to develop joint projects. The United Nations / Germany Workshop on ISWI 2024 shall take place in Neustrelitz, Germany from 10 to 14 June.
The next ISWI school is being planned for September 2024 in Nepal.

Space weather related institutions in Germany

Color Legend

- Astrophysics
- Sun and Heliosphere
- Space Radiation
- Ionospheric Weather
- Atmospheric Physics
- Geomagnetic Conditions

Universities

- Extraterrestrial Physics at Kiel University (CAU)
- Institute of Physics, University of Rostock
- Centre of Astronomy and Astrophysics (ZAA), TU Berlin (TUB)
- Institute of Physics & Astronomy, University of Potsdam
- Institute of Astrophysics at the University of Goettingen (IAG)
- Institute of Geophysics and Meteorology at the University of Cologne
- Faculty for Physics and Astronomy at Ruhr University Bochum (RUB)
- Institute for Meteorology, University of Leipzig
- Insitute of Geophysics and extraterrestrial Physics, TU Braunschweig (IGEP)
- German Geodätic Research Institute at Technical University of Munich (DGFI-TUM)

Societies

- Working Group Extraterrestrial Research e.V. **(AEF e.V.)**
- German Physical Society e.V. **(DPG e.V.)**
- German Geophysical Society e.V. **(DGG e.V.)**
- Vereinigung Cockpit e.V.

Research Institutes

- Leibniz Institute of Atmospheric Physics in Kühlungsborn **(IAP)**
- German Aerospace Center **(DLR)**:
  Institute for Solar-Terrestrial Physics,
  Earth Observation Center,
  Institute of Atmospheric Physics,
  Institute of Aerospace Medicine
- German Research Center for Geosciences **(GFZ)**
- Leibniz Institute for Astrophysics Potsdam **(AIP)**
- Max Planck Institute for Solar System Research **(MPS)**
- Thuringian State Observatory **(TLS)**
- Institute of Meteorology and Climate Research at Karlsruhe Institute of Technology **(KIT)**
- Leibniz Institute for Solar Physics **(KIS)**
- Environmental Research Station Schneefernerhaus **(UFS)**

Federal Government & Industry

- Geodetic Observatory Wettzell at the Federal Agency for Cartographie and Geodesy **(BKG)**
- Weltraumlagezentrum **(WRLageZ)** at the German Armed Forces
- European Space Operations Centre **(ESOC)** at ESA
- Airbus Defence and Space **(ADS)**

DLR

ITALIA

Y. Migoya-Orué

V. Romano

City	Institutions
Trento	Università di Trento, INFN
Trieste	ICTP
Torino	INAF
Genova	Università di Genova
Bologna	INAF
L'Aquila	Università dell'Aquila, INGV
Roma	INGV, INAF, Università di Tor Vergata, ASI, Italian Air Force
Perugia	Università di Perugia
Cosenza	Università della Calabria
Catania	Università di Catania, INAF
Palermo	Università di Palermo
Cagliari	INAF

ASI: Agenzia Spaziale Italiana
ICTP: International Centre for Theoretical Physics
INAF: Istituto Nazionale di Astrofisica
INFN: Istituto Nazionale di Fisica Nucleare
INGV: Istituto Nazionale di Geofisica e Vulcanologia

Plainaki et al. "***Current state and perspectives of Space Weather science in Italy***"
J. Space Weather Space Clim. 10 6 (2020), DOI: 10.1051/swsc/2020003

B. Rabiu

Space weather in Africa 21 countries

Benefits of African Participation

- Knowledge transfer
- Increase in number of research Publications
- Exchange of students and researchers between Africa and PI institutions outside Africa
- Deployment of equipment to Africa
- Organization of Summer schools and conferences in African countries, including ISWI Schools
- Sensitization of some national governments to participate in Space Programs
- Participation of Africans in conferences/workshops outside Africa
- Availability of equipment for research work within Africa
- Effective brain gain mechanisms
- Improved intra-continental cooperation

Talk on September 26, session 11h00-12h00

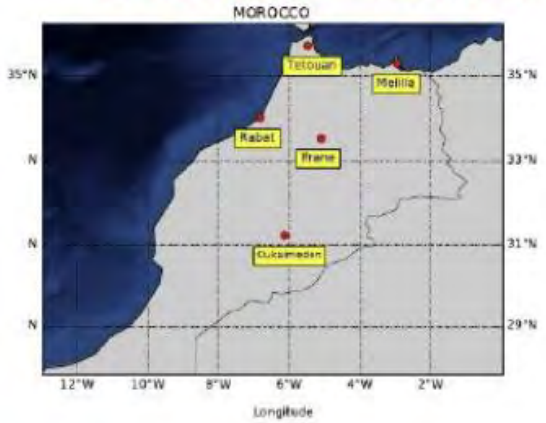
Space Weather in Morocco

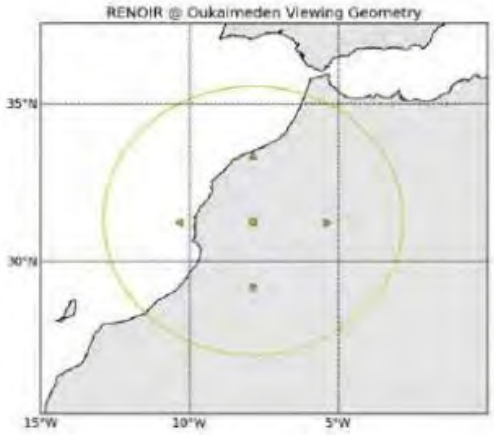
Pr Aziza Bounhir

Fabry-Perot interferometer

Wide angle Camera

GPS Stations in Morocco





RENOIR Network

KENYA : Joseph Olwendo

Capacity building Initiative in space weather science:

Pwani University in collaboration With ICTP, INGV among other sponsor organized a two week School on space weather and Low-latitude ionosphere at the Malindi Broglio Space Center during 2-13 October 2023.

(2) New Observatory for space weather studies was launched in Kenya around July 2023. The project is code named – NORISK for Near of real ionospheric specific over kenya

Antenna for the Ionosonde linked to NORISK project: The facility was used for training during the workshop Conduted in Octoner 2023.

Space monitoring facilities under installation in Ethiopia

- **Facilities under deployment in Bahir Dar**

✓ **1) Meteor Radar** in collaboration with IAP, German.

Training on assembling Meteor Radar antenna in Germany

PhD students assembled Meteor Radar antenna at Bahir Dar University

Confirmation that we got from IAP that the receiving and transmitting antennas are installed at the right place.

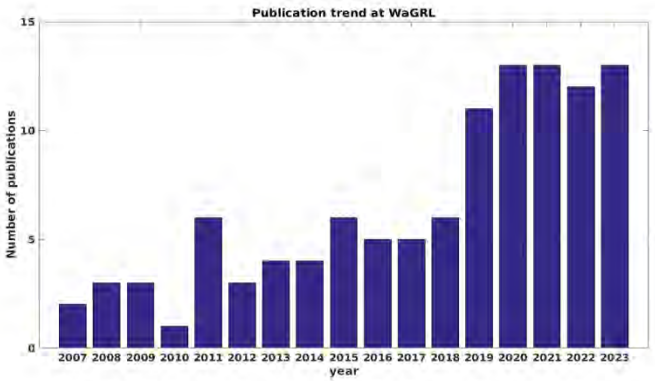
ETHIOPIA

Melessew Nigusie

2) All-Sky Imager in collaboration with Institute for Space-Earth Environmental Research (ISEE), Nagoya University, Japan.

- It has been installed, but due to current **civil war** in Ethiopia, we are not running it.
- I hope we will run it as Bahir Dar University is being reopened.

Space weather related publication trend at Washera Geospace and Radar Science Research Laborator, Bahir Dar University



SOUTH AFRICA

John Bosco jhabarulema

SANSA
SOUTH AFRICAN NATIONAL SPACE AGENCY

Provides 24/7 operational space weather services to the African region from November 2022

Current Partners:

- **Zimbabwe** — Zimbabwe National Geospatial and Space Agency (ZINGSA)
- **Nigeria** — University of Lagos (UNILAG)
- **Ethiopia** — Bahir Dar University
- **South Africa** — South African National Space Agency (SANSA); National Geospatial Information (NGI) TRIGNET
- **Zambia** — Kwame Nkrumah University (KNU)
- **Namibia** — Ministry of Mines and Energy (MME)
- **Uganda** — Busitema University (BU)
- **Kenya** — Pwani University (PU); Kenyan Space Agency (KSA)
- **Gabon** — L'Agence Gabonaise d'Etudes et d'Observations Spatiales (AGEOS)
- **Botswana** — Botswana International University of Science and Technology (BIUST)

More to come!

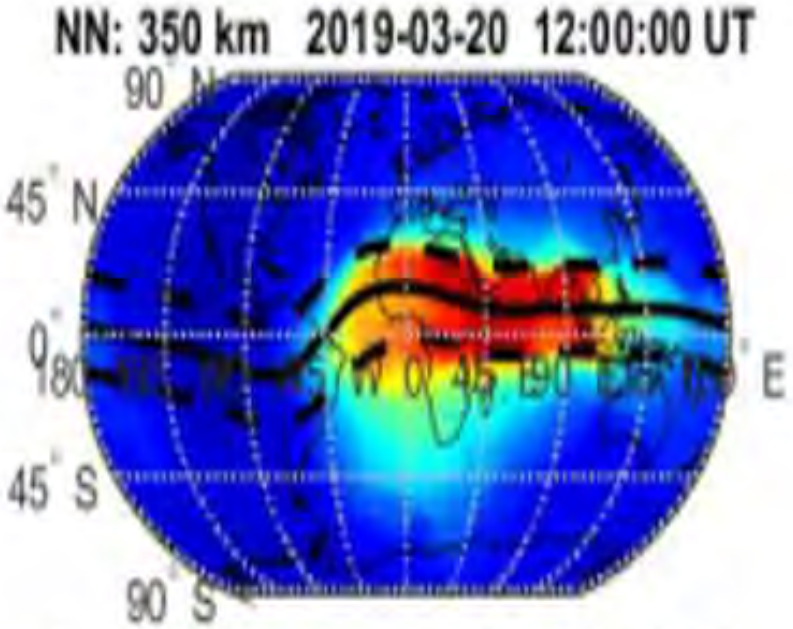
SANSA Instrumentation in Africa

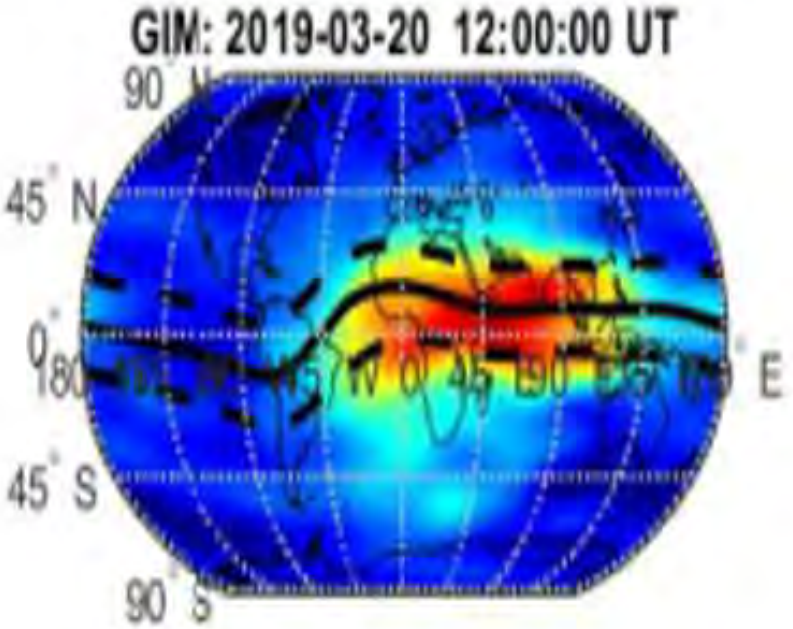
Focus is currently on the SADC region (SBAS + SWx) and the magnetic equator (SWx)

Focus is currently on the deployment of GNSS stations as the cost and infrastructure requirements offer the best value in terms of the outputs gained.

The African Instrumentation Network

Global 3-dimensional electron density model - 3DNN





- Advancement of AfriTEC
- developed by application of AI/ML techniques
- https://doi.org/10.1016/j.jastp.2021.105702
- https://doi.org/10.1016/j.asr.2024.02.014

Habarulema *et al., 2021, 2024*

John Bosco Habarulema(jhabarulema@sansa.org.za)

NIGERIA
Babatunde Rabiu

New Space Weather Infrastructure

VT - Nigerian Bowen Equatorial Aeronomy RADAR

VT-NigerBEAR

new science results that could improve our understanding of the equatorial ionosphere & space weather

multi-technique approach to study the ionosphere

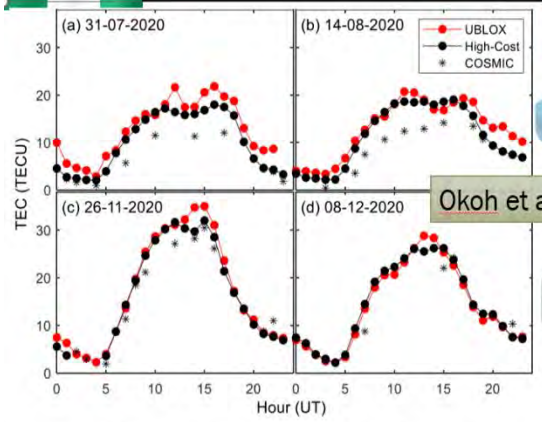
Global Ionospheric Research Infrastructure

Low-cost digisonde being set up

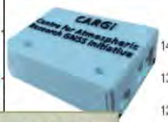
Abuja

ICTP – Anton and Bruno

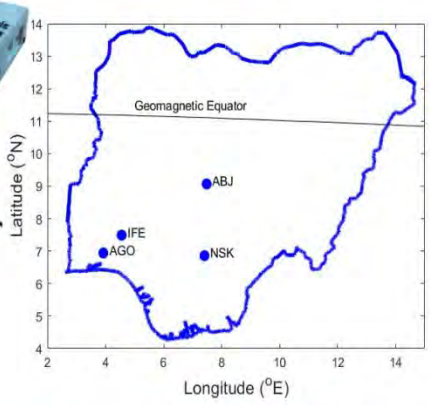
Deployment of low cost GNSS Rx



Low-cost U- BLOX ZED-F9P



Okoh et al 2021

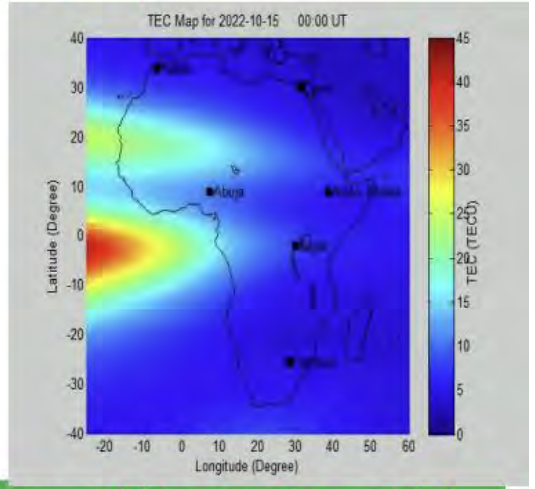


Very good agreement between the measurements (R^2 >> 0.8) and similar dynamics.

Abuja, Ago – Iwoye, Nsukka, Ile - Ife

AfriTEC Model

- a model of the ionospheric GNSS TEC over the entire African region
- used to obtain the ionospheric GNSS TEC at all locations over the African continent.
- The model is developed by the method of artificial neural networks.



https://arcsstee.org.ng/african-gnss-tec-models/

Annual conference on low-latitude geophysics

International Colloquium on Equatorial and Low-Latitude Ionosphere

2015 – 2023
7 Yearly Events
556 Participants from across the globe in All

BENEFITS

- Effective knowledge transfer
- Graduate training
- A number of PhD have been produced
- Productivity
- Enhanced research capability
- Joint cooperation/collaboration
- International model

-ICELLI 2023-

INTERNATIONAL COLLOQUIUM ON EQUATORIAL AND LOW-LATITUDE IONOSPHERE

University of Ilorin
Kwara State, Nigeria

September 4-8, 2023

53 PHYSICAL AND 73 VIRTUAL PARTICIPANTS FROM 21 COUNTRIES

WWW.ARCSSTEE.ORG.NG

AGS
African Geophysical Society

- Established Nov 2012, Addis Ababa, Ethiopia
- 1st conference June 2014, Abuja, Nigeria
- 2nd Conference, Nairobi 2015
- 3rd Conference, Abidjan, 2016
- 4th Conference, Egypt, 2019
- 5th Conference, Online, 2021
- 6th Conference, Lusaka, Zambia ,2023

www.afgps.org

African Geophysical Society

www.afgps.org

AGS is a dynamic, innovative, and interdisciplinary scientific association committed to the pursuit of understanding of Earth and Space for the benefits of mankind.

African Geophysical Society AGS
International Secretariat,
National Space Research and Development Agency (NASRDA),
Km 17 Umar Musa Y'Aradua Expressway
(old Airport Road), ABUJA, Nigeria

Email: secretariat@afgps.org; membership@afgps.org
Telephone: +234 803 0705787

Conclusion

- **Europe-Africa-Pacific Meridien Project**

005

International Colloquium on Equatorial and Low Latitude Ionosphere (ICELLI)
(Hybrid Event)
Report

Preamble: The International Colloquium on Equatorial and Low Latitude Ionosphere (ICELLI 2024) is an annual capacity building workshop geared towards understanding of the Sun and its impact on space weather; the dynamics of the equatorial ionosphere, its complexities and high level of dynamics which results in phenomena such as spread F, ionospheric anomaly, equatorial electrojet, equatorial plasma fountain, etc; and how space weather impact on telecommunications, navigation, satellite operations, and other space-based technologies. The Colloquium metamorphosed from a summer school-like programme tagged International School on Equatorial and Low Latitude Ionosphere (ISELLI) which held in Abuja and Ota, Nigeria in 2015 and 2017 respectively. This 2024 edition of the colloquium was the 8th edition of this capacity building gathering in Nigeria.

Date: 29 July - 2 August 2024

Venue: Mountain Top University, Prayer City, Ibafo, Ogun State, Near Lagos, Nigeria, & Everywhere online

The International Colloquium on Equatorial and Low-Latitude Ionosphere (ICELLI), was held at Mountain Top University, Prayer City, Ibafo, Ogun State Nigeria between 29th July and 2nd August 2024. At prime, 25 physical and 49 virtual participants from 19 countries participated in the Colloquium, which was co-organized by the Mountain Top University; UN-African Regional Centre for Space Science and Technology Education in English; National Space Research and Development Agency, the Network of Space-Earth Environmentalists; the Scientific Committee on Solar Terrestrial Physics (PRESTO/SCOSTEP); Boston College, USA; the UN-International Space Weather Initiative; the Institute for Space-Earth Environmental Research (ISEE), Nagoya University, Japan; the JSPS Program; and the African Geophysical Society (AGS).

Arrival of Guest scientists:

Lecturers and participants arrived at the facility of the Mountain Top University (CAS) on Monday 29th July, 2024.

The 8th edition like others, featured lectures, tutorials and hand on sessions on topics geared towards understanding of the Sun and its impact on space weather; the dynamics of the equatorial ionosphere, and how space weather impact on space-dependent technologies. Physical participants were taken on a tour to the proposed site for the installation of the SKiYMET radar expected to be deployed in collaboration with our partners from the Institute of Atmospheric Physics 'IAP', Germany. We also had the privilege of being taken on a tour of the University's Music laboratory and we were treated to some fine music and renditions. Details of the lectures delivered at the Activity alongside the names of the resource persons are as follows:

Resource Persons

1. Prof. Babatunde Rabiu, NASRDA, Nigeria (Convener); African Regional coordinator, ISWI
2. Prof. Christine Amory Mazaudier, Sorbonne Universities, Paris, France / ICTP, Trieste, Italy
3. Prof. Sandro. M. Radicella, Boston College, USA
4. Prof. Kazuo Shiokawa President-SCOSTEP, Institute for Space-Earth Environmental Research (ISEE), Nagoya University, Japan
5. Dr Keith Groves, Boston College, USA
6. Professor Wojciech J. Miloch, University of Oslo, Norway
7. Dr. Bruno Nava, The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy
8. Prof A. O. Olawepo, Department of Physics, University of Ilorin, Ilorin, Nigeria
9. Prof. Elijah O. Falayi, Tai Solarin University of Education, Ijagun, Nigeria
10. Prof. O. S. Bolaji, Bowen University, Nigeria/ Department of Mathematics and Physics, University of Tasmania, Hobart, TAS, Australia
11. Dr Samuel Ogunjo, Federal University of Technology, Akure, Nigeria
12. Prof. O. K. Obrou, President, African Geophysical Society,
13. Dr. Michel Blanc, IMCP Science Committee Chair
14. Prof. B. O. Adebesin - Hillside University of Science and Technology Okemesi Ekiti State
15. Dr. Zama Katamzi-Joseph, South African National Space Agency (SANSA), Hermanus, South Africa
16. Dr Daniel Okoh - United Nations – African Regional Centre for Space Science and Technology Education – English (UN-ARCSSTE-E), Ile-Ife, Nigeria;
17. Dr Gopi Seemala - Indian Institute of Geomagnetism (IIG), Mumbai, India
18. Dr John Bosco Habarulema, South African National Space Agency (SANSA), Hermanus, South Africa

19. Dr. Claudio Cesaroni - Istituto Nazionale Geofisica e Vulcanologia (INGV), Rome, Italy
20. Dr Bola Abdulrahim - United Nations – African Regional Centre for Space Science and Technology Education – English (UN-ARCSSTE-

E), Ile-Ife, Nigeria)

21. Aderonke Akerele - United Nations – African Regional Centre for Space Science and Technology Education – English (UN-ARCSSTE-E), Ile-Ife, Nigeria)

Opening & Day to day activity of the workshop

The workshop was declared open by the Vice Chancellor, Mountain Top University, Prof. Elijah Ayolabi, on Monday 30th July 2024. Thereafter, an introductory speech was made by Professor Babatunde Rabiu FAS, the convener of ICELLI. Goodwill messages were delivered by Prof. Kazuo Shiokawa, President, SCOSTEP, ISEE, Nagoya University, Japan; Prof. Christine Amory Mazaudier, Sorbonne Universities, Paris, France; as well as Professor Sandro Radicella and Dr Bruno Nava of the Abdus Salam International Centre for Theoretical Physics, Trieste, Italy. Other speakers that delivered goodwill messages are Professor Wojciech J. Miloch, University of Oslo, Norway; Prof. Olivier Obrou, President, African Geophysical Society; Prof. Andrew Ofudje, Dean, College of Basic and Applied Science, MTU; Dr Daniel Okoh – UN-ARCSSTE-E; Dr Gopi Seemala - Indian Institute of Geomagnetism (IIG), Mumbai, India; Dr John Bosco Habarulema, South African National Space Agency (SANSA), Hermanus, South Africa; and Dr. Claudio Cesaroni - Istituto Nazionale Geofisica e Vulcanologia (INGV), Rome, Italy.

The day-to-day activity of the workshop followed a well-structured schedule attached as Appendix 1 to this report. The 2024 ICELLI workshop featured lectures and training by leading experts on the following topics: Space Weather, Irregularities, Machine Learning Applications for Ionospheric Studies, Ionospheric Modelling in Africa, Connections of the Upper and Lower Atmosphere, as well as a panel session focusing on Research trends & cooperation in ionospheric studies. This year's colloquium featured two special sessions: the International Meridian Circle Program (IMCP) session with a focus on Africa, Europe and the Pacific; as well as the AfriTEC model session. Prof. Babatunde Rabiu delivered a lecture on the Status of Ground based instruments in Africa during the CONGA meeting which was incorporated into the colloquium; the zoom audience of CONGA was looped with the google meet audience of ICELLI. In all 29

papers were delivered by experts whose affiliations are listed in appendix 1. Some participants also presented contributed papers.

The workshop ended on Friday 2nd August 2024 with a technical tour.

Lecture Notes:

All lecture notes are available for downloading at:

https://mega.nz/folder/wzc1SI4a#P5lbLffUXHdPW4wFNYC_hA

Attendance:
A total of 74 participants from 19 countries participated in the Colloquium with breakdown as follows:

Total of number of physical participants: 25
Total number of online participants: 49 (Including 15 Experts that gave lectures online)

Countries of Participants: Italy, France, China, Algeria, Nigeria, Egypt, Uganda, India, Brazil, Ethiopia, Kenya, Ghana, Côte d'Ivoire, USA, Tunisia, Morocco, Japan, Pakistan, and Norway (19)

No of participants by Country:
Algeria- 1
Brazil - 3
China- 2
Côte d'Ivoire - 4
Egypt - 3
Ethiopia -1
France- 3
Ghana - 1
India - 3
Italy- 2
Japan - 1
Kenya - 2
Morocco – 1
Nigeria – 41
Norway- 1
Pakistan - 1
Tunisia -1
Uganda - 1
USA- 2

Acknowledgements

Appendix 2
Sample of Certificates

Appendix 4: Some Colloquium Pictures

Professor Elijah Ayolabi, Vice Chancellor, Mountain Top University, giving a welcome address and declaring the 2024 ICELLI open on 3rd August 2024

Professor Elijah Ayolabi, Vice Chancellor, Mountain Top University (Left) and Professor Babatunde Rabiu, Convener of ICELLI at the opening session of 2024 ICELLI on 3rd August 2024

Profeesor Kazuo Shiokawa, President SCOSTEP, giving a remark at the opening session of 2024 ICELLI on 3rd August 2024

A cross section of the on-site participants during one of the sessions at the 2024 ICELLI

A group photograph taken immediately after the opening session of 2024 ICELLI on 3rd August 2024

A group photograph taken during the visit to the Music House of the Mountain Top University on 4th August 2024

The Vice Chancellor, MTU, delivering the opening address


Professor Olivier Obrou, President, African Geophysical Society, giving a remark at the opening session of 2024 ICELLI on 3rd August 2024

Dr Daniel Okoh, Convener of AfriTEC session giving a remark at the opening session of 2024 ICELLI on 3rd August 2024

Professor Gopi Seemala giving a remark at the opening session of 2024 ICELLI on 3rd August 2024

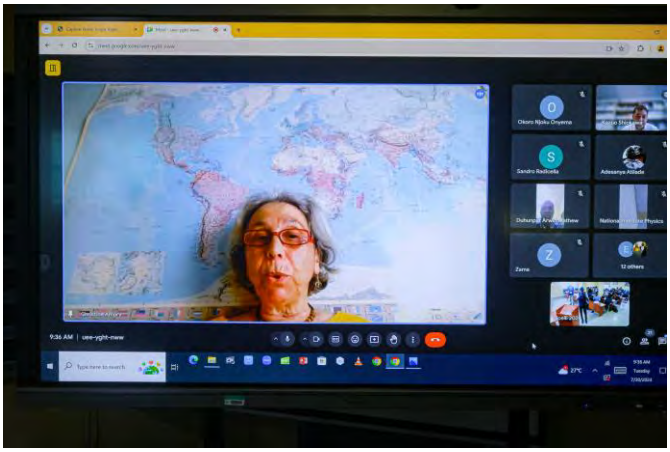

Dr John Bosco of SANSA giving a remark at the opening session of 2024 ICELLI on 3rd August 2024

Dr Claudio Cesaroni of INGV, Rome, Italy, giving a remark at the opening session of 2024 ICELLI on 3rd August 2024

The Vice Chancellor of MTU and Convener of ICELLI posing with ICELLI Travel awardees Feyisara Akinbuli (2nd from left) and Joshua Akinsusi (1st from right)

A cross section of the participants

Prof. Andrew Ofudje, Dean CBAS, MTU addressing the audience


Prof Christine Amory Mazaudier speaking at the opening session


Prof Sandro Radicella speaking at the opening session

Professor Olukayode Falayi chairing a session at 2024 ICELLI


Prof. Babatunde Rabiu delivering the introductory address at the opening session of ICELLI 2024

- Report compiled by Aderonke Akerele, UN-ARCSSTE-E, NASRDA

APPENDIX 1

International Colloquium on Equatorial and Low Latitude Ionosphere (ICELLI)
(Hybrid Event)
Venue: Mountain Top University, Prayer City, Ibafo, Ogun State Nigeria
HTTPS://ARCSSTEE.ORG.NG/INTERNATIONAL-COLLOQUIUM/

Date: 29th July – 2nd August 2024
Summary of schedule
(The time is UT+1, Lagos Nigeria time)

Date	Morning session 0900 – 12:00	1200 – 1300	Afternoon session 1300- 16:30
Monday 29th July 2024	Arrival at Mountain Top University, Prayer City, Nigeria		
Tuesday 30th July 2024	9:00 – 10:30 Opening Session Lectures: 10:30- 11:00 - Space Weather - Dynamos and geomagnetism (Prof. Christine Mazaudier) 11:00 – 11:30 - From linear to complex approach to scientific research: the new path (Prof. S. M. Radicella) 11:30 -12:00 - Ionospheric plasma irregularities and related space weather phenomena (Prof. Wojciech J. Miloch)	Lunch break	13- 13:30 Radio Occultations for ionospheric studies (Dr. Bruno Nava) 13:30 – 16:00 AfriTEC Project Session Introduction to AfriTEC Session and the AfriTEC Model (Dr. Daniel Okoh) Machine Learning Applications for Ionospheric Studies (Dr. Gopi Seemala) A global 3-D electron density reconstruction model based on radio occultation data and neural networks (Dr. John Bosco Habarulema) A New Observatory for Real-time Ionospheric Sounding over Kenya (NORISK) and its relevance for Ionospheric Modelling in Africa (Dr. Claudio Cesaroni) Hands-on Demonstration on Use of the AfriTEC (Aderonke Akerele) (30min s each)
Wednesday 31st July 2024	IMCP Session 09:00 – 09:20 : Space Weather Activities in Tunisia (Ahmed Ammar)		13:00 – 13:45 - Ion and Electron Cyclotron wave-particle interactions in the Earth's inner magnetosphere (Prof. Kazuo Shiokawa)

APPENDIX 1

	09:20 - 09:40 : Space weather research at low latitudes in Africa and participation to the IMCP (Babatunde Rabiu) 09:40 - 10:00 : Space Weather Research and Infrastructures at SANSA and potential contributions to the IMCP (Michael Koch, Pierre Cilliers 10:00 - 10:20 : Space Weather research and infrastructures in East Africa, and potential contributions to the IMCP (Melessew Nigussie) 10:20-10:40 : Break 10:40-11:00: The Geodesy Observatory Tahiti: Past, Present and Future (Jean-Pierre Barriot) 11:00 - 11:20 : China's Ground-Based Space Environment Monitoring Network—Chinese Meridian Project (CMP). (Hui Li) 11:20 - 11:40 : AOGS-RAC Low-Latitude Ionosphere Working Group : Activities and Scientific collaboration (Haixia Lyu, Michel Blanc, Siti Syukriah Khamdan) 11:40 – 12:00: The great potential of the IMCP for contributing to equatorial and low- latitude research (Michel Blanc) 12:00-12:30: round-table discussion and conclusions: **"Building the International Meridian** Circle over Africa, Europe and the **Pacific"** Moderated by Profs. Aziza Bounhir, Jian Wu and Frederic Pitout		13:45 - 14:15 – Geomagnetic Induced Currents: A Tutorial Guide to Empirical and Simulation Studies (Prof. B. O. Adebesin) 14:15 – 14:45 A Hybrid Physics-Based/Machine Learning Approach to Forecast Scintillations (Dr Keith Groves) 14:45- 15:00 Tea break 15:00- 15:30 Forecasting of Ionospheric Scintillations using Machine Learning Techniques and ULF-Wave Power in Equatorial Region (Prof. Ayman Mahrous) 15:30 - 16:30 pm CONGA; Status of Ground based instruments in Africa (Prof. Babatunde Rabiu)

APPENDIX 1

Thursday 1st August 2024	9:00 – 9:30 Connections of the Upper and Lower Atmosphere (Prof. O. S. Bolaji) 9:30 -10:00: African Geophysical Society (Prof. O. K. Obrou) 10:00 – 10:30 Applications of nonlinear dynamics and chaos theory in geospace investigation (Dr. Samuel Ogunjo) 10:30 – 11:00 Medium-scale traveling ionospheric disturbances observed during the nighttime (Dr. Zama Katamzi-Joseph) 11:00 -11:30 Introduction to Skyimet radar (Aderonke Akerele) 11:30- 12:00 Analysis of total electron content over the African low latitude region during the maximum phase of solar cycle 24 (2012-2014) (Prof. E. O. Falayi)		13:00 – 14;00 Contributed papers or Panel session - Research trends & cooperation in ionospheric studies 14:00 - 14;30 Space weather activities & opportunities at SANSA (Dr. John Bosco Habalurema) 14:30 - 15:00 A statistical analysis of GNSS-derived TEC climate over Abuja, Nigeria (Dr. Bola Abdulrahim) 15:00 - 15:30 Okoh: Available data & opportunities at SERL 15:30- 16:30 Wrap Up & Closing session
Friday 2nd August 2024	Technical tour		
Saturday 3rd August 2024	Departure		

Resource Persons

1. Prof. Babatunde Rabiu, NASRDA, Nigeria (Convener); African Regional coordinator, ISWI
2. Prof. Christine Amory Mazaudier, Sorbonne Universities, Paris, France
3. Prof. Sandro. M. Radicella, Boston College, USA
4. Prof. Kazuo Shiokawa President-SCOSTEP, Institute for Space-Earth Environmental Research (ISEE), Nagoya University, Japan
5. Dr Keith Groves, Boston College, USA
6. Professor Wojciech J. Miloch, University of Oslo, Norway
7. Dr. Bruno Nava, The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy
8. Prof. Elijah O. Falayi, Tai Solarin University of Education, Ijagun, Nigeria

APPENDIX 1

9. Prof. O. S. Bolaji, Bowen University, Nigeria/ Department of Mathematics and Physics, University of Tasmania, Hobart, TAS, Australia
10. Dr Samuel Ogunjo, Federal University of Technology, Akure, Nigeria
11. Prof. O. K. Obrou, President, African Geophysical Society,
12. Dr. Michel Blanc, IMCP Science Committee Chair
13. Prof. B. O. Adebesin - Hillside University of Science and Technology Okemesi Ekiti State
14. Dr. Zama Katamzi-Joseph, South African National Space Agency (SANSA), Hermanus, South Africa
15. Dr Daniel Okoh - United Nations – African Regional Centre for Space Science and Technology Education – English (UN-ARCSSTE-E), Ile-Ife, Nigeria;
16. Dr Gopi Seemala - Indian Institute of Geomagnetism (IIG), Mumbai, India
17. Dr John Bosco Habarulema, South African National Space Agency (SANSA), Hermanus, South Africa
18. Dr. Claudio Cesaroni - *Istituto Nazionale Geofisica e Vulcanologia (INGV)*, Rome, Italy
19. Dr Bola Abdulrahim - United Nations – African Regional Centre for Space Science and Technology Education – English (UN-ARCSSTE-E), Ile-Ife, Nigeria)
20. Aderonke Akerele - United Nations – African Regional Centre for Space Science and Technology Education – English (UN-ARCSSTE-E), Ile-Ife, Nigeria)

Dr. Daniel Okoh Receives AGU Africa Award for Research Excellence in Space Science

006

Dr. Daniel Okoh has been awarded the prestigious Africa Award for Research Excellence in Space Science by the American Geophysical Union (AGU). This award, one of the highest honors for early/mid-career African scientists, recognizes Dr. Okoh's outstanding contributions to space weather research, particularly in ionospheric modeling and its applications for the African continent. The Award shall be officially presented at the Annual Conference of AGU holding in December 2024 at Washington DC, USA.

Dr. Daniel Okoh is a researcher at the Space Environment Research Laboratory, National Space Research and Development Agency (NASRDA), Abuja. He presently works as a postdoctoral fellow on the NORISK (New Observatory for Real-time Ionospheric Sounding over Kenya) project of the National Institute for Geophysics and Volcanology (INGV).

Dr. Okoh leads the team responsible for developing the African regional ionospheric Total Electron Content (AfriTEC) model, which has been instrumental in advancing space weather forecasting capabilities. His innovative work on integrating Machine Learning and Artificial Intelligence with ionospheric data has significantly enhanced the accuracy of space weather predictions, making substantial contributions to both scientific understanding and practical applications in communications and navigation systems.

The AGU Africa Award for Research Excellence in Space Science is given annually to an early career scientist from the African continent in recognition of significant work that shows the focus and promise of making outstanding contributions to research in space science. Established in 2015 by the generosity of Sunanda Basu, this award supports diversity in the Earth and space science community by recognizing excellence in research by African scientists and expanding opportunities for international collaboration on the African continent.

The AGU award acknowledges Dr. Okoh’s role in addressing critical scientific challenges unique to the African space environment and his leadership in international collaborations. His research has also gained recognition through his work on the global 3D-NN electron density model, which offers groundbreaking insights into the Earth's ionosphere.

The AGU Africa Award for Research Excellence in Space Science not only highlights Dr. Okoh’s individual achievements but also represents a growing recognition of Africa's vital role in global space research. As Dr. Okoh continues his work, this accolade promises to propel further innovation and inspire the next generation of African space scientists.

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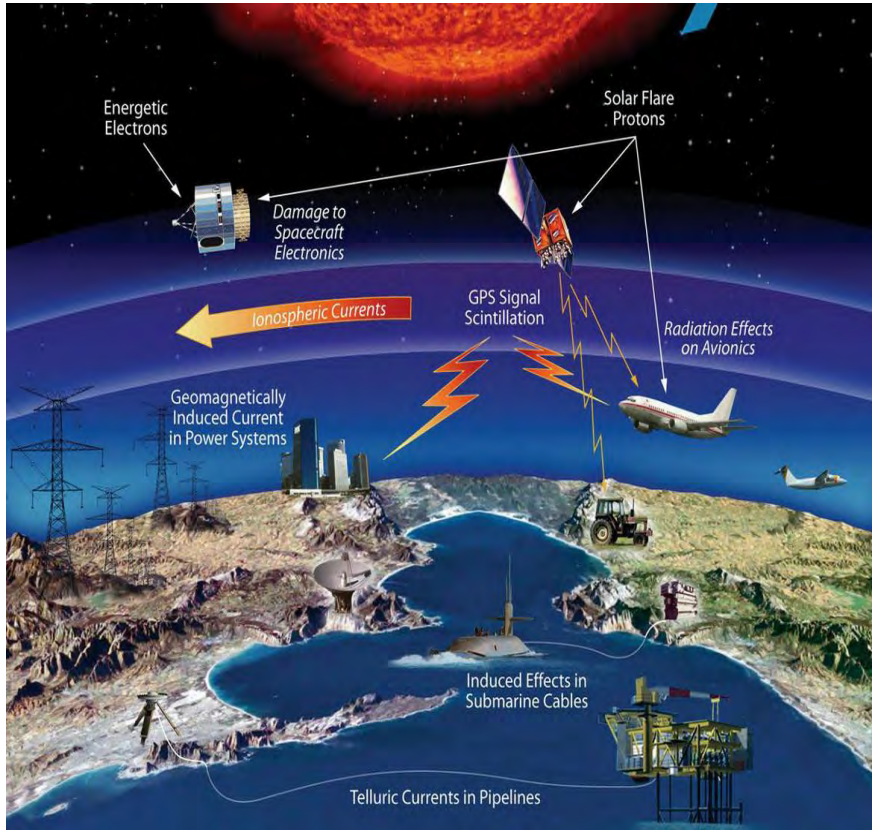
I*nternational Space Weather Initiative*

M*aghreb* **A***frica West and Central*

Conakry - 14 - 25 October 2024

Participating countries

Algeria, Benin, Burkina Faso, Cameroon, Chad, Côte d'Ivoire, Democratic Republic of Congo, France, Guinea, Morocco, Palestine, Republic of Congo, Senegal, Tunisia, Togo, Vietnam



007

UNDERSTANDING AND PREDICTING THE IMPACT OF EXTREME SOLAR EVENTS ON OUR EVERYDAY LIVES:

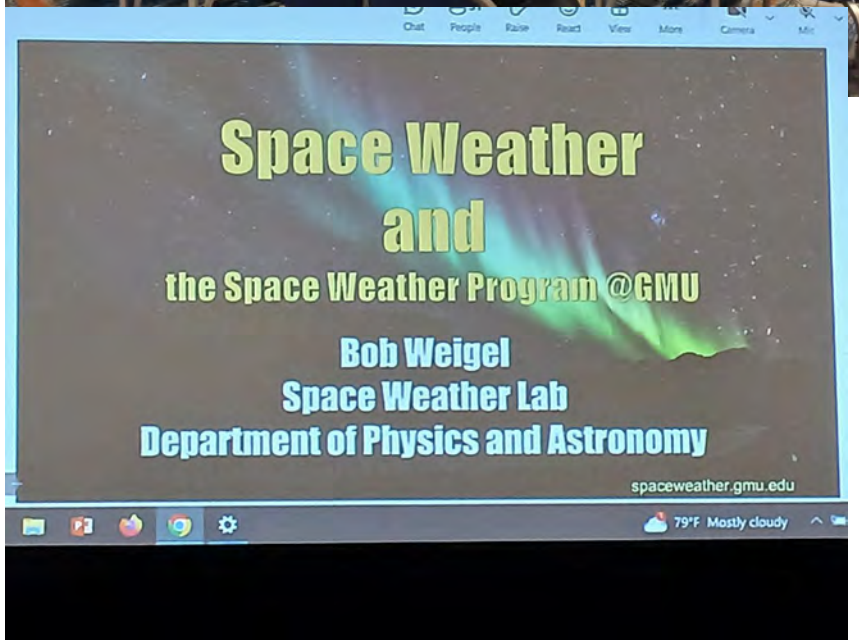
NEW TECHNOLOGIES
CLIMATE

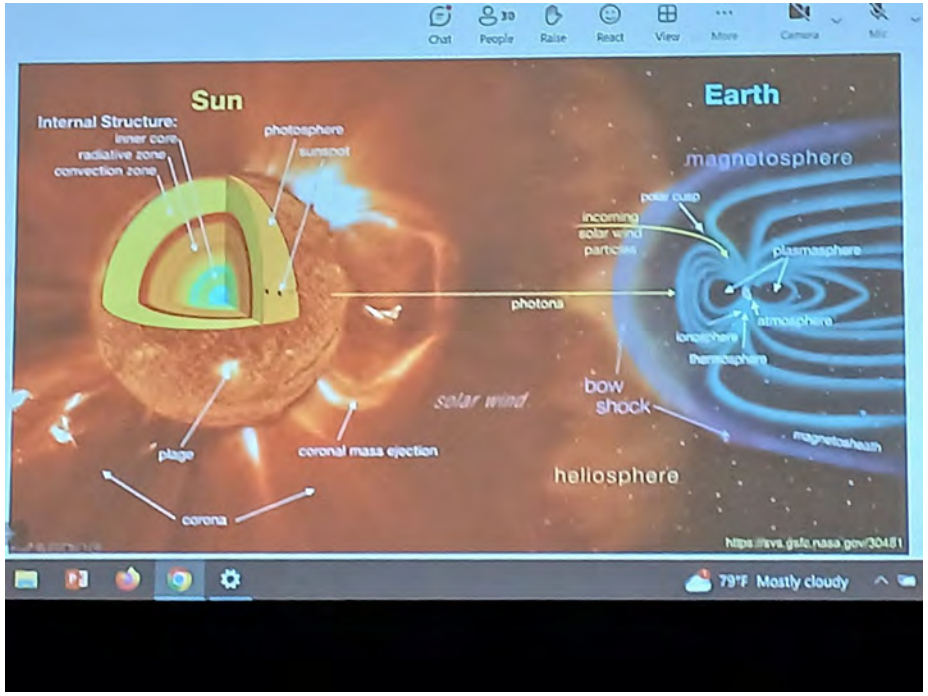
An Overview of Space Weather Research 008

Dr. Bob Weigel,

Professor and Director of Space Weather Lab, George Mason University

16-Sept-2024





https://www.ion.org/gnss/

ION INSTITUTE OF NAVIGATION

ION GNSS+ 2024
September 16-20
Baltimore, MD

https://www.nytimes.com/2024/10/11/science/northern-lights-world-photos.html

A sky painted in red, orange and yellow was framed by a rail structure near the St. Joseph Lighthouse in St. Joseph, Mich.

Credit...Don Campbell/The Herald-Palladium via AP

By **The New York Times**

Oct. 11, 2024

Night skies came aglow on Thursday with the shimmering palette of the northern lights, or the aurora borealis if you prefer.

Above rooftops in Brooklyn and along the shores of Maine, amid Scottish trees and between Russian monuments to artistry, human eyes looked up, surprised to spot colorful bands of chemistry dancing in the dark. Forecasts from space weather watchers in the United States suggested that the show could be seen as far south as Alabama. It may linger through Friday evening in states farther north, closer to their usual habitat, with some visibility expected from the lower Midwest to Oregon.

Stars shined above a line of trees and against the lilac backdrop of the night sky by Haraldsted Lake, north of Ringsted, Denmark.

The New York Times

The northern lights are usually most visible near the North Pole, but this burst of energy brought colors to places much farther south, such as Rouans, in western France.

The New York Times

Even in urban areas illuminated by light from apartments, streetlamps and automobiles, like New York City, the sky became the main attraction on Thursday evening. The purplish tint seemed to hover above buildings in Queens.

The New York Times

The sky above Kyiv, Ukraine, glowed red-orange above a gray haze.

The New York Times

A burst of color, red and green, flashed above Holy Island in Northumberland, in northeastern England.

The New York Times

Tall art pieces stood in dark contrast to the sky, tinged in light hues of purple at a park in Nikola-Lenivets in the Kaluga region of western Russia.

The New York Times

A neighborhood still without electricity, after damage caused by Hurricane Helene, became a bucolic setting for a view of the northern lights in Asheville, N.C.

The New York Times

Water by a gulf glinted with the reflections of the aurora borealis in Gdynia, Poland.

The New York Times

The horizon glowed scarlet and bright green above the road ahead in Lietzen, about 40 miles east of Berlin.

THE END

Reporting and editing by *Clinton Cargill, Brent Lewis, Kenneth Chang, Katrina Miller, Víctor Manuel Ramos and Michael Roston*.