

**REPORT ON THE 2<sup>nd</sup> INTERNATIONAL SCHOOL ON EQUATORIAL  
AND LOW-LATITUDE IONOSPHERE (ISELLI-2)  
COVENANT UNIVERSITY, CANAANLAND, OTA, OGUN STATE, NEAR  
LAGOS, NIGERIA**

**10-16 SEPTEMBER 2017**

**Co-organized by:**

Centre for Atmospheric Research, National Space Research and Development Agency, Nigeria;  
JSPS core-to-core program B. Asia-Africa Science Platforms, Japan;  
Center for International Collaborative Research (CICR), Institute for Space-Earth Environmental Research  
(ISEE), Nagoya University, Japan;  
Inter-university Upper atmosphere Global Observation Network (IUGONET), Japan;  
Project for Solar-Terrestrial Environment Prediction (PSTEP), MEXT, Japan;  
The Scientific Committee on Solar Terrestrial Physics (SCOSTEP); and  
Covenant University, Canaan Land, Ota, Nigeria

**BACKGROUND INFORMATION**

This 2nd international school on the equatorial and low-latitude ionosphere is a follow up to the highly successful first edition, which was held in Abuja, Nigeria, September 2015. ISELLI-2 is aimed at capacity building of young researchers and graduate-course students in ionospheric and space weather Physics.

The School was co-organized by the Centre for Atmospheric Research, National Space Research and Development Agency, Nigeria; JSPS core-to-core program B. Asia-Africa Science Platforms, Japan; Center for International Collaborative Research (CICR), Institute for Space-Earth Environmental Research (ISEE), Nagoya University, Japan; International Center for Space Weather Science and Education, Kyushu University, Japan; Inter-university Upper atmosphere Global Observation NETwork (IUGONET), Japan; Project for Solar-Terrestrial Environment Prediction (PSTEP), MEXT, Japan; The Scientific Committee on Solar Terrestrial Physics (SCOSTEP); and Covenant University, Canaan Land, Ota, Nigeria.

**VENUE AND DATES**

The workshop held between 10<sup>th</sup> and 16<sup>th</sup> September 2017 at the **Covenant University, Canaan Land, Ota, near Lagos, Nigeria**. All lectures and hands-on training took place within the halls reserved within the University Campus.

**ARRIVAL DATE**

The official arrival date was Sunday 10<sup>th</sup> September 2017.

## **THE PROGRAMME**

The School started with an opening session at about 9:00 am on Monday 11<sup>th</sup> September 2017. The Head of Department of Physics, Dr (Mrs) Mojisola Usikalu welcome every participant to the University campus. Other speakers at the Opening ceremony were: Prof Kazuo Shiokawa of ISEE, Nagoya University and Professor Babatunde Rabiú of CAR, NASRDA, who were both Co-Directors of the School.

Day-to-day activities of the School which followed a well structured schedule is as reflected in Appendix 1 (Program\_ISELLI -2 \_ 2017). Detailed report on the various events and lectures are reported in the rapporteur's report labeled as Appendix 2.

On Wednesday 17<sup>th</sup> September 2017, thirty-one (31) participants toured the historical Olumo Rock in the ancient city of Abeokuta and were shown some historical sites within the city.

The School was brought to a close on Friday 15<sup>th</sup> September 2017 with a short wrap up session at about 1:00 pm which featured presentation of certificates of attendance to all participants. A sample of the certificate is attached as Appendix 3

## **SUMMARY OF PARTICIPATION**

52 persons participated in the School; 14 instructors, and 40 trainees. In all participants from 10 Countries participated in the August event. See the list of participants in Appendix 4. The Instructors are again listed in Appendix 5.

## **COUNTRIES OF PARTICIPANTS**

1. Cameroon
2. Cote D'Ivoire
3. Egypt
4. Ethiopia
5. India
6. Nigeria
7. Japan
8. Kenya
9. Uganda
10. United States

## **AVAILABILITY OF THE LECTURE NOTES**

All the lecture notes delivered at the School could be downloaded as pdf at:

[http://carnasrda.com/iselli2\\_presentation/](http://carnasrda.com/iselli2_presentation/)

### ***School Co-Directors***

1. Prof Kazuo Shiokawa, Center for International Collaborative Research (CICR), Institute for Space-Earth Environmental Research (ISEE), Nagoya University, Japan
2. Prof Babatunde Rabiú, Centre for Atmospheric Research, National Space Research and Development Agency, Nigeria.



## **2<sup>nd</sup> INTERNATIONAL SCHOOL ON EQUATORIAL & LOW-LATITUDE IONOSPHERE ISELLI - 2**

Covenant University, Ota, Nigeria

10 - 16 September 2017

### **OUTLINE OF ACTIVITY**

#### **Sunday 10 September 2017**

Arrival and registration

#### **Monday 11 September 2017**

8:30 – 10:00 Registration / Opening ceremony/ About the School

10:00-10:30 - Health Break

10:30 – 12:00 - Solar-Terrestrial Physics Introduction – Prof Kazuo Shiokawa, Institute for Space-Earth Environmental Research (ISEE), Nagoya University, Japan

12:00- 13:00 - Ionosphere: An overview and observational techniques~ Prof Olivier K Obrou, Félix Houphouët-Boigny University, Abidjan, Cote d'Ivoire

13:00 – 14:00 – Lunch

14:00 – 15:00 - Equatorial Ionospheric Phenomena: A tutorial - Professor A. Babatunde Rabi, Centre for Atmospheric Research, National Space Research and Development Agency, Nigeria;

15:00 – 16:00 - AMBER magnetometer network and Equatorial electrodynamics ~ Dr. Endawoke Yizengaw, Institute for Scientific Research, Boston College, USA,

16:00 – 17:30 - Magnetosphere-Ionosphere Coupling ~ Dr. Akimasa Yoshikawa, International Center for Space Weather Science and Education, Kyushu University, Japan

#### **Tuesday 12 September 2017**

8:30 – 10:00 - Ionosphere: Measurements and origin of disturbances: – Prof Kazuo Shiokawa, ISEE, Japan

10:00-10:30 - Health Break

10:30 – 12:00 - Equatorial electrojet current : variability and their electromagnetic coupling – Dr. Akimasa Yoshikawa, ICSWSE, Japan

12:00- 13:00 - Introduction to Space Weather Impacts – Dr. Endawoke Yizengaw, ISR, BC, USA

13:00 – 14:00 – Lunch

14:00 – 14:45 - International Reference Ionosphere – Prof. E. O. Oyeyemi, University of Lagos, Nigeria

14:45 – 16:00 - Training on Ionolab TEC, IRI-Plas-2015 and NeQuick-2 – Dr. A. O. Adewale, University of Lagos, Nigeria

16:00 – 16:30 - CAR NN Ionospheric TEC model - Dr. D. I. Okoh

16:30–17:30 - Participants poster session 1 (15 posters)

### Wednesday 13 September 2017

8:30 – 10:00 - Nighttime medium-scale traveling ionospheric disturbances (MSTIDs) – Prof Kazuo Shiokawa, ISEE, Japan

10:00-10:30 - Health Break

10:30 – 11:00 - About MAGDAS magnetometers – Dr. Akimasa Yoshikawa, ICSWSE, Japan,

11:00–17:30 - Tour of the ancient Abeokuta City and Obasanjo Presidential Library.

### Thursday 14 September 2017

8:30 – 9:30 – GIC current impacts at the geomagnetic equator – Dr. Endawoke Yizengaw, ISR, BC, USA

9:30 – 10:00 – VarSITI - Variability of the Sun and Its Terrestrial Impact – Prof Kazuo Shiokawa, ISEE, Japan

10:00-10:30 - Health Break

10:30–11:00 – Where to click to get data from different instruments and how to process them – Dr. Endawoke Yizengaw, ISR, BC, USA

11:00 – 12:00 - Tutorial on Ionosonde and its data usage – Dr. A. O. Olawepo, University of Ilorin, Nigeria

12:00- 13:00 – Vertical plasma drifts in the equatorial ionosphere – Dr. B. O. Adebesein, Landmark University, Nigeria

13:00 – 14:00 – Lunch

14:00 –16:00 - Training for the IUGONET data use: hands on seminar – Dr. Shun Imajo, World Data Center for Geomagnetism, Data Analysis Center for Geomagnetism and Space Magnetism, Kyoto University, Japan

16:00 – 16:30 – Estimation of Equatorial electrojet from ground based data - Professor A. Babatunde Rabi, CAR, NASRDA, Nigeria

16:30–17:30 Participants poster session 2 (15 posters)

### Friday 15 September 2017

8:30 – 9:30 - Space weather observational facilities and Research opportunities at CAR) –Prof Babatunde Rabi, CAR, NASRDA, Nigeria

9:30 – 10:00 - Current Research Problems – Professor A. Babatunde Rabi, CAR, NASRDA, Nigeria

10:00-10:30 - Health Break

10:30 – 11:00 - Geomagnetic Induction – Dr. E. O. Falayi, Tai Solarin University of Education, Nigeria

11:00- 11:30 – GPS-TEC Data Analysis Laboratory – Ms R. Bola Abdulrahim, Centre for Satellite Technology Development, NASRDA, Nigeria

11:30 – 12:30 - Developing research skills and ethics – Dr. T. V. Omotosho, Covenant University, Nigeria

12:30 – 13:00 - Closing Session

13:00 – 14:00 – Lunch

### Saturday 16 September 2017

Departure

## APPENDIX 2: DAY TO DAY ACTIVITIES

### DAY 1: Sunday, 10 September 2017.

Many participants arrived at the venue of the School on the first day. Adequate arrangements were made for lodging at the Covenant University Guest Houses and at the Camp Houses. Dinner was served by 7:30 pm.

### DAY 2: Monday, 11 September 2017

**09:30 – 11:00** Registration/Introduction

**11:00 – 11:30** Tea Break

**11:30-13:00** The first lecture was delivered by Prof. Kazuo Shiokawa of the Institute for Space-Earth Environmental Research (ISEE), Nagoya University, Japan. His talk, titled *Solar-Terrestrial Physics Introduction*, started with an overview of the solar-terrestrial environment. He went further to provide detailed explanation on the Sun and heliosphere, Structure and dynamics of the magnetosphere and ionosphere, and Space weather effects on human activity.

**13:00-14:00** Prof. Olivier K. Obrou, from Felix Houphouet-Boigny University in Abidjan, Cote d'Ivoire, presented the next lecture titled *Ionosphere: An overview and observational techniques*. His talk included the historical background on the existence and properties of the ionosphere. Additional topics taught by Prof. K. O. Obrou were Formation, Characteristics and observational techniques of the ionosphere, and the Equatorial ionosphere.

**14:00-15:00** Lunch break

**15:00-16:00** After the lunch break, Prof. A. B. Rabiou from the Centre for Atmospheric Research, National Space Research and Development Agency (CAR, NASRDA), Anyigba, Kogi State, Nigeria presented a tutorial on *Equatorial Ionospheric Phenomena*. He taught on the Equatorial Ionospheric Anomaly (EIA) and its manifestations, scintillation in the equatorial region, Equatorial Spread-F (ESF), Equatorial Electrojet (EEJ) and Solar quiet (Sq) variability and other topics.

**16:00-17:30** The final tutorial for Day 1 was presented by Dr. Endawoke Yizengaw from the Institute for Scientific Research, Boston College, USA. In his talk, titled *AMBER magnetometer network and Equatorial electrodynamics*, he taught extensively on the use of data from the AMBER magnetometer network and presented research findings from the data.

### **DAY 3: Tuesday, 12 September 2017**

**08:30 – 10:00** Day 3 began with a tutorial on the ionosphere titled *Ionosphere: Measurements and origin of disturbances*, presented by Prof. Kazuo Shiokawa. In his talk Prof. K. Shiokawa discussed the different techniques/instruments used to study the ionosphere. He also taught on the major forces that cause dynamic variations in the F-region region of the mid-latitude ionosphere. He further explained the occurrences of Large Scale Travelling Ionospheric Disturbances (LSTIDs) and composition changes of the ionosphere during geomagnetic storms. The ionospheric disturbances which occur during geomagnetically quiet periods were also discussed. In the concluding part of his talk, he highlighted key research questions which remain unanswered in the study of the ionosphere.

**10:00 – 10:30** Group photograph/Tea Break

**10:30-12:00** Prof. Akimasa Yoshikawa presented the next tutorial titled *Magnetosphere-Ionosphere Coupling*. He explained ionospheric electrodynamics using the magneto-hydrodynamic (MHD) theory and also explained the coupling processes between the magnetosphere and ionosphere via the shear Alfvén wave.

**12:00-13:00** The third lecture for the day was delivered by Dr. Endawoke Yizengaw. Various impacts of space weather were presented in his talk titled *Introduction to Space Weather Impacts*.

**13:00-14:00** Lunch break

**14:00-14:45** A lecture on the *International Reference Ionosphere (IRI)* was delivered by Prof. E. O. Oyeyemi from the Department of Physics University of Lagos, Nigeria. His talk began with a brief introduction on the structure, formation, composition, and applications of the ionosphere. Next, he discussed the need for modelling of the ionosphere and the two main types of modelling. The details of the IRI model were then presented after which a demonstration of how to supply input parameters and obtain model outputs was given. Research results using the IRI model were presented and further applications of the model were provided.

**14:45-16:00** The next talk was a session on *Training on Ionolab TEC, IRI-Plas-2015, and NeQuick-2* by Dr. A. O. Adewale from the Department of Physics University of Lagos, Nigeria. Different methods of extracting Total Electron Content from data files were first introduced. Participants of the School were taken through a hands-on session on using the different TEC extraction software and models.

**16:00-16:30** The concluding talk for the day was presented by Dr. D. I. Okoh from the Centre for Atmospheric Research, (CAR), Anyigba, Kogi State, Nigeria. Results from the *CAR NN*

*Ionospheric TEC model* showed that the model performed better than existing TEC models in predicting the total electron content.

**16:30-17:30 Poster Session II:** The Following participants displayed their posters -

- |                             |                      |
|-----------------------------|----------------------|
| 1. Owolabi, Temitope Pascal | 3. Bolarinwa Adekoya |
| 2. Honore Messanga          | 4. Patrick Mungufeni |

#### **DAY 4: Wednesday, 13 September 2017**

**08:30 – 10:00** Prof. K. Shiokawa's tutorial on *Nighttime Medium-Scale Travelling Ionospheric Disturbances (MSTIDs)* started by 8:30 am. Observations of nighttime MSTIDs obtained from GPS TEC and airglow intensity imaging were presented. A possible explanation for the predominant south-west propagation of these disturbances at the midlatitudes during the nighttime was provided. Prof. Shiokawa also talked about the Inter-hemispheric coupling through nighttime MSTIDs at middle latitudes, MSTID signatures in the electric field and magnetic field fluctuations observed by different satellites, and the Global distribution of nighttime MSTIDs.

**10:00 – 10:30** Tea Break

**10:30-11:00** In his talk titled *About MAGDAS magnetometers*, Prof. A. Yoshikawa discussed the MAGDAS magnetometer network and the derivation and applications of the EE-index derived from the geomagnetic field measurements.

**12:00-19:30** Tour of the ancient Abeokuta city.

#### **DAY 5: Thursday, 14 September 2017**

**08:30 – 09:30** Dr. B. O. Adebisin from the Department of Physical Sciences, Landmark University, Omu-Aran, Kwara State, Nigeria delivered the first lecture of the day titled *Vertical plasma drifts in the equatorial ionosphere*. His talk began with an explanation of the process of vertical plasma drift and its drivers. Different methods which had been previously employed in the measurement of vertical plasma drift were also presented. The use of the height of ionospheric F2 layer as a measure of vertical plasma drift was explained and the results obtained using this method were presented. Studies of the pre-reversal enhancement (PRE) of the vertical plasma drift were also presented.

**09:30-10:00** Dr. Endawoke Yizengaw presented the next talk on GIC current impacts at the geomagnetic equator. The use of ground magnetometers to measure GICs and the effects of

geomagnetic storms on power transformers reported at different locations was discussed. Research results on this topic were also presented.

**10:00 – 10:30** Tea Break

**10:30-11:00** Participants returned from the tea break to listen to the talk by Prof. K. Shiokawa presented on *VarSITI – Variability of the Sun and its Terrestrial Impact*. An overview of the international interdisciplinary programs in solar-terrestrial physics operated by SCOSTEP was given. Details of the 4 scientific projects under VarSITI (ISEST, SEE, ROSMIC, and SPeCIMEN) were also provided. The activities of the VarSITI program from 2014 till date were presented as well as the campaigns in the program. Information about the databases supported by VarSITI was provided and copies of the most recent VarSITI newsletter were distributed to all participants. Prof. K. Shiokawa promised to include participants, who have not subscribed to the VarSITI newsletter, in the mailing list.

**11:00-12:00** In his talk on *Where to click to get data from different instruments and how to process them*, Dr. Endawoke Yizengaw provided useful websites for space weather information such as images of the sun, solar wind parameters, magnetic indices, magnetometer data, GPS RINEX data, calculated GPS TEC, magnetospheric data, and several more. The websites of publicly available model run data bases like the Community Coordinated Modeling Centre (CCMC) were also provided.

After his talk, Dr. E. Yizengaw then presented the talk on *Multi-instrument Techniques for Space Weather Monitoring* on behalf of Dr. Anthea Coster of the MIT Haystack Observatory.

**12:00-13:00** Dr. A. O. Olawepo from the University of Ilorin, Nigeria delivered a *Tutorial on Ionosonde data and its usage*. A description of the ionosonde, its components, and its outputs were given. He further explained the major features of a typical ionogram and how to interpret ionograms. Different methods of ionogram scaling and reduction were introduced. The typical parameters derivable from an ionogram and their applications were explained. Different processing techniques and software like POLANT and NHPC were introduced. Sources of ionosonde data were also provided.

**13:00-14:30** Lunch break

**14:30-16:30** Hands-on *Training for the IUGONET data use* was facilitated by Dr. Shun Imajo from the World Data Center for Geomagnetism, Data Analysis Center for Geomagnetism and Space Magnetism, Kyoto University, Japan. He guided the participants on the installation of the SPEDAS GUI tool on their laptops after which participants were able to use the software to load and plot data, and also save the plots.

**16:30-17:30 Poster Session II:** The following participants displayed their posters-



1. Olajide-Owoyomi
2. Afolabi O. O
3. Omondi George
4. Adebisi Shola
5. Idolor Omena Raphael
6. Phani Chandrasekar
7. Ellahouny Nada
8. Olawale Bello
9. Kazeem Abdullahi
10. Olugbon Busola
11. Olabode Ayomide

#### **DAY 6: Friday, 15 September 2017**

**08:30 – 09:30** Prof. A. B. Rabiou presented the first lecture for the day on *Space weather observational facilities and research opportunities at CAR*. A summary of the activities at CAR NASRDA, its mission statement, focus areas, modes of operation, research projects, space research laboratories and their functions, equipment, the Inter-University Corporation for Atmospheric Research (IUCAR) and more were discussed.

**09:30-10:00** An interactive session to discuss current research topics and areas with outstanding science problems was facilitated by Prof. A. B. Rabiou. Participants made notable contributions in this session.

**10:00 – 10:30** Group photograph/Tea Break

**10:30-11:00** Participants reconvened after the tea break for the talk on Boston College *GPS-TEC Data Analysis Laboratory* by Ms. Bola R. Abdulrahim. She explained the different formats of the data recorded by GPS receivers and the parameters required from GPS receivers in order to calculate the TEC. The processes involved in data analysis by GPS-TEC were explained. Recent updates to the software were highlighted during the talk. She showed participants how to process downloaded data files using the software. Due acknowledgements were given to Dr. Gopi Seemala, the software developer.

**11:00-11:30** Dr. E. O. Falayi delivered the next talk on *Geomagnetic Induction*. He provided detailed explanation on modelling of Geomagnetically Induced Currents (GICs) and showed recent research results in this area. Recommendations on how to protect infrastructure from GIC damage were also discussed.

**11:30-12:30** The final talk in the School was presented by Dr. V. T. Omotoso from Covenant University, Nigeria. In his talk on *Developing Research Skills and Ethics*, he discussed issues like authorship, plagiarism, peer review, conflicts of interest and many more. The second part of his talk focused on developing research skills. He provided tips

on personal development mentioned important research skills that any researcher ought to acquire.

**12:30-13:00** In closing, Dr. E. O. Falayi acknowledged and thanked, on behalf of the participants, the School Directors, Instructors, and Local Organizing Committee. The Head, Physics Department, Covenant University, in her closing remarks thanked all the participants for a successful event and expressed hope that the success of the School would attract more international collaborations and events. Dr. E. Yizengaw expressed his gratitude to the Head of Physics for successfully co-organizing the School and for the support provided throughout the event. In conclusion, the School Director, Prof. Kazuo Shiokawa encouraged every participant to make effort and invest time to learn and understand the concepts that had been taught during the School.

**13:00** Lunch

**Saturday, 16 September 2017      Departure**

**Report Prepared By:**

**Busola Olugbon**

*University of Lagos, Nigeria*

2<sup>nd</sup>



INTERNATIONAL SCHOOL ON EQUATORIAL AND  
LOW-LATITUDE IONOSPHERE (ISELI-2)

*Certificate*  
**OF PARTICIPATION**  
*is awarded to*

Covenant University, Canaan Land, Ota, Nigeria. 11 - 15 September, 2017

**PROF. KAZUO SHIOKAWA**  
*Director of School*



**PROF. A. BABATUNDE RABIU**  
*Director of School*



## 2<sup>nd</sup> INTERNATIONAL SCHOOL ON EQUATORIAL & LOW-LATITUDE IONOSPHERE ISELLI - 2

Covenant University, Ota, Nigeria

10 - 16 September 2017

### PARTICIPANTS

S/N	NAME	AFFILIATION
1	Iluore Keneth	University of Nigeria, Department of Physics And Astronomy, Faculty of Physical sciences.Nigeria
2	Adekoya Bolarinwa	Olabisi Onabanjo University.Nigeria
3	Joel Emmanuel S.	Covenant University,Ota, Nigeria
4	Afolabi Oladayo	Ladoke Akintola University of Technology, Ogbomoso, Oyo state, Nigeria
5	Jimoh Oluwaseyi Emmanuel	Federal College of Education (Technical), Akoka,Nigeria
6	Yusuf Najib	Centre for Atmospheric Research,Nigeria
7	Boyo H.O	Covenant University,Ota,Nigeria
8	Obafaye Aderonke Adekemi	CAR-NASRDA,Nigeria
9	Adebiyi Shola John	Landmark University,Nigeria
10	Owolabi Oluwafisayo Paul	Department of Physics, University of Ilorin, Kwara State, Nigeria
11	Olabode Ayomide Oluyemi	Obafemi Awolowo University, Ile-Ife, Nigeria
12	Kazeem Abdullahi K.	Department of Physics, Federal University of Technology, Akure, Ondo State,Nigeria
13	Adewale Adekola Olajide <sup>T</sup>	University of Lagos,Nigeria
14	Owolabi Temitope Pascal	African Regional Centre for Space Science, ARCSSTEE O.A.U. ile ife,Nigeria

15	Olugbon Busola	University of Lagos,Nigeria
16	Akinyemi Gbenga Akinpelumi	Redeemer's University Ede, Osun State, Nigeria
17	Abdulrahim Rasheedat Bola <sup>T</sup>	National Space Research and Dev. Agency, Abuja, Nigeria
18	Olawole Olukunle	Covenant Univeristy, Ota, Nigeria
19	Obafemi, A.	Covenant University,Ota,Nigeria
20	Olajide Owoyomi	Department of Physics, Federal University of Technology, Akure
21	Bello, Olawale Ramon	Department of Physics, Federal University of Technology, Akure, Nigeria
22	Anoke Rose	University of Lagos, Nigeria
23	Idolor Omena Raphael	University of Lagos, Nigeria
24	Bimbo Jamah	CAR-NASRDA
25	Fashae Joshua Bankole	University of Lagos, Nigeria
26	Adewoyin Imoleayo Deborah	University of Lagos, Nigeria
27	Moses Mefe	Ahmadu Bello Univerisy Zaria-Nigeria
28	Oloruntola, Racheal Foluke	Federal College of Animal Health and Production Technology Ibadan. Oyo State, Nigeria
29	Ajiboye Ahmed AbdulYaqub	University of Ilorin, Nigeria
30	HONORE MESSANGA ETOUNDI	University of Yaounde 1,Cameroon
31	YAO N gbesso Josee	Laboratoire de physique de l'Atmosphere, University FHB Abidjan Cote d'Ivoire
32	Dr. Aizebeokhai, A. P.	Covenant University,Ota,Nigeria
33	Ellahouny Nada	Space Weather Monitoring Center,Egypt
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35	Tuyizere Sarathiel	University of Rwanda,Rwanda
36	MUNGUFENI Patrick	Mbarara University of Science Science and Technology, Mbarara, Uganda
37	Phani Chandrasekar	CSRI-NGRI, India
38	Anyasi Amaka Ifeyinwa	Strategic Application, NASRDA, Abuja

39	Prof A. Babatunde Rabiū <sup>T</sup>	Centre for Atmospheric Research, NASRDA, Nigeria
40	Prof Kazuo Shiokawa <sup>T</sup>	Institute for Space-Earth Environmental Research (ISEE), Nagoya University, Japan.
41	Prof Olivier K Obrou <sup>T</sup>	Félix Houphouët-Boigny University, Abidjan, Cote d'Ivoire
42	Dr. Endawoke Yizengaw <sup>T</sup>	Institute for Scientific Research, Boston College, USA
43	Dr. Akimasa Yoshikawa <sup>T</sup>	International Center for Space Weather Science and Education, Kyushu University, Japan
44	Prof. E. O. Oyeyemi <sup>T</sup>	University of Lagos, Nigeria
45	Dr. Maxwell Omeje	Covenant University, Nigeria
46	Dr. D. I. Okoh <sup>T</sup>	Centre for Atmospheric Research, National Space Research and Development Agency, Nigeria
47	Dr. A. O. Olawepo <sup>T</sup>	University of Ilorin, Nigeria
48	Dr. B. O. Adebisin <sup>T</sup>	Landmark University, Nigeria
49	Dr. Shun Imajo <sup>T</sup>	World Data Center for Geomagnetism, Data Analysis Center for Geomagnetism and Space Magnetism, Kyoto University, Japan
50	Dr. Mrs M. Usikalū <sup>T</sup>	Covenant University, Ota, Nigeria
51	Dr. E. O. Falayi <sup>T</sup>	Tai Solarin University of Education, Nigeria
52	Dr. T. V. Omotosho <sup>T</sup>	Covenant University, Ota, Nigeria

<sup>T</sup> : Instructors

### Instructors with their Affiliations

1. Prof Kazuo Shiokawa, Institute for Space-Earth Environmental Research (ISEE), Nagoya University, Japan
2. Professor A. Babatunde Rabi, Centre for Atmospheric Research, National Space Research and Development Agency, Nigeria;
3. Prof Olivier K Obrou, Félix Houphouët-Boigny University, Abidjan, Cote d'Ivoire
4. Dr. Endawoke Yizengaw, Institute for Scientific Research, Boston College, USA,
5. Dr. Akimasa Yoshikawa, International Center for Space Weather Science and Education, Kyushu University, Japan
6. Prof. E. O. Oyeyemi, University of Lagos, Nigeria;
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12. Dr. E. O. Falayi, Tai Solarin University of Education, Nigeria
13. Ms R. Bola Abdulrahim, Centre for Satellite Technology Development, NASRDA, Nigeria ;
14. Dr. T. V. Omotosho, Covenant University, Nigeria