



***(Hybrid format) United Nations Workshop on
the International Space Weather Initiative:
The Way Forward***

Organised by

The United Nations Office for Outer Space Affairs

Hosted by

The United Nations Office for Outer Space Affairs

26 – 30 June 2023

Vienna

PROGRAMME

Venue: Vienna International Centre

Monday, 26 June

VENUE: Conference Room 1 (CR-1), C-building, 2nd Floor, Vienna International Centre (VIC)

TIME: UTC+02:00 (CEST – Central European Summer time)

08:00 – 09:15 Registration (Gate 1, VIC)

09:30 Opening and Welcome Remarks

Sharafat GADIMOVA, *United Nations Office for Outer Space Affairs*

Natchimuthukonar GOPALSWAMY, *National Aeronautics and Space Administration, United States of America*

09:40 Keynote addresses: Setting the tone

Sun and Space Weather, *Natchimuthukonar GOPALSWAMY, National Aeronautics and Space Administration, United States of America*

Space Weather Campaigns, *Manuela TEMMER, Austria*

10:20 – 10:40 Coffee Break

10:40 Session 1: Space Weather Instrumentation and Data

Chairperson: Paul Baki OLANDE, Kenya

Rapporteur: Emmanuel ARIYIBI, Nigeria

10:40 ISWI Data Coordination & Usage, *Shing FUNG, United States*

11:00 CALLISTO instrument and the e-CALLISTO network, *Christian MONSTEIN, Switzerland*

11:20 Analysis of Solar Radio Bursts Detected by A Single Station CALLISTO Spectrometer for Space Weather Study at Space Technology Complex, Banting, Malaysia, *Chen Chen LAU, Malaysia (online)*

11:40 LOFAR radio-telescope as a novel instrument for ionosphere monitoring, *Andrzej KRANKOWSKI, Poland*

12:00 Estimating the daytime vertical $E \times B$ drift velocities in the F-region of the equatorial ionosphere using the IEEY and AMBER magnetic data in West Africa, *Kassamba Abdel Aziz DIABY, Ivory Coast*

12:20 – 13:20 Lunch break

13:20 Session 2: Magnetosphere-Ionosphere-Thermosphere Coupling

Chairperson: Patrick MUNGUFENI, Uganda

Rapporteur: Narayan CHAPAGAIN, Nepal

13:20 The magnetospheric weather: origin and consequences, *Rumi NAKAMURA, Austria*

13:40 Ionospheric Space Weather, *Susan SKONE, Canada*

14:00 Interdisciplinary approach to research in Space Weather and Ionosphere: a necessary trend, *Sandro RADICELLA, Italy*

14:20 The role of the ionosphere in the space weather, *Lucilla ALFONSI, Italy*

14:40 A Novel Ionospheric Diagram for Understanding Ionospheric Characteristics and Behaviour, *Mehmet BARAN ÖKTEN, Turkiye*

15:00 – 15:20 *Coffee Break*

15:20 Session 3: Space Weather Monitoring using Low-Cost Receiver Systems

Chairperson and Rapporteur: Sharafat GADIMOVA, United Nations Office for Outer Space Affairs

15:20 Ionospheric Monitoring Using Low-cost GNSS receivers, *Bruno NAVA, ICTP, Italy*

15:40 Low-Cost GNSS Receiver System for Space Weather, *Dinesh MANANDHAR, Japan*

16:00 A Comparison of Low-Cost GNSS Scintillation and TEC Measurements with Baseline Observations, *Keith GROVES, United States*

16:20 – 17:40 Discussion Panel 1: ISWI Instruments

Moderator: Shing FUNG, United States

Rapporteur:

- Christian MONSTEIN, *Switzerland*
- Keith GROVES, *United States*
- Dinesh MANANDHAR, *Japan*
- Ivan DOROTOVIČ, *Slovakia*

17:40 *Adjourn*

Tuesday, 27 June

09:00 Session 4: Magnetosphere-Ionosphere-Thermosphere Coupling (continued)

Chairperson: Andrzej KRANKOWSKI, Poland

Rapporteur: George Steve FAJARDO SORIA, Peru

09:00 On the coupling between the equatorial electrojet and the solar quiet daily variation Sq current using ground observation, *Babatunde RABIU, Nigeria*

09:20 Behaviour of Galactic Cosmic Rays before and during high-energy magnetospheric electron flux enhancements, *Olga KRYAKUNOVA, Kazakhstan*

09:40 Longitudinal dependence of ionospheric irregularities to maximum ring current and PPEF sensed by GNSS and magnetometers during the storm of 4 November 2021, *Nadia IMTIAZ, Pakistan*

10:00 Prediction of Ionospheric Irregularities over Egypt using GNSS Observations and Deep Learning, *Hassan NOORELDEEN, Egypt*

10:20 Investigation of Ionospheric Response to Geomagnetic Storms over a Low-Latitude Station, Ile-Ife, Nigeria, *Emmanuel ARIYIBI, Nigeria*

10:40 -11:00 *Coffee Break*

11:00 Session 5: Space Weather Modelling

Chairperson: Sandro RADICELLA, Italy

Rapporteur: Nadia IMTIAZ, Pakistan

11:00 Forecasting Space Weather from Coronal Mass Ejections: Modeling and Observational Challenges, *Camilla SCOLINI, Belgium*

- 11:20 Empirical climatological electron density models adaptation to Space Weather events representation, *Yenca MIGOYA ORUÉ, ICTP, Italy*
- 11:40 Assessment of local derived ionospheric model in baseline ambiguity resolution, *Siti Syukriah KHAMDAN, Malaysia*
- 12:00 Ionospheric modeling using machine learning towards space weather operational service, *Maria Graciella MOLINA, Argentina (online)*
- 12:20 CDPP web-based tools for space weather, *Frederic PITOUT, France*

12:40 – 14:00 *Lunch Break*

14:00 Session 6: Space Weather Effects on Technology

Chairperson: Lucilla ALFONSI, Italy

Rapporteur: Siti Syukriah KHAMDAN, Malaysia

- 14:00 An open-access massive data set for research on geomagnetic field effects on GPS/GNSS ionospheric delay, *Renato FILJAR, Croatia (on-line)*
- 14:20 Analysis of the effects of ionospheric disturbances on GPS receivers of LISN during the declining phase of solar cycle 24, *George Steve FAJARDO SORIA, Peru*
- 14:40 Ionospheric effects on the performance of GAGAN satellites for aircraft precision approach, *Narayan DHITAL, Germany (online)*
- 15:00 Effects of Equatorial Plasma Bubbles on Performances of Real-Time Kinematics (RTK) in Thailand During the Ascending Phase of Solar Cycle #25, *Pornchai SUPNITHI, Thailand*
- 15:20 Effects of the relative dynamics of ionospheric irregularities and GPS satellites on receiver tracking loop performance, *Trisani BISWAS, India*

15:40 – 16:00 *Coffee Break*

16:00 Session 7: Space Weather Research

Chairperson: Mehmet BARAN ÖKTEN, Turkiye

Rapporteur: Yenca MIGOYA ORUE, ICTP, Italy

- 16:00 Solar Energetic Particle events and their importance for Space Weather, *Nina DRESING, Finland (online)*
- 16:20 Findings on the October effect in VLF measurements, *Daniela BANYS, Germany (online)*
- 16:40 Geoeffective twisted flux ropes in the solar wind near Earth, *Sergio DASSO, Argentina (online)*
- 17:00 Operational Space Weather Services at University of Graz, *Manuela TEMMER, Austria*
- 17:20 Ionospheric response to the 23-31 August 2018 geomagnetic storm in the Europe-African longitude sector using multi-instrument observations, *Teshome DUGASSA, Ethiopia*
- 17:40 *Adjourn*

Wednesday, 28 June

09:00 Session 8: Space Weather Research (continued)

Chairperson: Pornchai SUPNITHI, Thailand

Rapporteur: Trisani BISWAS, India

- 09:00 Atmospheric Irregularities over the Equatorial and Low Latitude Region during geomagnetically disturbed and quiet time, *Patrick ESSIEN, Ghana*
- 09:20 Overview of Type II SRBs through analysis of associated solar and near-earth space weather features during ascending phase of SC 25, *Jean UWAMAHORO, Rwanda*
- 09:40 Expansion of the African equatorial ionization anomaly (EIA) crests during intense magnetic storms in the year 2013, *Patrick SIBANDA, Zambia*
- 10:00 Ionospheric Plasma Anomaly Using GPS TEC Measurements from Nepal, *Narayan CHAPAGAIN, Nepal*
- 10:20 Impact and mitigation of space weather effects on GNSS receiver performance, *Amira HUSSEIN, Egypt (online)*

10:40 - 11:00 *Coffee Break*

11:00 Session 9: National/Regional Space Weather Programs

Chairperson: Babatunde RABIU, Nigeria

Rapporteur: Kassamba Abdel Aziz DIABY, Ivory Coast

- 11:00 SWAP: An initiative to network researchers and stakeholders in space weather in Austria, *Rachel BAILEY, Austria*
- 11:20 Serbian space weather research activities, *Nikola VESELINOVIĆ, Serbia*
- 11:40 Space weather Infrastructure and Capacity Building in Africa, *Paul Baki OLANDE, Kenya*
- 12:00 Space Weather in Morocco, *Aziza BOUNHIR, Morocco (online)*
- 12:20 Space Weather Studies in Indonesia, *Yunita PERMATASARI, Indonesia (online)*
- 12:40 International Meridian Circle Project in Europa and Africa: a regional contribution to the world space weather science and monitoring observation systems, *Michel BLANC, France (online)*

13:00 – 14:00 *Lunch Break*

14:00 Session 10: National/Regional Space Weather Programs (continued)

Chairperson: Patrick ESSIEN, Ghana

Rapporteur: Nikola VESELINOVIC, Serbia

- 14:00 Assessing the interrelationship between strong geomagnetic storms and power grid disruptions in Poland, *Agnieszka GIL, Poland (online)*
- 14:20 Validation of Ionospheric Irregularities observed by Radio Occultation measurements over the low latitude African region, *Patrick MUNGUFENI, Uganda*

14:40 – 15:00 *Coffee Break*

15:00 – 16:00 ISWI Webinar

- *Lucia KLEINT, Astronomical Institute, University of Bern, Switzerland*

16:10 – 17:30 Discussion Panel 2: ISWI – The Way Forward

Moderator: Manuela TEMMER, Austria

Rapporteur: Sharafat GADIMOVA, United Nations Office for Outer Space Affairs

- Masha KUZNETSOVA, *United States (online)*
- Mamoru ISHII, *Japan (online)*
- Babatunde RABIU, *Nigeria*
- Nadia IMTIAZ, *Pakistan*

17:30 *Adjourn*

Thursday, 29 June

Technical Tour

- "Hohe Warte", the Austrian Meteorological Service (ZAMG)
- Vienna Institute of Astronomy

Friday, 30 June

09:00 Session 11: Space Weather Case Studies

Chairperson: Dinesh MANANDHAR, Japan

Rapporteur: Jean UWAMAHORO, Rwanda

- 09:00 Coronal flux ropes and space weather, *Alexander NINDOS, Greece*
- 09:20 Variations in the rotational speed of the solar corona (2011–2022), *Ivan DOROTOVIČ, Slovakia*
- 09:40 Addressing space weather Challenges on Technology - Geomagnetically Induced Currents, *Chigomezyo NGWIRA, United States (online)*
- 10:00 Capability Development Space, *Friedrich TEICHMANN, Austria*
- 10:20 Equatorial Plasma Bubble (EPB) Observations at Low Latitude Regions of ASEAN, *Lin Min MIN MYINT, Thailand (online)*

10:40 - 11:00 *Coffee Break*

11:00 Session 12: Space Weather Case Studies (continued)

Chairperson: Hassan NOORELDEEN, Egypt

Rapporteur: Patrick SIBANDA, Zambia

- 11:20 Effect of the turbulence of fast solar winds on the inner magnetosphere: Case of the outer minima of solar cycles 20, 21, 22, 23 and 24, *Inza GNANOU, Burkina Faso*
- 11:40 Effect of Ionosphere on GNSS, *Mohammed Yahya ALRADI ELDAW, Sudan (online)*
- 12:00 Stealth Coronal Mass Ejections and properties of its associated ICME, *Ravindra Marutibhai JADAV, India (online)*
- 12:20 An empirical model for estimating ICMEs speeds, delays and expected geomagnetic activity, *Nataly SHLYK, Russian Federation (online)*
- 12:40 "TROPOMAG": possible effects of geomagnetic storms on the troposphere, *Paolo MADONIA, Italy (online)*

13:00 – 14:00 *Lunch Break*

14:00	Session 13: Space Weather Case Studies (continued) <i>Chairperson: Inza GNANOU, Burkina Faso</i> <i>Rapporteur: Teshome DUGASSA, Ethiopia</i>
14:00	Ionospheric response of intense geomagnetic storms over Indian low latitude regions, <i>Abhay Kumar SINGH, India (online)</i>
14:20	Observations of X-ray and EUV fluxes during X-class solar flares and response of upper ionosphere, <i>Arun Kumar UPADHAYAYA, India (online)</i>
14:40	Wrap-up Session and Concluding Remarks <i>Moderator: Sharafat GADIMOVA, United Nations Office for Outer Space Affairs</i> <ul style="list-style-type: none"> - Summary of sessions - Observations and recommendations
15:40	<i>Coffee Break and Adjourn</i>