



United Nations
Office for Outer Space Affairs

***United Nations/Germany Workshop on
the International Space Weather Initiative:
Preparing for the Solar Maximum***

Organised by

The United Nations Office for Outer Space Affairs

Supported by

the German Aerospace Centre (DLR)

Sponsored by

the International Committee on Global Navigation Satellite Systems (ICG)

10 – 14 June 2024

Neustrelitz, Germany

PROGRAMME



The International Space Weather Initiative (ISWI) is a programme of international cooperation to advance space weather science by a combination of instrument deployment, analysis of space weather data from these instruments in conjunction with other data and the communication of such results.

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Local Organizing Committee

Daniela Banyś	German Aerospace Center - DLR e.V.
Shradha Mohanty	German Aerospace Center - DLR
David Wenzel	German Aerospace Center - DLR

Monday, 10 June 2024

VENUE: *Park Hotel Fasanerie, Karbe-Wagner-Straße 59, D-17235 Neustrelitz, Germany*

08:00 – 09:00 *Registration*

09:00 Opening and Welcome Remarks

Moderator: Daniela BANYŚ, Germany

Aarti HOLLA-MAINI, United Nations Office for Outer Space Affairs

Holger WANDSLEB, State Authority in Science and Research, Mecklenburg-Western Pomerania, Germany

Andreas GRUND, Mayor of Neustrelitz, Germany

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

Jens BERDERMANN, German Aerospace Centre (DLR), Germany

09:30 Keynote address

09:30 – 10:00 *Solar activity and ionospheric weather, Norbert JAKOWSKI, Germany*

10:00 – 10:20 *Coffee Break*

10:20 Session 1: Solar eruptions – their sources at the Sun and impact on geospace (magnetosphere, ionosphere, atmosphere, ground)

Chairperson: Natchimuthukonar GOPALSWAMY, United States of America

Rapporteur: Bernhard KLIEM, Germany

10:20 *(invited) Coronal Mass Ejections observations – from Sun to impact on Geospace, Manuela TEMMER, Austria*

10:50 *(invited) Coronal Mass Ejections observations flux ropes and space weather, Volker BOTHMER, Germany*

11:20 *(invited) Numerical modeling of Coronal Mass Ejections, Tibor TÖRÖK, United States of America*

11:50 *(invited) Non-force-free magnetic fields and solar eruptions, Xiaoshuai ZHU, China*

12:20 *(invited) Space weather impact on polar atmospheric ozone and climate, Pekka T VERRONEN, Finland*

12:50 – 13:50 *Lunch break*

13:50 (continued) Session 1: Solar eruptions – their sources at the Sun and impact on geospace (magnetosphere, ionosphere, atmosphere, ground)

13:50 *Models of quasi-discontinuous solar wind streams, Lukas WESTRICH, Germany*

14:05 *Ensemble simulations of Coronal Mass Ejections in interplanetary space with elliptical cone models, Johan MUHAMAD, Indonesia*

14:20 *Move to next session*

14:25 Session 2: Flares and their impact on ionosphere/atmosphere, flare-Coronal Mass Ejections (CME) relationship

Chairperson: Daniela BANYŚ, Germany

Rapporteur: Giorgio Arlan da SILVA PICANÇO, Brazil

- 14:25 (invited) Magnetic field parameters determining the association of solar flares and CMEs, *Ting LI, China*
- 14:55 Flare production potential of sunspots based on modified Zurich and magnetic classifications, *Ali KILCIK, Türkiye*
- 15:10 – 15:30 *Coffee Break*
- 15:30 Session 3: Space Weather Extreme Events**
Chairperson: Kichang YOON, Republic of Korea
Rapporteur: Sharafat GADIMOVA, Office for Outer Space Affairs
- 15:30 (invited) Extreme space weather events, *Natalia BUZULUKOVA, United States of America*
- 16:00 Effect of geomagnetic storm on ionosphere over Nepal, *Drabindra PANDIT, Nepal*
- 16:15 *Move to next session*
- 16:20 Session 4: Tools and methods for space weather education and outreach**
Chairperson: Kathleen KRAEMER, United States of America
Rapporteur: Drabindra PANDIT, Nepal
- 16:20 (invited) Tools and methods for space weather education and outreach, *Maria KUZNETSOVA, United States of America*
- 16:50 First results from the first low-cost SDR-based ionosonde in equatorial Africa, *Babatunde RABIU, Nigeria*
- 17:05 *Adjourn*

Tuesday, 11 June 2024

- 09:00 Session 5: Coronal holes and high-speed streams that lead to stream interaction regions**
Chairperson: Yihua YAN, China
Rapporteur: Jean UWAMAHORO, Rwanda
- 09:00 (invited) A benchmark community data set for the evaluation of solar coronal hole boundaries, *Karin MUGLACH, United States of America*
- 09:30 (invited) Coronal holes and high-speed streams that lead to stream interaction regions, *Sergio DASSO, Argentina*
- 10:00 Tracking a near-ecliptic merged interaction region, *Claire FOULLON, United Kingdom*
- 10:15 *Move to next session*
- 10:20 Session 6: Solar energetic particles and the associated phenomena such as coronal/interplanetary radio bursts**
Chairperson: Sergio DASSO, Argentina
Rapporteur: Mary DUSABE, Kenya
- 10:20 (invited) Solar energetic particles and the associated phenomena such as coronal/interplanetary radio bursts, *Natchimuthukonar GOPALSWAMY, United States of America*
- 10:50 - 11:10 *Coffee Break*

- 11:10** (continued) **Session 6: Solar energetic particles and the associated phenomena such as coronal/interplanetary radio bursts**
- 11:10 Magnetic connectivity between low and higher corona as seen from solar type-III radio bursts, *Malte BRÖSE, Germany*
- 11:25 An assessment of solar cycle 25 progress through observation of SRBs and associated geomagnetic storms, *Jean UWAMAHORO, Rwanda*
- 11:40 The correlation between fluctuations in the fluxes of energetic protons and cosmic rays during Forbush decrease events, *Mihailo SAVIĆ, Serbia*
- 11:55 – 12:00 *Move to next session*
- 12:00 Session 7: Spacecraft anomaly, impact on GNSS, ionospheric irregularities**
- Chairperson: Pekka T VERRONEN, Finland*
Rapporteur: Mmatjie Sarah MALATJI, South Africa
- 12:00 (invited) Spacecraft anomaly, impact on GNSS, ionospheric irregularities, *Anthea COSTER, United States of America*
- 12:30 – 13:30 *Lunch Break*
- 13:30 (continued) Session 7: Spacecraft anomaly, impact on GNSS, ionospheric irregularities**
- 13:30 (invited) Characteristics of ionospheric irregularities during geomagnetic storms using long-term worldwide GNSS data, *SORI Takuya, Japan*
- 14:00 Multi-index analysis of ionospheric disturbances driven by internal and external physical mechanisms during space weather events, *Giorgio Arlan da SILVA PIKANÇO, Brazil*
- 14:15 Response of the equatorial ionosphere over Accra, Ghana, to a moderate geomagnetically-induced storm using the low-cost global navigation satellite system, *Solomon Otoo LOMOTEY, Ghana*
- 14:30 A glance on the monitoring network for evil waveform and ionospheric characterization H037-MoNEWIC, *David WENZEL, Germany*
- 14:45 A study on the low-latitude ionospheric scintillation using datasets from GNSS SCINDA receivers and ionosonde instruments in Kenya, *Mary DUSABE, Kenya*
- 15:00 Climate governance - a state-of-the art, *Yvette RAMOS, France*
- 15:15 – 15:30 *Group photo*
- 15:30 – 15:45 *Coffee Break*
- 16:15 *Bus for City tour Neustrelitz*
- 18:00 – 21:00 *Dinner at Orangeries*

Wednesday, 12 June 2024

- 09:00 Session 8: Geomagnetic storms and radiation belt variability due to CMEs and SIRs**
- Chairperson: Shing FUNG, United States of America*
Rapporteur: Johan MUHAMAD, Indonesia
- 09:00 (invited) Geomagnetic storms and radiation belt variability due to CMEs and SIRs, *Drew TURNER, United States of America*

- 09:30 (invited) Results of EU H2020 project: Prediction of adverse effects of geomagnetic storms and energetic radiation – PAGER, Yuri SHPRITS, Germany
- 10:00 (virtually) Drivers of intense geomagnetic field variations, Chigomezyo NGWIRA, United States of America
- 10:15 Variations in the ionospheric parameters over midlatitude Europe region during September 6 – 10, 2017 geomagnetic storm caused by coronal mass ejections, Kateryna AKSONOVA, Czech Republic
- 10:30 - 10:50 Coffee Break
- 10:50 Lunch to go
- 11:00 Bus for excursion to Peenemünde (Historical Technical Museum)
- 15:00 Café at Baltic Sea
- 16:30 Bus back to hotels

Thursday, 13 June 2024

09:00 Session 9: Space weather prediction using various techniques including Machine Learning

Chairperson: Aderonke AKERELE, Nigeria

Rapporteur: Claire FOULLON, United Kingdom

- 09:00 (invited) Space weather prediction using various techniques including machine learning, Dario DEL MORO, Italy
- 09:30 (invited) AI with large model for solar activity forecasting, Long XU, China
- 10:00 Prediction of the geomagnetic K index at Hermanus based on its previous value, Mmatjie Sarah MALATJI, South Africa
- 10:15 Detection and analysis of solar prominences in extreme ultraviolet wavelengths, William BECKWITH-CHANDLER, United Kingdom
- 10:30 (virtually) Predicting daily foF2 over Pakistan using machine learning, Muhammad Ayyaz AMEEN, Pakistan
- 10:45 - 11:05 Coffee Break

11:05 Session 10: Space weather instrumentation (ISWI instruments and other instruments)

Chairperson: Sharafat GADIMOVA, Office for Outer Space Affairs

Rapporteur: Manjula RANASINGHE, Sri Lanka

- 11:05 (invited) Aditya solar wind particle experiment (ASPEX) on-board India's aditya-L1 mission, Dibyendu CHAKRABARTY, India
- 11:35 (invited) Natural Language Processing for an AI-driven Ionosphere Forecast by Historical Analogy, Ivan GALKIN, United States of America
- 12:05 – 13:35 Lunch Break

13:35 (continued) Session 10: Space weather instrumentation (ISWI instruments and other instruments)

Chairperson: Dmytro VASYLYEV, Germany

Rapporteur: Solomon Otoo LOMOTY, Ghana

13:35	Solar eruptive events as observed by radio imaging-spectroscopic facilities, <i>Yihua YAN, China</i>
13:50	The evolution of interplanetary Coronal Mass Ejections in the heliosphere, <i>Yutian CHI, China</i>
14:05	Application of IAP CAS continuous HF Doppler sounding to the improvement of GNSS positioning accuracy, <i>Jaroslav URBAR, Czech Republic</i>
14:20	Recent developments in ground-based space weather monitoring: GIFDS and CALLISTO approaching event analysis, <i>Daniela BANYŚ, Germany</i>
14:50 - 15:10	<i>Coffee Break</i>
15:10 – 17:00	Poster Session
	<i>Solar eruptions – their sources at the Sun and impact on geospace (magnetosphere, ionosphere, atmosphere, ground)</i>
POSTER 1	A study of solar flare effects on the geomagnetic field components during solar cycles 23 and 24, <i>Oswald Didier Franck GRODJI, Ivory Coast</i>
	<i>Spacecraft anomaly, impact on GNSS, ionospheric irregularities</i>
POSTER 2	Phase gradient screen approach for the modeling of ionospheric scintillation, <i>Dmytro VASYLYEV, Germany</i>
POSTER 3	Characteristics on large-scale wave structure in Southeast Asia, <i>Yu Yi LIOW, Malaysia</i>
POSTER 4	Different plasma bubble dynamics over the EIA: a comparative study of geomagnetic storm responses in two distinct regions of South America, <i>Gilda GONZÁLEZ, United States of America</i>
	<i>Space weather instrumentation (ISWI instruments and other instruments)</i>
POSTER 5	Application of the relativistic electron alert system (REleASE) to instruments on board of STEREO-A, <i>Henrik DRÖGE, Germany</i>
POSTER 6	The eSWua upper atmosphere observing infrastructure: a comprehensive facility for space weather monitoring, <i>Massimo VIOLA, Italy</i>
POSTER 7	Equatorial plasma bubble (EPB) detection and analysis using 2-D ROTI map and VHF radar images during the upcoming solar maximum, <i>Pornchai SUPNITHI, Thailand</i>
POSTER 8	Low-Cost GNSS receiver system for space weather data, <i>Sharafat GADIMOVA, Office for Outer Space Affairs</i>
	<i>Spacecraft anomaly, impact on GNSS, ionospheric irregularities</i>
POSTER 9	Examining the mid-latitude ionospheric trough with high-resolution IGS ionospheric maps, <i>Kateryna LUBYK, Germany</i>
POSTER 10	Ionospheric scintillation observations: A multi-sensor approach over low-latitude equatorial region, <i>Shradha MOHANTY, Germany</i>
POSTER 11	Characterization of travelling ionospheric disturbances in relation to the occurrence of equatorial plasma bubble, <i>Arthur Amaral FERREIRA, Germany</i>
POSTER 12	Intense Spread-F event at a low latitude station and its possible relationship with a geomagnetic storm and substorms, <i>Graciela MOLINA, Argentina</i>

Tools and methods for space weather education and outreach

- POSTER 13 AISstorm 2.1 - Atmospheric Ionization during substorms model, *Jan Maik WISSING, Germany*
- POSTER 14 Long-term analysis of inter-hemispheric field-aligned currents and seasonal and disturbance time variations in dawn, noon, and dusk sectors utilizing equatorial magnetic fields at Davao Station, Philippines, *Manjula RANASINGHE, Sri Lanka*
- POSTER 15 Ground level muon detectors response to extreme space weather events during solar Cycle 25, *Nikola VESELINOVIC, Serbia*
- POSTER 16 GlowcOst-global network of cosmic ray muon detectors for monitoring space and terrestrial weather, *Nikola VESELINOVIC, Serbia*
- POSTER 17 Transient variation of Doppler frequency shift of ionospheric signal within the equatorial region, *Aderonke AKERELE, Nigeria*
- POSTER 18 Ionosphere monitoring and prediction center (impc), *Martin KRIEGEL, Germany*
- 17:00 Adjourn

Friday, 14 June 2024

09:00 Session 11: Operational Space Weather

Chairperson: Babatunde RABIU, Nigeria

Rapporteur: Oswald Didier Franck GRODJI, Ivory Coast

- 09:00 (invited) Space weather radiation impacts on aviation, *Rendani NNDANGANENI, South Africa*
- 09:30 (invited) Space weather within ESA's space safety programme, *Alexi GLOVER, France*
- 10:00 (invited) Operational space weather in Norway, *Wojciech Jacek MILOCH, Norway*

10:30 - 10:50 Coffee Break

10:50 (continued) Session 11: Operational Space Weather

Chairperson: Graciela MOLINA, Argentina

Rapporteur: Kateryna AKSONOVA, Czech Republic

- 10:50 (invited) Forecasting and analysis of solar energetic particle radiation storms, *Olga E. MALANDRAKI, Greece*
- 11:20 (invited) Progress of MUSER and Chinese IPS telescope for space weather, *Wei WANG, China*
- 11:50 (invited) Japanese activities for operational space weather, *TSUGAWA Takuya, Japan*

12:20 – 13:20 Lunch Break

13:20 (continued) Session 11: Operational Space Weather

Chairperson: Ali KILCIK, Türkiye

Rapporteur: Mihailo SAVIĆ, Serbia

- 13:20 (invited) Sun Earth connections: impact of space weather events at low latitudes, *Christine AMORY, France*

- 13:50 *(invited) Forecasting ionospheric irregularities, Kathleen KRAEMER, on behalf of Keith GROVES, United States of America*
- 14:20 National space weather strategy and action plan to solar cycle 25, Yoon KICHANG, Republic of Korea
- 14:35 – 14:50 *Coffee Break*
- 14:50 Announcement of the ISWI Workshop in 2025, Babatunde RABIU, Nigeria
- 14:55 Announcement of the ISWI Workshop in 2026, Yoon KICHANG, Republic of Korea
- 15:00 Closing remarks**
- Sharafat GADIMOVA, *United Nations Office for Outer Space Affairs*
- Natchimuthukonar GOPALSWAMY, *National Aeronautics and Space Administration, United States of America*
- Daniela BANYŚ, *German Aerospace Centre, Germany*
- 15:30 – 16:00 *Farewell***