
Organised jointly by

The United Nations Office for Outer Space Affairs and
The Baku State University on behalf of the Government of Azerbaijan

Co-organized and co-sponsored by

The International Committee on Global Navigation Satellite Systems and
The National Aeronautics and Space Administration, United States of America

Hosted by

The Baku State University

31 October – 4 November 2022

Baku, Azerbaijan

PROGRAMME

Venue: Fairmont Hotel Baku
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.
Monday, 31 October 2022

**Time: AZT (Baku, Azerbaijan) Local Time (UTC/GMT + 4 hours)**

09:00 - 10:00  **Registration** (Fairmont Hotel Baku, Flame Towers 1A, Mehdi Huseyn street, Baku)

10:00 – 11:00  **Opening and Welcome Remarks**

Elchin BABAYEV, Baku State University, Azerbaijan

Emin AMRULLAYEV, Ministry of Science and Education, Azerbaijan

Roald SAGDEEV, Maryland University, United States of America

Indira HAJIYEVA, Ministry of Youth and Sport, Azerbaijan

Samaddin ASADOV, Space Agency (Azercosmos), Azerbaijan

Luc ST-PIERRE, United Nations Office for Outer Space Affairs

Sharafat GADIMOVA, International Committee on Global Navigation Satellite Systems Executive Secretariat

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

Namig JALILOV, Shamakhy Astrophysical Observatory, Azerbaijan

11:00 – 11:20  **Coffee Break**

11:20  **Keynote addresses: Setting the tone**

Protecting the planet from space threats, Roald SAGDEEV, United States of America

The sun as the primary source of space weather, Nat GOPALSWAMY, United States of America

12:10 – 13:30  **Session 1: Space Weather Instrumentation and Data**

Chairperson: Andrzej KRANKOWSKI, Poland

Rapporteur: Ajesh ASOKAN PILLAI, India

12:10  First joint STIX and LOFAR observations of a flare event on 06 June 2020, Malte BRÖSE, Germany

12:30  Review of the D Region study using the AWESOME VLF receiver in Algeria, Samir NAIT AMOR, Algeria

12:50  Microwave observations of the sun with VIRAC RT-32 radio telescope, Dmitrijs BEZRUKOVS, Latvia (virtual)

13:10  Questions and discussions

13:30 – 14:40  **Lunch break**

14:40 – 16:00  **Session 2: Space Weather Modelling**

Chairperson: Rustam RUSTAMOV, Azerbaijan

Rapporteur: Patrick ESSIEN, Ghana
14:40  Space weather with the virtual space weather modelling centre and recent coronal modelling developments, Michaela BRCHNELOVA, Belgium
15:00  Icarus: a new highly optimized heliospheric model for forecasting purposes, Tinatin BARATASHVILI, Belgium
15:20  Development of a whole atmosphere model with a non-hydrostatic dynamical core, Soudhe KAMALI, United States of America
15:40  Using B-splines to model Total Electron Content derived from radio occultation measurements by cosmic satellites over African region, Patrick MUNGUFENI, Uganda
16:00 – 16:20  Coffee Break

16:20 – 18:00  Session 2: Space Weather Modelling (continued)

   Chairperson: Malte BRÖSE, Germany
   Rapporteur: Jesús Roberto ROMERO RUIZ, Mexico

16:20  Space Weather studies with the NeQuick ionospheric electron density model, Bruno NAVA, Italy (virtual)
16:40  Operational forecasting of ground effects using the Gorgon MHD Model, Mike HEYNS, United Kingdom
17:00  Employing advanced coronal mass ejection models in EUHFORIA for space weather forecasting, Anwesha MAHARANA, Belgium
17:20  Ionospheric models comparison of single-frequency GPS positioning in Algeria, Lahouaria TABTI, Algeria (virtual)
17:40  Detection, analysis and forecasting of sunspot groups (active regions) using advanced machine learning, Muhammad Ali ISMAIL, Pakistan
18:00  Adjourn
18:30 – 20:30  Welcome Reception

Tuesday, 1 November 2022

09:00 – 11:00  Session 3: Space Weather Research

   Chairperson: Valeri NAKARIAKOV, United Kingdom
   Rapporteur: Saurav GAUTAM, Nepal

09:00  Analysis of geomagnetic disturbances for earthquake precursor detection, Nur Fatin Irdina ZULHAMIDI, Malaysia
09:20  Evidence of impact of earthquakes on geomagnetic and ionospheric activity during spotless sun, Tamara GULYAEVA, Russian Federation (virtual)
09:40  Design and assembly of a COTS CubeSat for space weather applications, M. Chantale DAMAS, United States of America
10:00  Temporal and periodic variations of the solar flare index during the last four solar cycles and their association with selected geomagnetic activity parameters, Ali KILCIK, Türkiye
10:20  Search and identification of precursors of solar flares based on microwave observations of active regions, Elena POPOVA, Chile, Dmitrijs Bezruckovs, Latvia, Vladislavs Bezruckovs, Latvia, Sergei Piskunov, Latvia, Anatoli I. Popov, Latvia
10:40 Heliospheric and atmospheric parameters affecting cosmic rays flux measured at Belgrade muon station, Nikola VESELINOVIC, Serbia (virtual)

11:00 - 11:30 Coffee Break

11:30 – 12:50 Session 3: Space Weather Research (continued)

Chairperson: Renato FILJAR, Croatia
Rapporteur: Ahmed Ali HAMEED, Iraq

11:30 Comparison of IRI simulated top-side ionosphere with the in situ satellite observations, Imran GIRACH, India (virtual)

11:50 Plasma irregularities over low-mid latitudes during intense geomagnetic storms of solar cycle 24, Nadia IMTIAZ, Pakistan

12:10 A statistical analysis of geomagnetic storms and their effect on Earth atmosphere currents, Raja Adibah RAJA HALIM SHAH, Malaysia

12:30 Questions and discussions

12:50 - 14:00 Lunch Break

14:00 – 15:40 Session 4: Solar Physics

Chairperson: Raja Adibah RAJA HALIM SHAH, Malaysia
Rapporteur: Heba S. MOHAMED, Egypt

14:00 The limits of the solar events amplitudes: the occurrence of strong flares from the point of view of the underlying dynamo mechanism, Elena POPOVA, Chile, Roald Sagdeev, United States of America, Mikhail Malkov, United States of America, Dmitrijs Bezrukovs, Latvia, Vladislavs Bezrukovs, Latvia, Sergei Piskunov, Latvia, Anatoli I. Popov, Latvia

14:20 Nonlinear self-deformation of unidirectional surface Alfven waves and aspects of uniturbulence, Rajab ISMAYILLI, Tom Van Doorsselaere, Norbert Magyar, Belgium

14:40 On the evolution of dynamical complexities in space environment over four solar cycles, Akeem Babatunde RABIU, Nigeria

15:00 Local Anisotropy in Parker’s solar dynamo model, Ramin ALLAHVERDIYEV, Azerbaijan, Egor Yushkov, Russian Federation

15:20 Questions and discussions

15:40 - 16:00 Coffee Break

16:00 – 17:40 Session 4: Solar Physics (continued)

Chairperson: Babatunde RABIU, Nigeria
Rapporteur: Teshome DUGASSA, Ethiopia

16:00 Analysis of small-scale magnetic field generation in MHD-Shell model, Ilyas ABUSHZADA, Azerbaijan, Egor Yushkov and Dmitriy Sokoloff, Russian Federation

16:20 Study of solar elemental abundances evolution during solar flares using satellite-based soft x-ray measurements, Asif M. MANDAYAPURAM, India (virtual)

16:40 Diagnostics of the pre-flare and pre-eruption magnetic field in the solar corona, Valeri NAKARIAKOV, United Kingdom
### Wednesday, 2 November 2022

#### 09:00 – 10:20  Session 5: Magnetosphere-Ionosphere-Thermosphere Coupling

**Chairperson:** Patrick MUNGFENI, Uganda  
**Rapporteur:** Abdou Lahat DIENG, Senegal

<table>
<thead>
<tr>
<th>Time</th>
<th>Presentation</th>
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<tbody>
<tr>
<td>09:00</td>
<td>Equatorial and low-latitude ionospheric TEC response to CIR-driven geomagnetic storms at different longitude sectors, Teshome DUGASSA, Ethiopia</td>
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<tr>
<td>09:20</td>
<td>Ionospheric plasma fluctuation response to space weather events in September 2017, August 2018, and March 2015 (St Patrick’s Day) over the equatorial and low latitude region, Patrick ESSIEN, Ghana</td>
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<td>09:40</td>
<td>On the response of equatorial thermosphere-Ionosphere system to the annular solar eclipse on 26 December 2019: Preliminary results, Ajesh ASOKAN PILLAI, India</td>
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<tr>
<td>10:00</td>
<td>Comparison between the position central angle of coronal mass ejections (CME) and its angular width for high and low solar activity and effects on magnetosphere, Ahmed Ali HAMEED, Iraq</td>
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#### 10:20 – 10:50  Coffee Break

#### 10:50 – 12:30  Session 6: Space Weather Effects

**Chairperson:** Nadia IMTIAZ, Pakistan  
**Rapporteur:** Fatin Irdina ZULHAMIDI, Malaysia

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<tr>
<td>10:50</td>
<td>Statistical learning TEC predictive model for GNSS ionospheric delay mitigation in self-adaptive environment - aware SDR GNSS position estimation algorithm, Renato FILJAR, Croatia</td>
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<td>11:10</td>
<td>Total electron content estimation and comparison using multi-GNSS constellations at Pashchimanchal Campus, Saurav GAUTAM, Nepal</td>
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<td>11:30</td>
<td>Current performance of IGS ionospheric products and future improvements, Andrzej KRANKOWSKI, Poland</td>
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<td>11:50</td>
<td>Cross wavelet analyses of convection electric field and excess equatorial ionospheric TEC, Rajat ACHARYA, India (virtual)</td>
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<td>12:10</td>
<td>The ionospheric response to geomagnetic storms in Asia using the GNSS network, Heba S. MOHAMED, Egypt</td>
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#### 12:30 – 13:30  Lunch Break

#### 14:00 – 18:00  Technical Tour - AZERCOSMOS

### Thursday, 3 November 2022

#### 09:00 – 10:40  Session 7: National/Regional Space Weather Programs

**Chairperson:** Amira SHIMEIS, Egypt

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<tr>
<td>09:00</td>
<td>Spectral transfer of magnetic helicity in short-correlated plasma turbulence, Egor YUSHKOV, Dmitry Sokoloff, Russian Federation</td>
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<tr>
<td>09:20</td>
<td>Kelvin-Helmholtz MHD instabilities of supersonic shear layers with heat flux in anisotropic space plasmas, Namig JALILOV, Azerbaijan, Rajab Ismayilli, Belgium</td>
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<tr>
<td>09:40</td>
<td>Adjourn</td>
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</table>
Rapporteur: Mike HEYNS, United Kingdom

09:00 Comparison of the daytime variability of equatorial electrojet and vertical drift velocity inferred from ground-based magnetometers and C/NOFS observations in Africa, Honoré MESSANGA ETOUNDI, Cameroon

09:20 Monitoring the Impact of Solar Event along Europe –African West Chain by GIM/CODG maps, Amira SHIMEIS, Egypt

09:40 Public policies and civil protection in space weather, Jesús Roberto ROMERO RUIZ, Mexico

10:00 Questions and discussions

10:40 – 11:00 Coffee Break

11:00 – 13:00 Session 8: Space Weather Case Studies, Outreach and Education

Chairperson: Luc ST-PIERRE, Office for Outer Space Affairs
Rapporteur: Honoré MESSANGA ETOUNDI, Cameroon

11:20 Geomagnetically induced currents: The case of Kenyan electric power grid, George Erick OMONDI, Kenya

11:40 Estimating zonal Ekman transport along coastal Senegal during passage of hurricane Fred, 30–31 August 2015, Abdou Lahat DIENG, Senegal

12:00 Investigation of the relationship of electron flux enhancements with interplanetary and geophysical characteristics, Botakoz SEIFULLINA, Kazakhstan

12:20 The contribution of CRASTE-LF to capacity building in space science and technology in Africa, Anas EMRAN, Morocco

12:40 Low-cost receiver for space weather, Sharafat GADIMOVA, Office for Outer Space Affairs

13:00 – 14:30 Lunch Break

14:30 Study and Monitoring of the Earth Magnetic Field Using Fasat Charle’s magnetometer, Herman TELLO, Chile (virtual)

14:50 The MADRIGAL database, Anthea COSTER, United States of America (virtual)

15:10 The effects of ionospheric disturbances on GNSS signals during solar cycle 24, Eldaw MOHAMMED ABBAKER, Sudan

15:30 Discussion Session

- Regional cooperation to advance the space weather science.
- Capacity-building and technical guidance to be provided to countries that wished to be engaged in space weather science and education.
- Issues and concerns of application, requirements of implementing, possibilities of success, mechanisms and resources of implementing.

16:00 – 16:20 Coffee Break

16:00 Discussion Session (continued)

- Discuss plans, framework for a mechanism of regional cooperation; follow-up projects and initiatives.

17:00 Adjourn

Friday, 4 November 2022
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<tr>
<th>Time</th>
<th>Session Title</th>
<th>Speaker(s)</th>
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<tr>
<td>10:00 – 11:20</td>
<td><strong>Session 8: Space Weather Case Studies, Outreach and Education</strong> (continued)</td>
<td><strong>Chairperson:</strong> Ali KILCIK, Türkiye&lt;br&gt;<strong>Rapporteur:</strong> George Erick OMONDI, Kenya</td>
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<tr>
<td>10:00</td>
<td>Space Science and Technology: Diversity and Sustainability, <em>Rustam RUSTAMOV</em>, Azerbaijan</td>
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<td>11:00</td>
<td>High-resolution remote sensing satellite data and space weather forecasting models, <em>Sevda IBRAHIMOVA</em>, Azerbaijan</td>
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<td>11:20 – 11:40</td>
<td><strong>Coffee Break</strong></td>
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<td>11:40</td>
<td><strong>Wrap-up Session</strong></td>
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<td>- Summary reports of presentation sessions.</td>
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<td>- Summary report of discussion session.</td>
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<td>13:00 – 14:00</td>
<td><strong>Lunch Break</strong></td>
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<td>14:00</td>
<td><strong>Concluding Remarks</strong></td>
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<td>- Luc ST-PIERRE, <em>United Nations Office for Outer Space Affairs</em></td>
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<td>- Elchin BABAYEV, <em>Baku State University</em></td>
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