2026 Workshop: Equatorial Ionization Anomaly and Ionospheric Irregularities

Long title
Advances in Equatorial, Low and Mid latitude Aeronomy and Ionospheric Irregularities
Conveners
Zihan Wang
Deepak Karan
Cesar Valladares
Qingyu Zhu
zihan.wang@uta.edu
Description

This workshop highlights the latest discoveries and methodological advancements in aeronomy across equatorial, low-, and mid-latitude regions. It focuses on the Equatorial Ionization Anomaly and ionospheric irregularities spanning these latitude ranges. We invite presentations on space- and ground-based measurements as well as modeling efforts. Discussions will emphasize how integrating these diverse, distributed observational resources can deepen our understanding of plasma electrodynamics, identify the seeding of ionospheric irregularities (like atmospheric waves, traveling ionospheric disturbances, and stratospheric warmings), and pave the way for robust nowcasting and forecasting tools.

Agenda

1. Cesar Valladares 10:00-10:07

Multi-year statistics of TEC depletions and TIDs in the America sector

2. Endawoke Yizengaw 10:07-10:14

Impact of Quiet Time Ionospheric Irregularities on Radio Frequency Propagations

3. Zihan Wang 10:14-10:21

Quiet time Super EPB

4. Jonas De Sousa Dos Santos 10:21-10:28

Sensitivity of Equatorial Plasma Bubble Generation to Mild-to-Moderate Geomagnetic Activity Across Seasons: Evidence from Long-Term Observations and Numerical Experiments

5. Asti Bbatt 10:28-10:35

Low latitude plasma bubbles during strong geomagnetic events during current solar maximum

6. Gilda González 10:35-10:42

Study of storm-time Equatorial Plasma Bubbles using FORMOSAT-7/COSMIC-2 IVM

7. Yamila Melendi 10:42-10:49

Ionospheric irregularities during the Mother’s Day geomagnetic storm over Argentina

8. Min-Yang Chou 10:49-10:56

Stormtime EPB using SAMI-WACCMX

9. Alahna Cardenas-O’toole 10:56-11:03

Relationship between EPBs and plasma temperature

10. Benedict Pineyro 11:03-11:10

Impact of wind variability on the nonlinear evolution and dissipation of convective gravity waves in the upper mesosphere and lower thermosphere

11. Josemaria Gomez Socola presented by Fabiano Rodrigues 11:10-11:17

On the distributed observations of mid-latitude scintillation over the US

12. Ana Newheart 11:17-11:23

GloTEC and SWPC's scintillation data product

13. Sneha Yadav Presented by Larry Lyons 11:23-11:30

Electrodynamic Effects of Lower Latitude TEC Bursts over American Longitudes During the May and October 2024 Geomagnetic Superstorms

14. Marie Bals 11:30-11:36

Three-dimensional observations of coherent E-region irregularities with the CONDOR meteor radar network over the Andes

15. Minjing Li 11:36-11:42

Impacts of E-region neutral wind shear on equatorial plasma bubbles: SAMI3 simulations including metal ions

16. Deepak Karan 11:42-11:48

Merging of the EIA Crests into a Single Peak over ~35 deg Longitude During the 19 January 2026 Geomagnetic Superstorm

17. Tapendra Sodari 11:48-11:54

EIA merging during Jan 2026 storm

18. Qingyu Zhu 11:54-12:00

Impact of traveling atmospheric disturbances on the interhemispheric asymmetry of storm-time EIA variations

https://drive.google.com/drive/folders/1sGI_n6VfNj3dsmvBlXBudkJbTQLJ7gB…

Justification

Understanding the complex dynamics of the ionosphere-thermosphere system particularly the EIA and the triggering of low- to mid-latitude ionospheric irregularities remains a critical challenge for the space weather community. The highly variable nature of phenomena like Equatorial Plasma Bubbles is driven by a complex interplay of solar forcing, atmospheric waves, the equatorial dynamo, and geomagnetic storms. While these interactions have puzzled researchers for decades, recent transformative advancements in observations, modeling, and Machine Learning methods present a unique opportunity for breakthroughs. Expanding global networks of distributed ground-based observatories, satellite missions, and the deployment of next-generation radar and radio arrays are now providing unprecedented, continuous data. This workshop is essential to convene the

aeronomy community to synthesize these latest discoveries. By strategizing how to best integrate these massive new datasets with advanced numerical models, we can collaboratively transition from observation to prediction, drastically improving space weather forecasting.

Related to CEDAR Science Thrusts:
Encourage and undertake a systems perspective of geospace
Explore exchange processes at boundaries and transitions in geospace
Explore processes related to geospace evolution
Fuse the knowledge base across disciplines in the geosciences
Manage, mine, and manipulate geoscience/geospace data and models
Workshop format
Short Presentations
Keywords
Equatorial Ionization Anomaly, Ionospheric Irregularities, Equatorial Plasma Bubble, Traveling Ionospheric Disturbances
View PDF