2021 Workshop: Equatorial space physics and space wx

Long title
Geospace observations and space weather studies at the magnetic equator
Conveners

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Description

A number of discoveries in the area of equatorial aeronomy and space physics have emerged in rapid succession in the last few years. These include the recognition of new classes of waves and instabilities in the equatorial ionosphere, new causal mechanisms underlying well-known instabilities responsible for space weather (e.g. convective instability leading to F-region plasma depletions and equatorial spread F), and new methods for probing the thermosphere and ionosphere from the ground. A major upgrade of the Jicamarca Radio Observatory is underway which will accelerate the pace of discovery further while providing, for the first time, continuous incoherent scatter observations for space weather modeling and forecasting. Complementing these developments are a number of new and planned spacecraft missions which can offer insights into these discoveries and promote new ones, for example ICON, GOLD, COSMIC II, and a prospective NASA sounding rocket campaign in Peru.

This workshop will review some of the aforementioned discoveries and emerging experimental capabilities and underline the research areas in the greatest need of attention. The goal is to help join experimentalists, theorists, and modelers with a range of interests and backgrounds and focus their efforts into the most promising lines of research in low-latitude space physics.

The tentative agenda for this workshop is as follows:

- Marco Milla: Jicamarca status report
- Jorge Chau: SIMONe Meteor radar network results
- William Longley: New results regarding 150 km echoes + plasma lines

- Fabiano Rodrigues: New sensors for distributed space weather observations
- Cesar Valladares: LISN network expansion
- David Hysell: Beacon network and ESF forecasting
- Luis Navarro: High-altitude drifts measurements
- Sevag Derghazarian: High-altitude echoes

Justification

The challenge in equatorial aeronomy and space weather is the conversion of our knowledge of the fundamental physics at work into actionable strategies for forecasting and mitigating space weather effects. We will meet the challenge by disseminating information about the fundamental physics and the experimental and modeling/ computational methods available for aeronomy research at the magnetic equator. The inherent questions will be addressed through a format involving presentations, Q&A, and discussion. The resources needed (ground- and space-based instruments, theory, models) are largely in place but need further promotion, another objective of the workshop. Progress will be measured in terms of improving forecast skill.

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