

LISN: Science Highlights

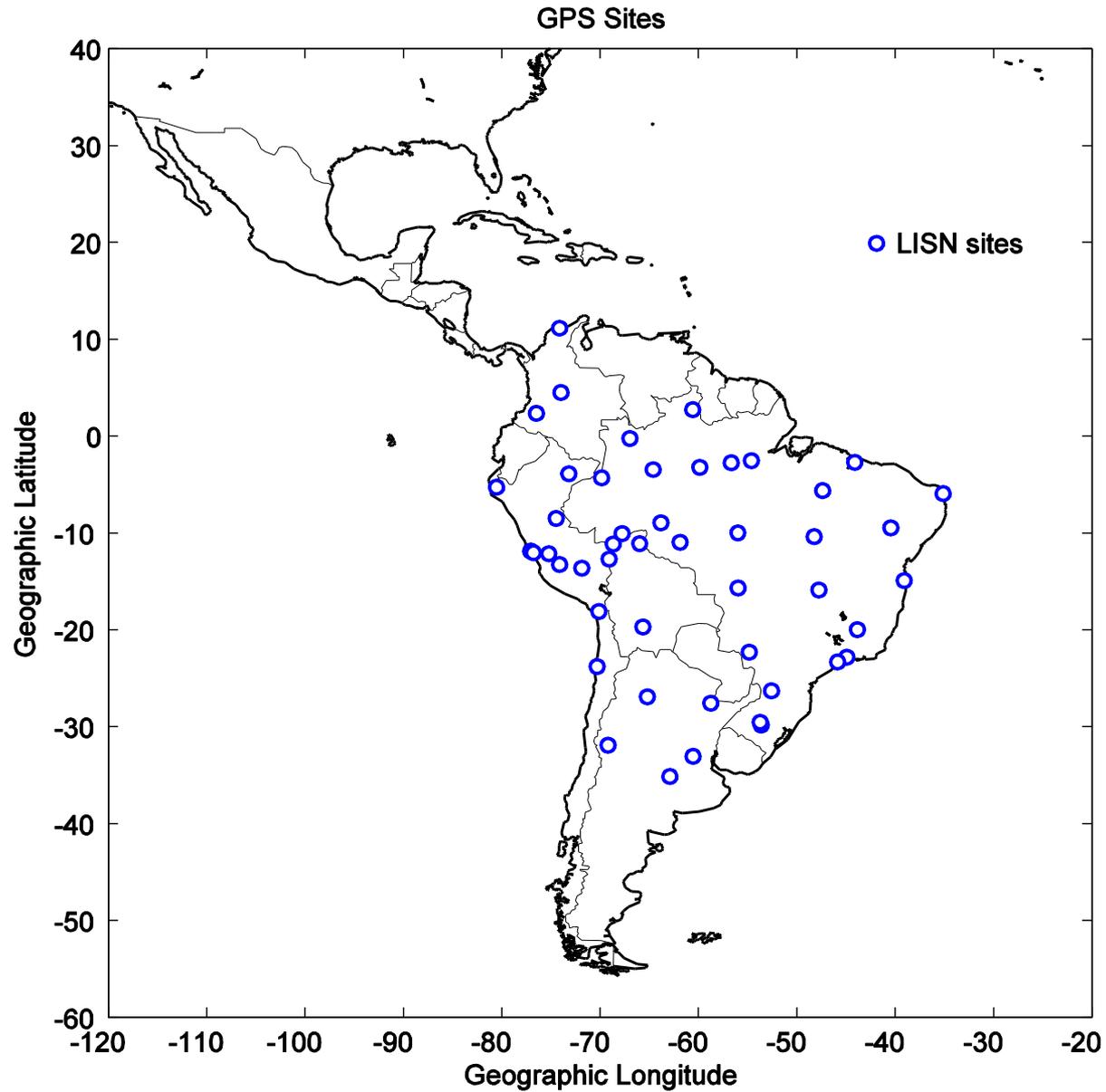
Cesar E. Valladares



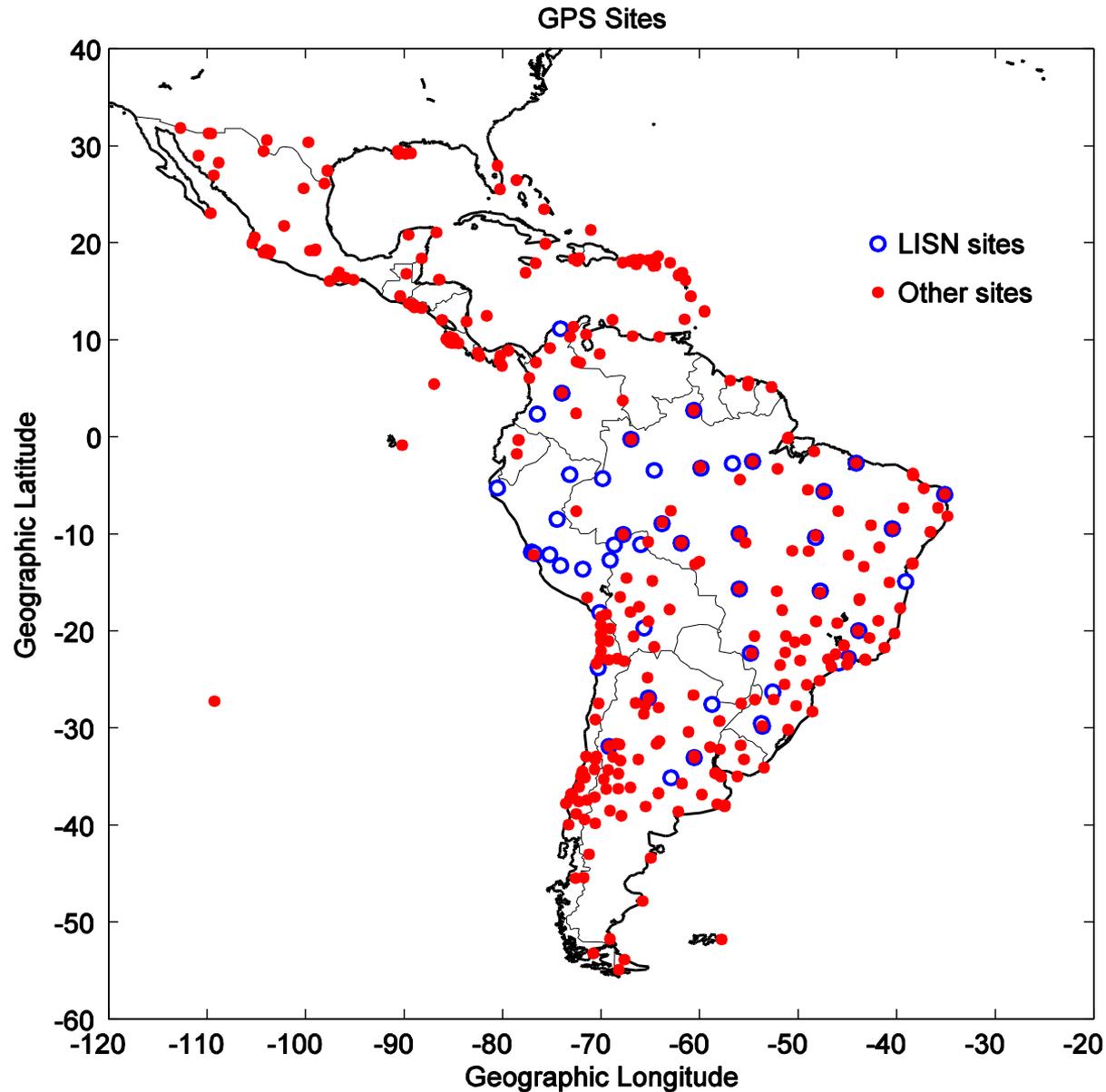
Low-latitude Ionospheric Sensor Network (LISN)

- The LISN network is a distributed observatory designed to provide nearly real-time observables (**nowcast**) to the Aeronomy community. LISN aims to develop a short term (60 minutes) predictive model of the ionosphere (**forecast**) based on real-time data-ingestion techniques.
- LISN consists of: 47 GPS receivers, 5 magnetometers, and 1 VIPIR ionosonde.
- LISN is built to provide continuous data to the US and international Space Physics Communities.

LISN GPS Stations



LISN and other GPS Stations in South and Central Americas



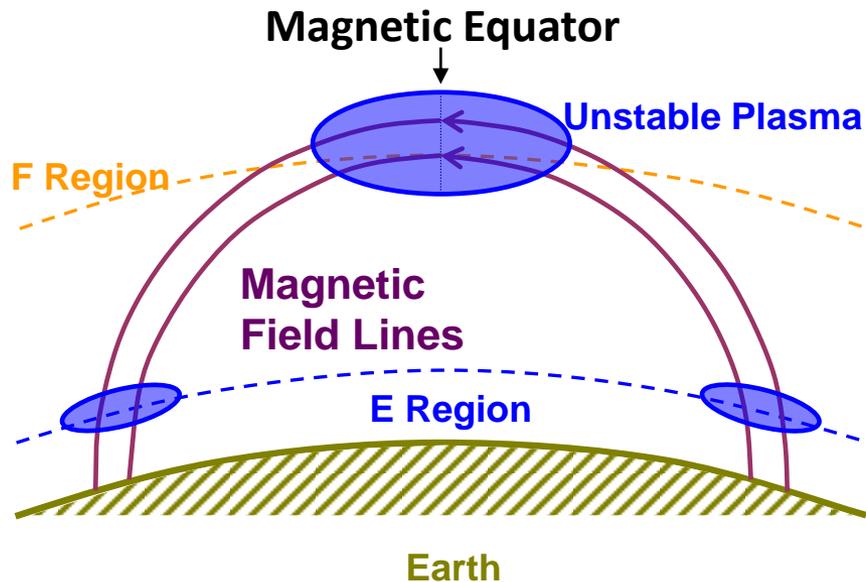
2 Magnetometer Baselines in SA; LISN (Green)



4 Magnetometer Baselines in SA; LISN (Green) and Others (blue)



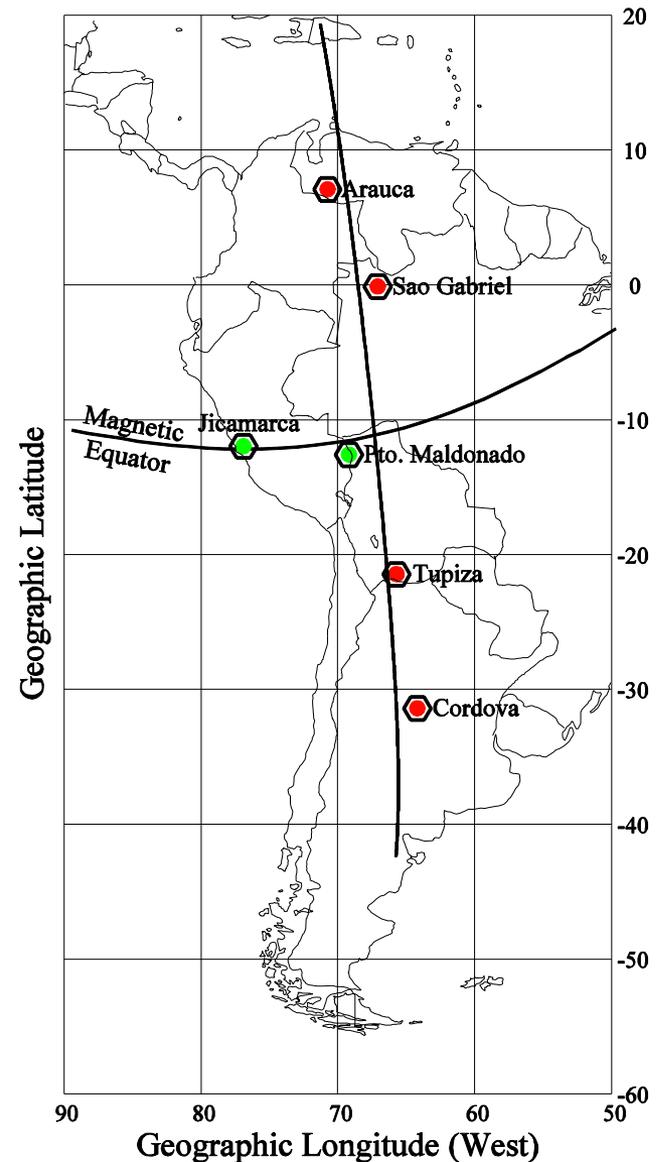
E Region and Equatorial Spread F (ESF)



The field lines that intersect the E region over the cities of Sao Gabriel, Brazil and Tupiza, Bolivia map to between 295 – 320 km at the magnetic equator. We will be able to investigate: (1) if E_s layers short out ESF. (2) role of equatorial and off-equatorial E region to balance pre-reversal currents.

Provided by K. Groves

SA Ionosondes (partial)



Projects to be conducted with Vertical Incidence Pulsed Ionospheric Radar (VIPIR) ionosondes

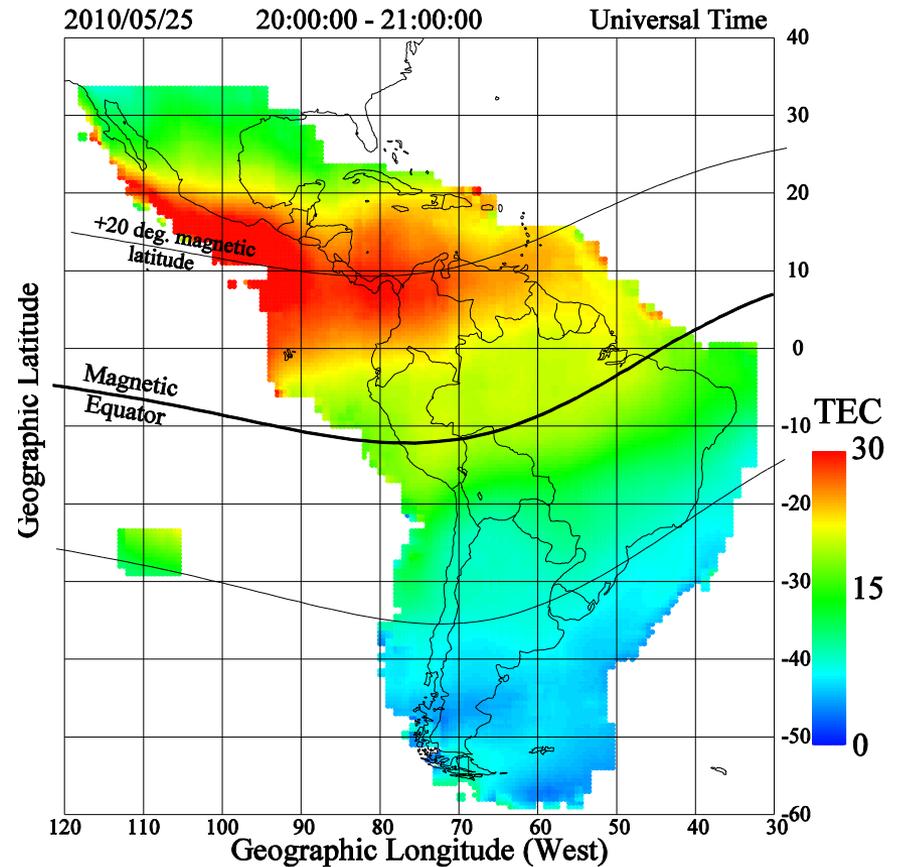
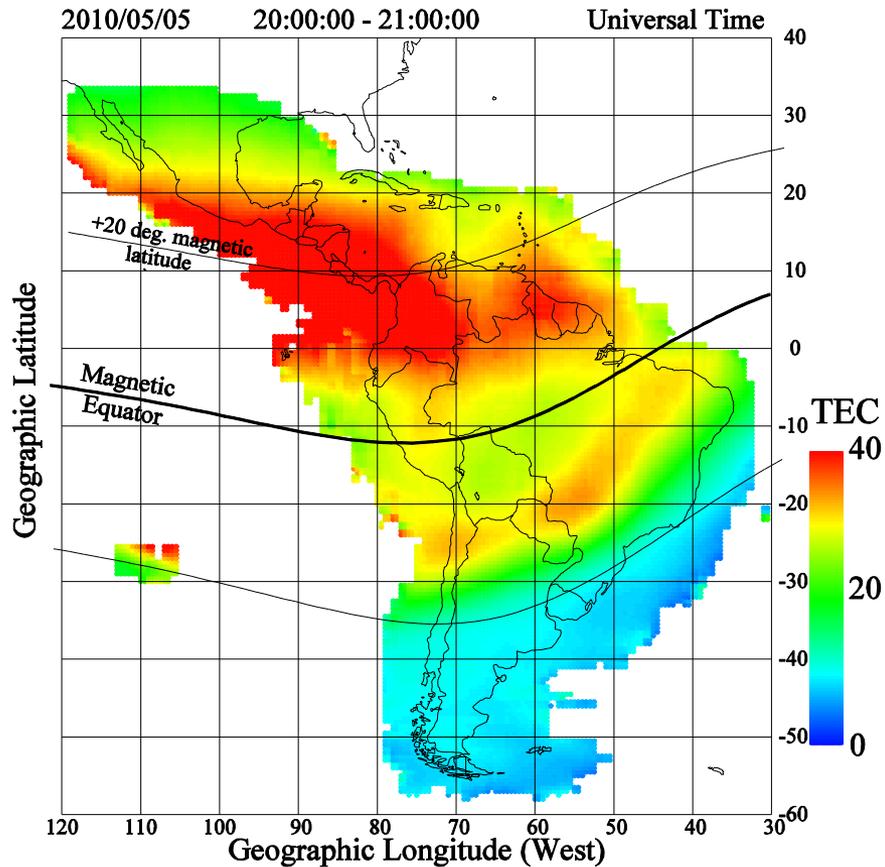
To use VIPIR measurements of E and E_s layers provided by two ionosondes placed at nearly conjugate locations, ~11-12° on both sides of the magnetic equator, and to study the role of E_s layers on the onset and dynamics of ESF.

To calculate the value of the meridional winds using the LISN ionosondes and compare these values with measurements conducted in South America using Fabry-Perot interferometers and other techniques.

To use data from GPSs and VIPIRs and numerical techniques to calculate plasma density profiles along the LISN meridian (~67° W).

Compare F₀f₂ values from P. Maldonado at the magnetic equator and Jicamarca also at the mag. eq, but separated by 800 km to observe longitudinal variability.

Longitudinal Extension of Anomaly during Quiet Magnetic Conditions

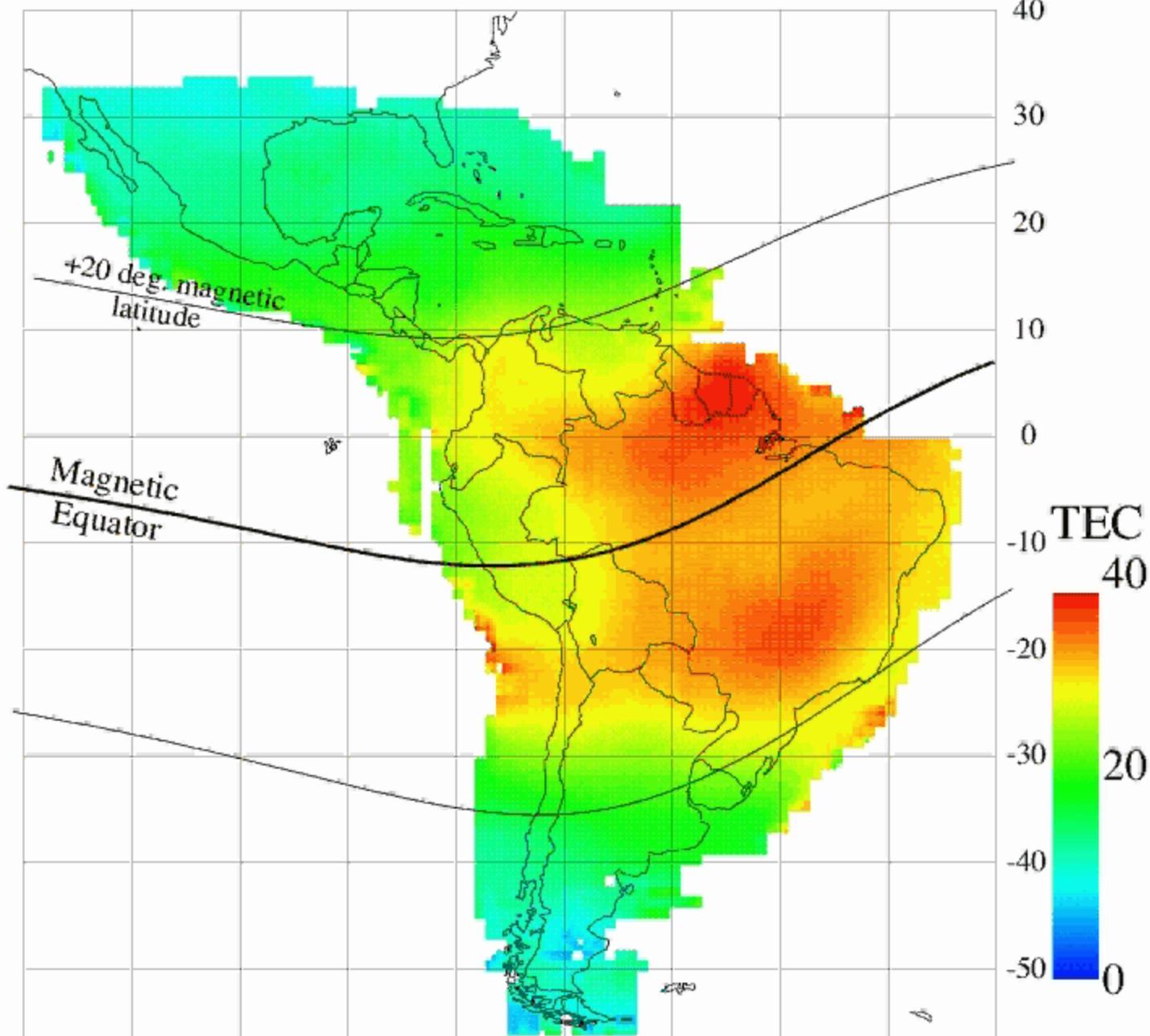


2010/09/20

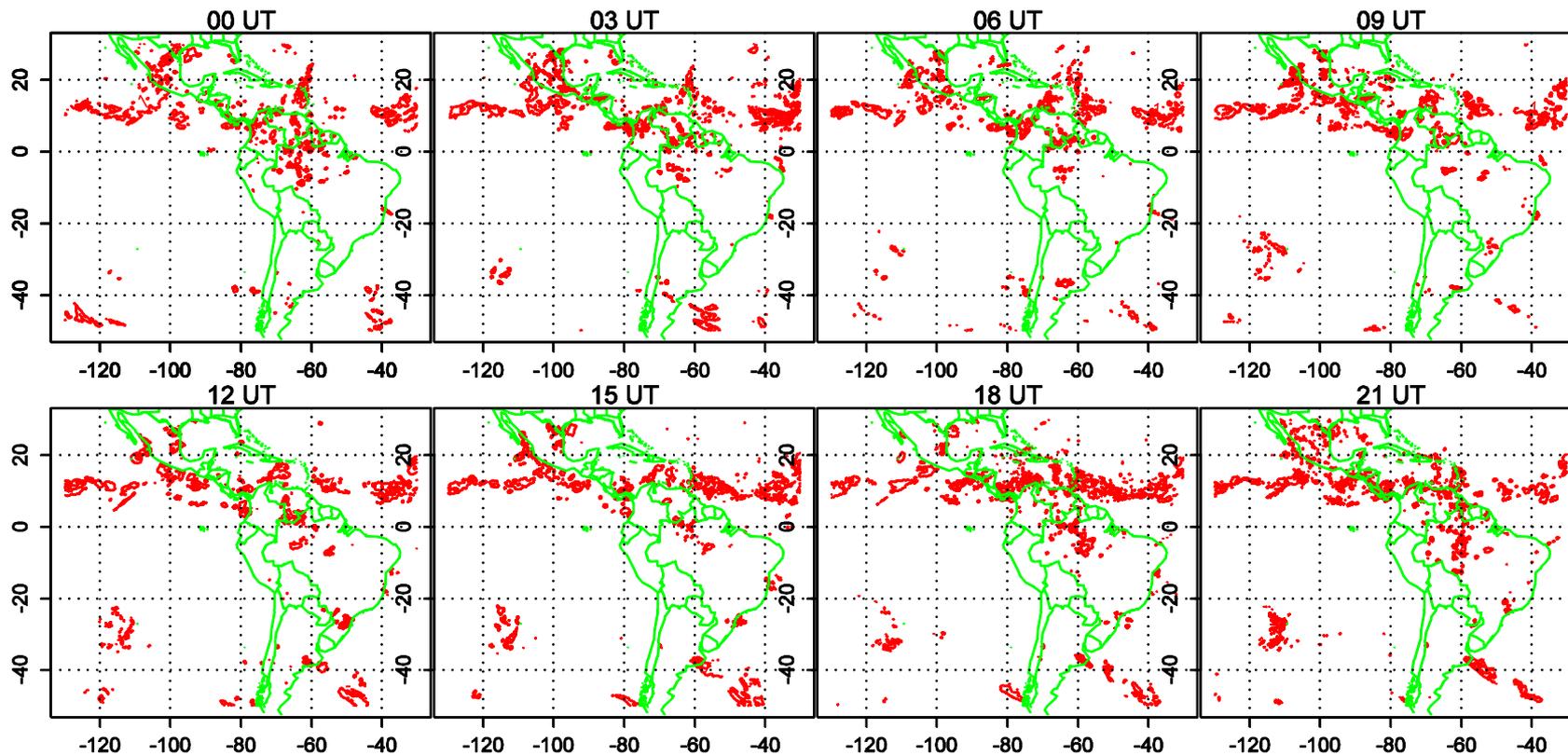
16:00:00 - 16:10:00

Universal Time

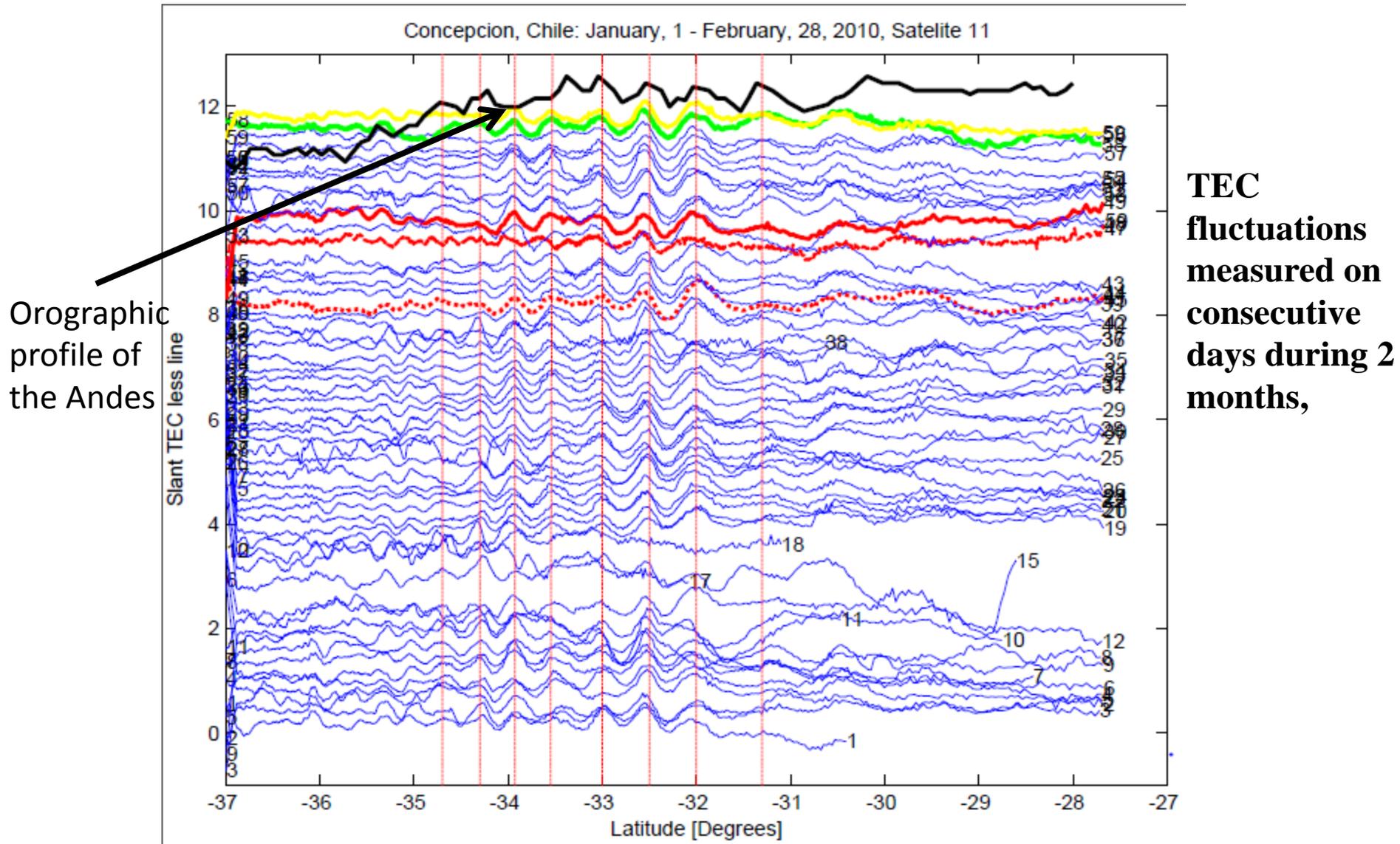
Geographic Latitude



TRMM 3-hr avg rainfall (mm/hr)
2010/09/20



Mountain Waves near Concepcion, Chile



Slide Provided by Wes Swartz

Conclusions

- **The LISN network operates continuously and provides data to the US aeronomy community.**
- **The data has an inherent regional context. This fact can be used in studies that have a regional context to investigate the day-to-day and longitudinal variability.**
- **Some efforts proposed for next 5 years:**
 - (1) Calculation of density profiles along the LISN meridian using GPS TEC data and VIPIR bottomside N_e profiles.**
 - (2) To answer several questions regarding longitudinal trends in the electrodynamics.**
 - (3) Study the Role of E and E_s layers and their relationship with ESF initiation.**
 - (4) ESF and the role of gravity waves on seeding plasma bubbles.**