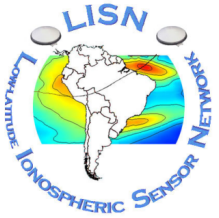
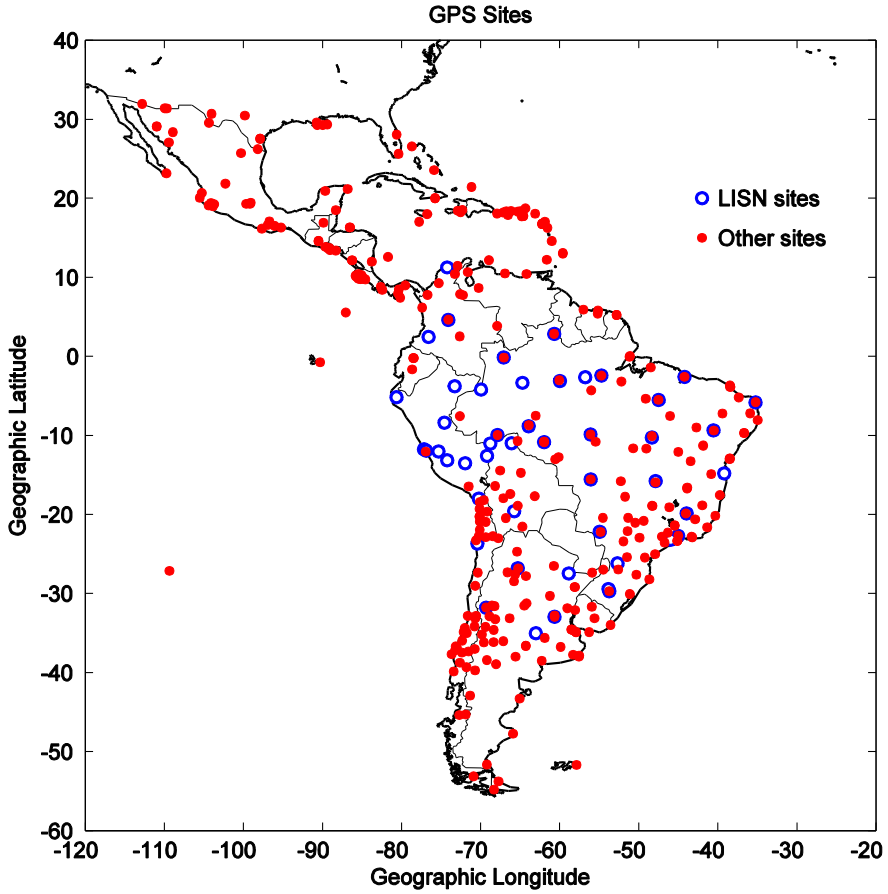


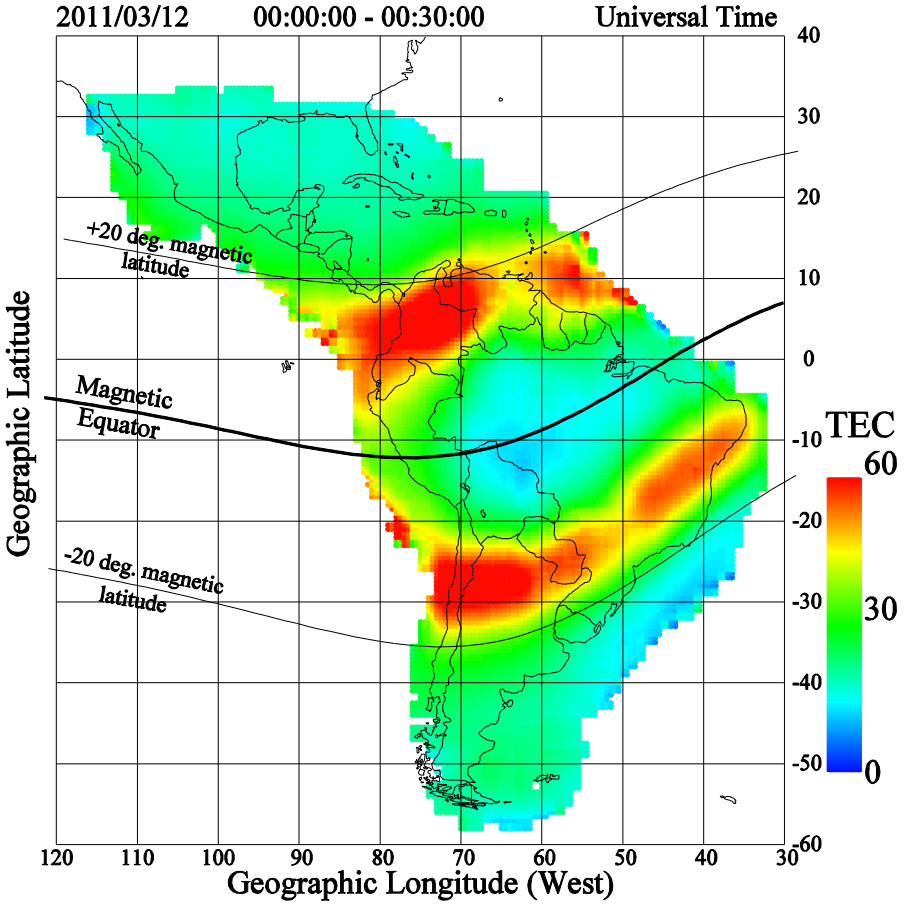
Combining Jicamarca and LISN data and a numerical model of the low latitude ionosphere to calculate the meridional neutral winds

Cesar E. Valladares

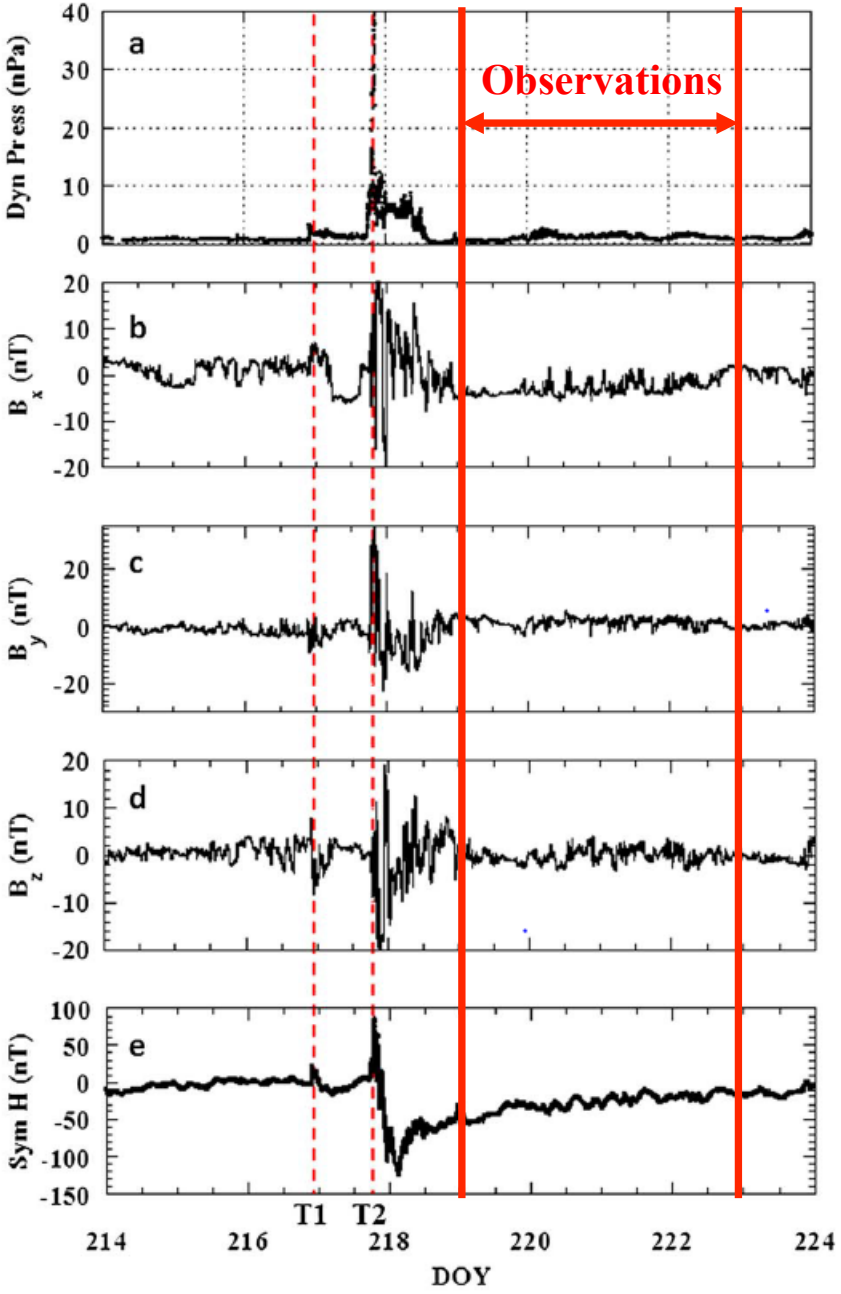
University of Texas at Dallas

LISN GPS receivers and basic measurements



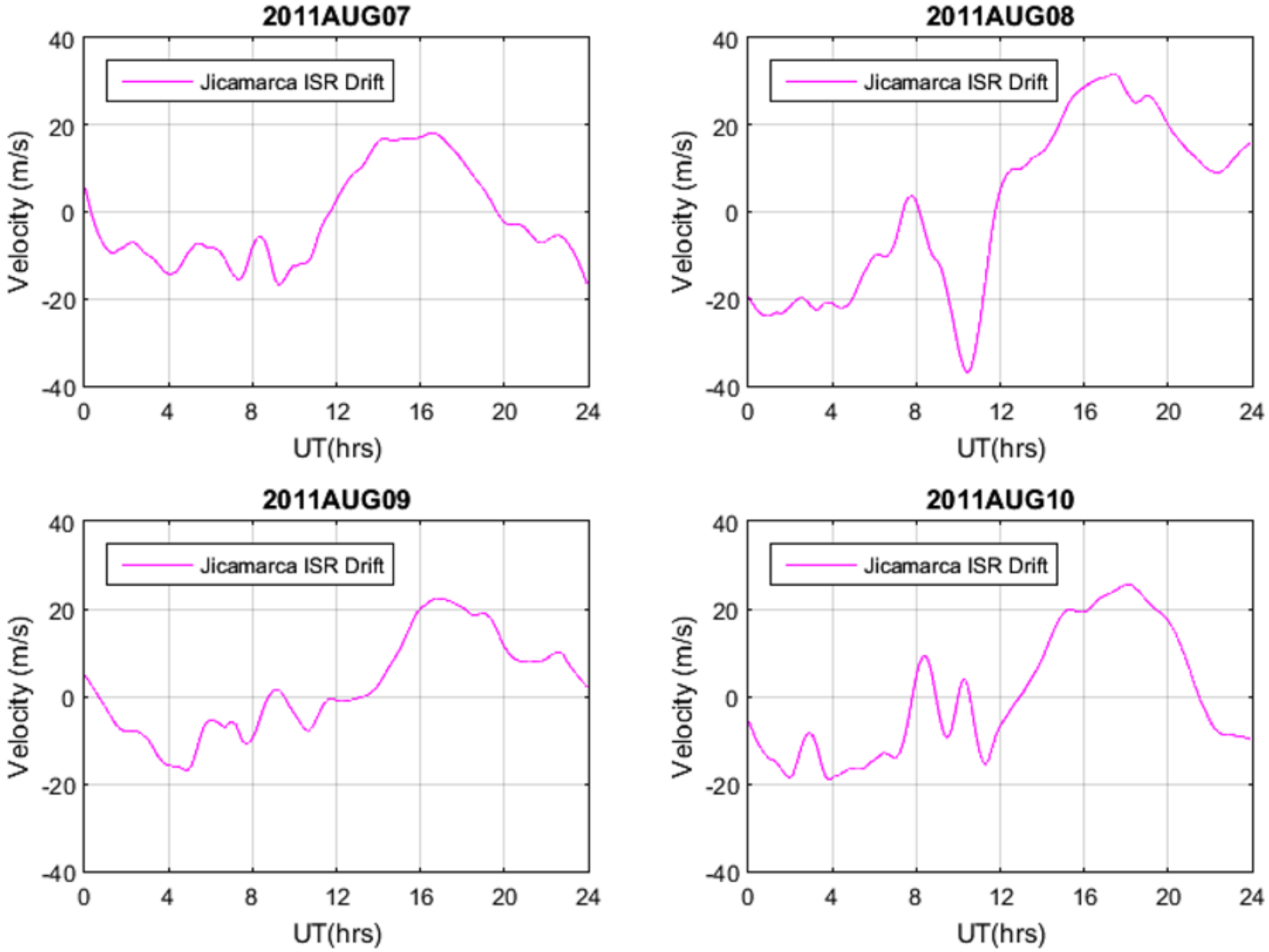


IMF and SymH values during August 2011 storm (Huang et al., 2013)

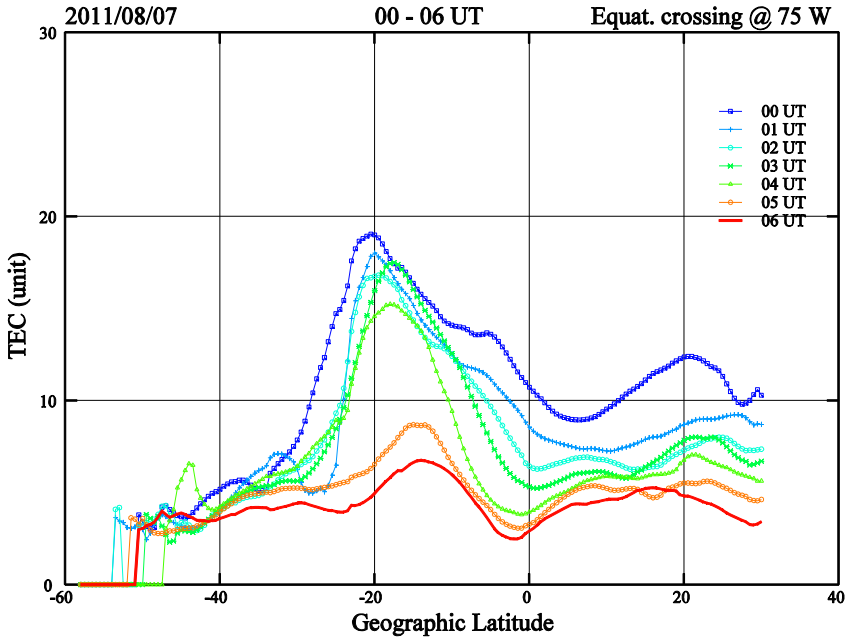


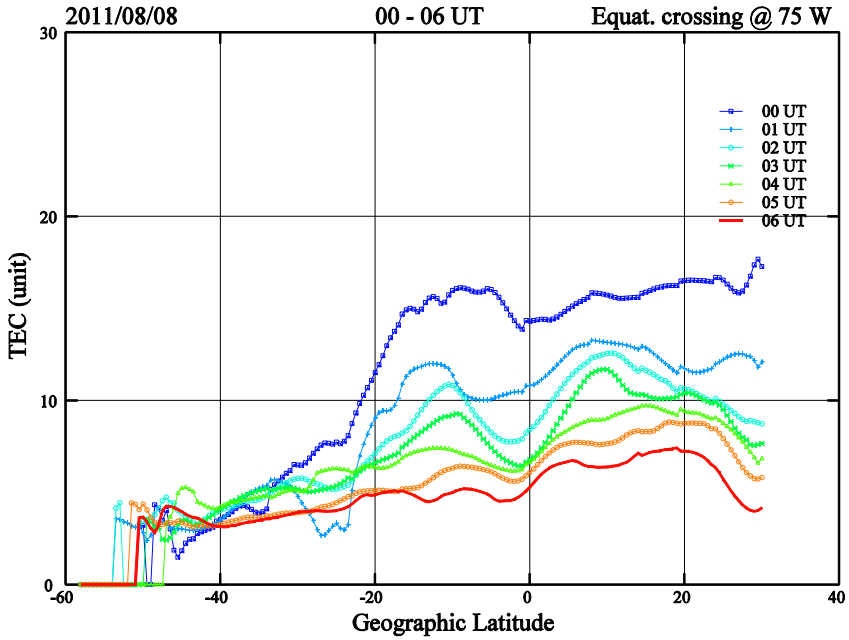
During the recovery phase of the magnetic storm of August 2011 that lasted few days.

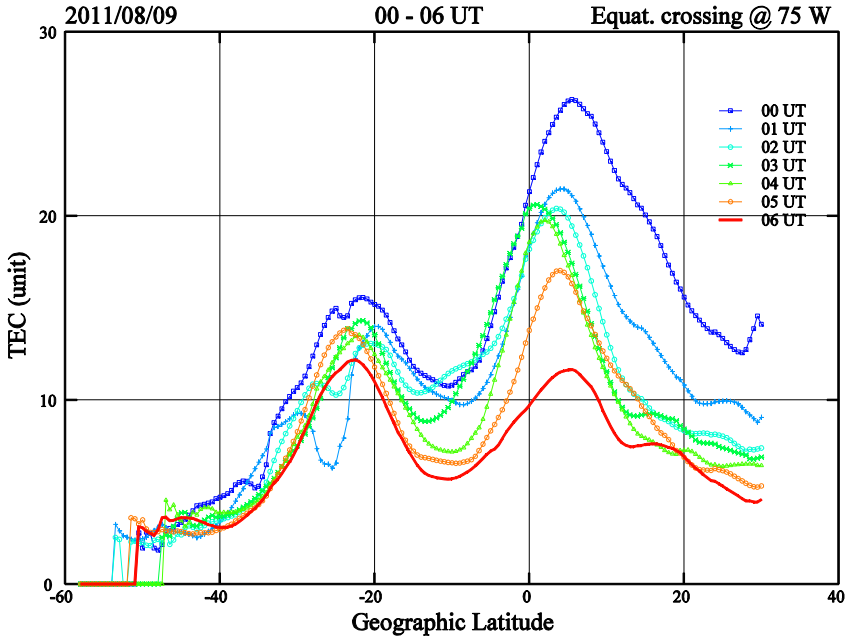
Jicamarca vertical drift measurements

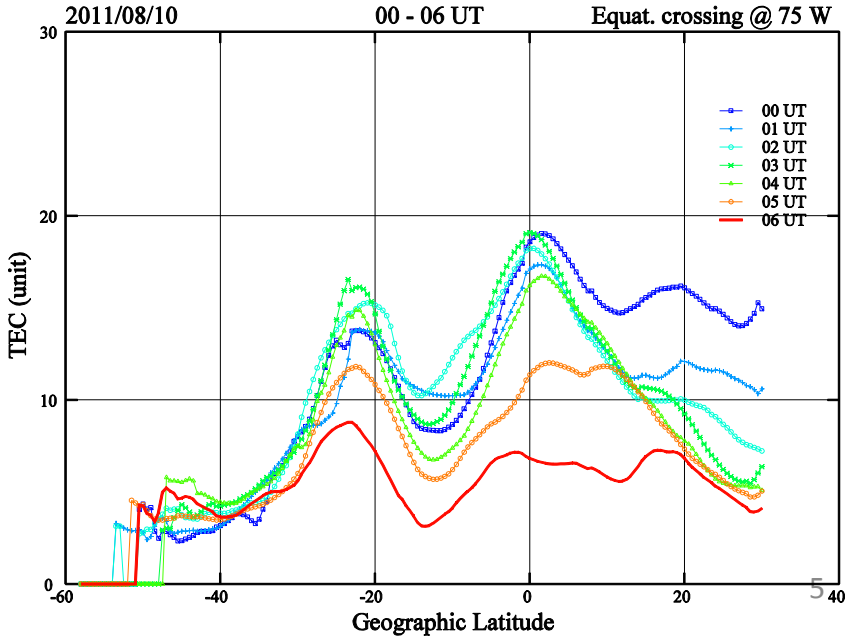


LISN TEC latitudinal profiles at 75 Degrees West

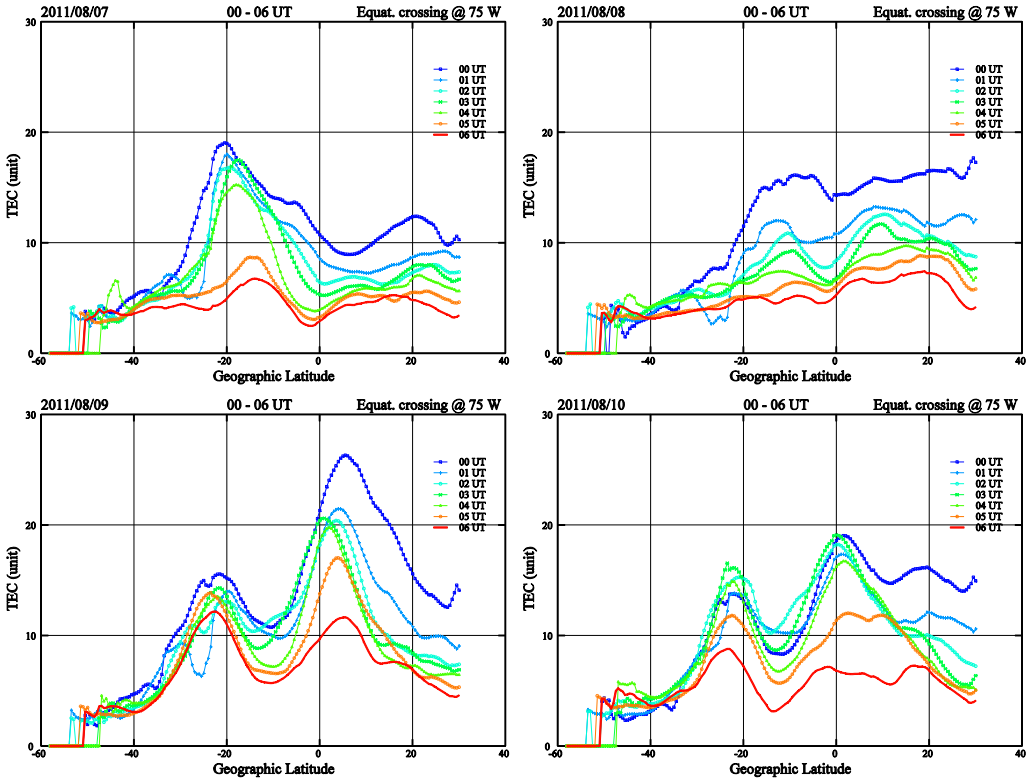


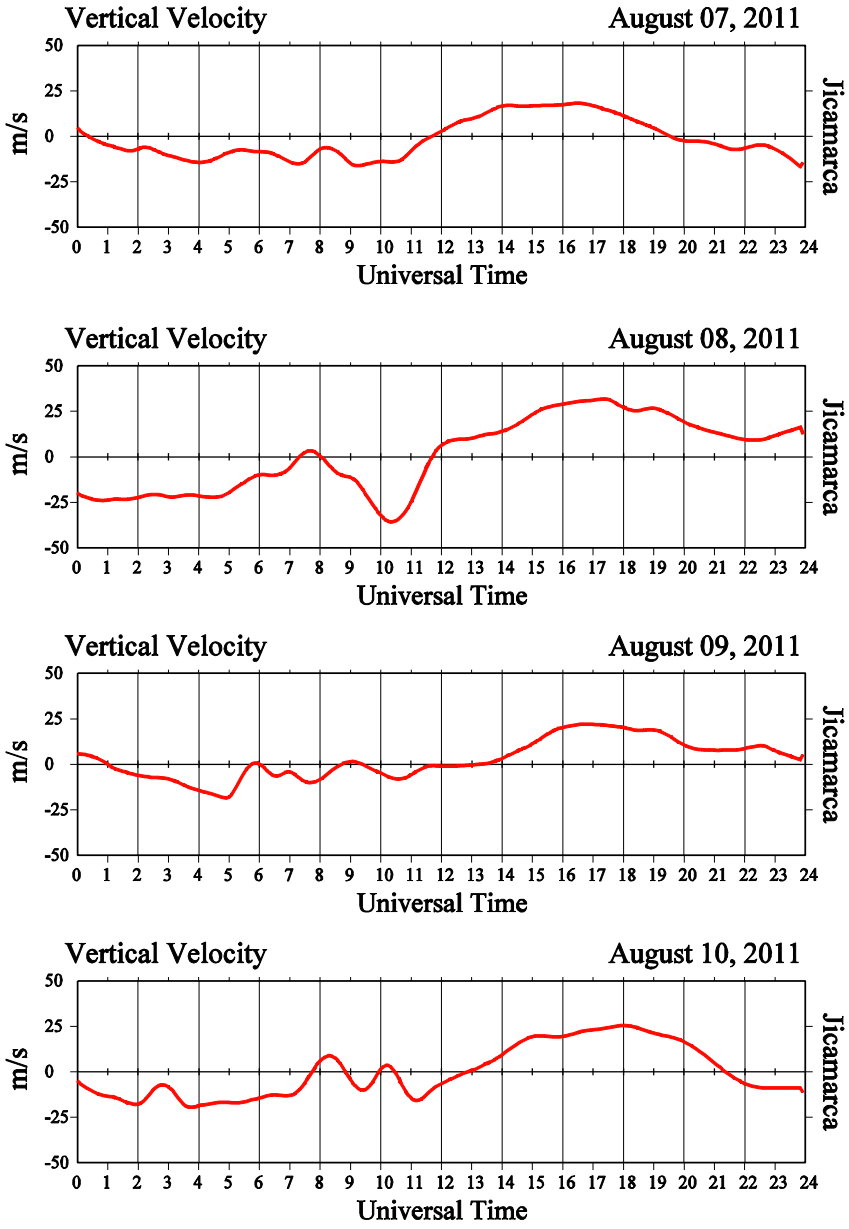




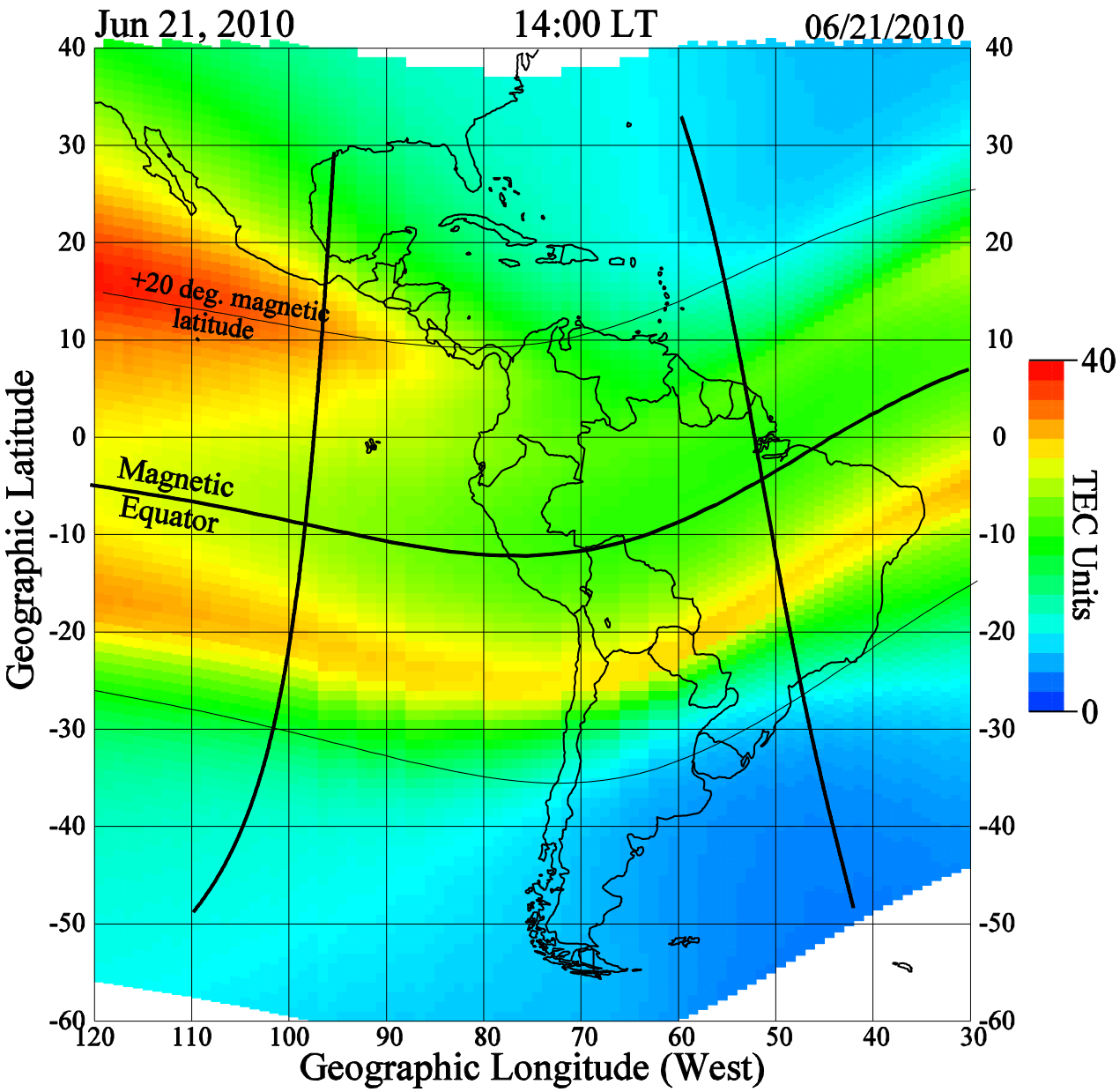


LISN TEC latitudinal profiles at 75° W





TEC plot of LLIONS simulations for 90 longitudinal sectors

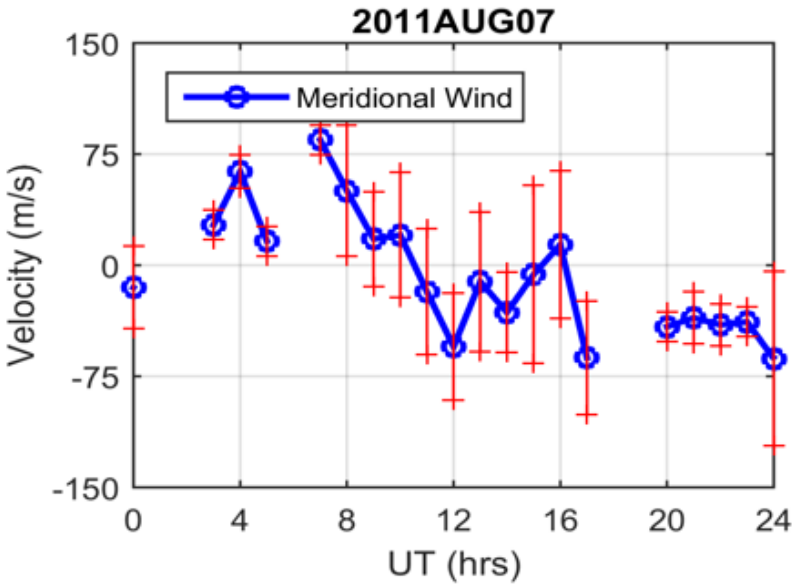


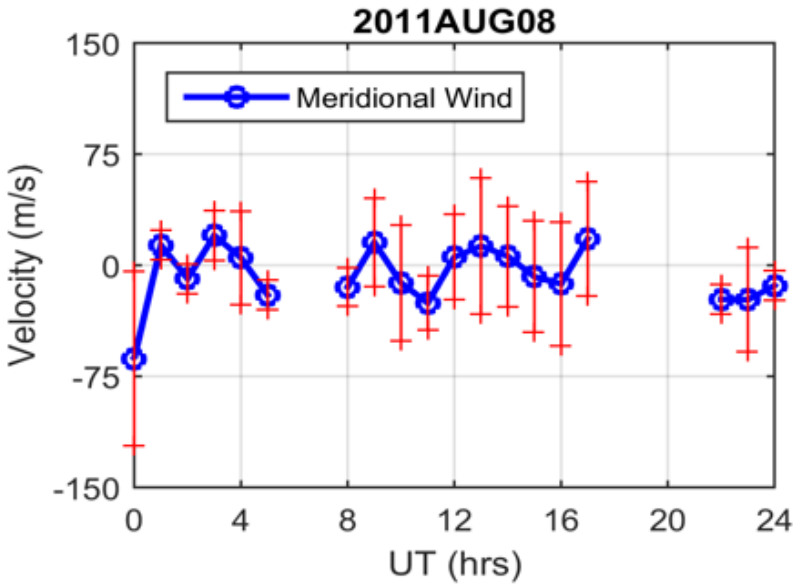
LLIONS is a physics-based ionosphere model of the low- and mid-latitude ionospheres.

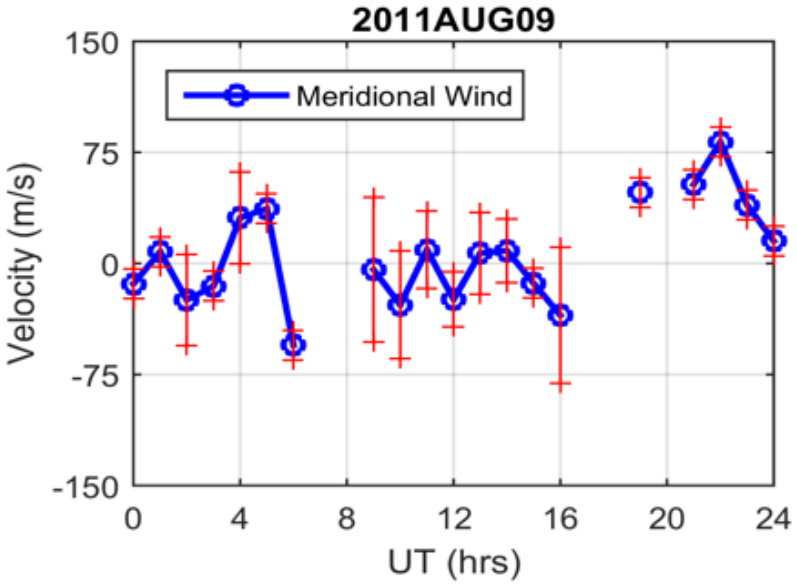
LLIONS calculates the 2D, time-dependent density distributions of five major plasma constituents (NO^+, O_2^+, H^+, O^+, e^-) between ±45° latitude and 90-4000 km altitude. The plasma distribution is solved along magnetic field lines.

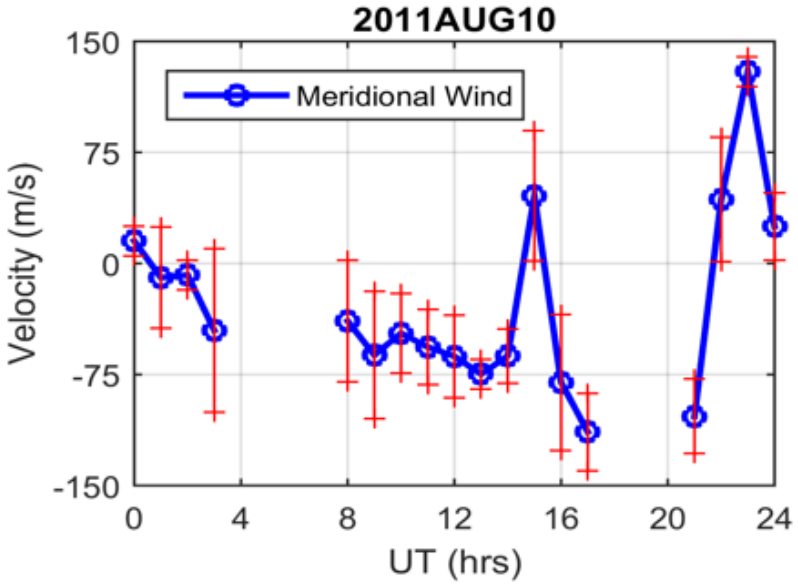
We have conducted ensemble modeling using the following values of the meridional wind: -100, -80, -60, -40, -20, 0, 20, 40, 60, 80, 100 m/s.

SOFDI Wind measurements at Huancayo

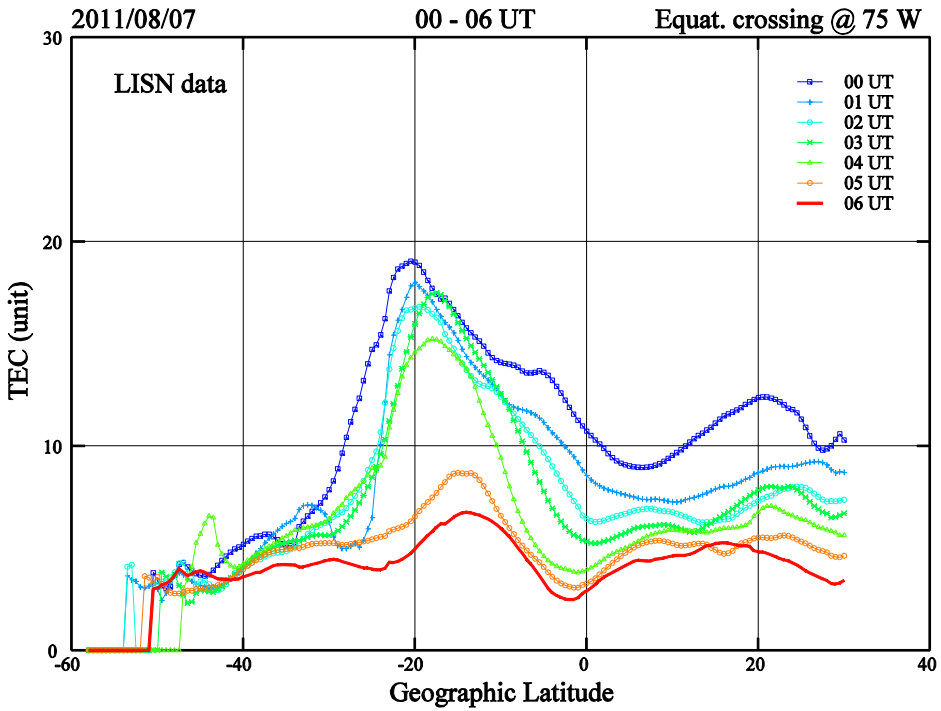




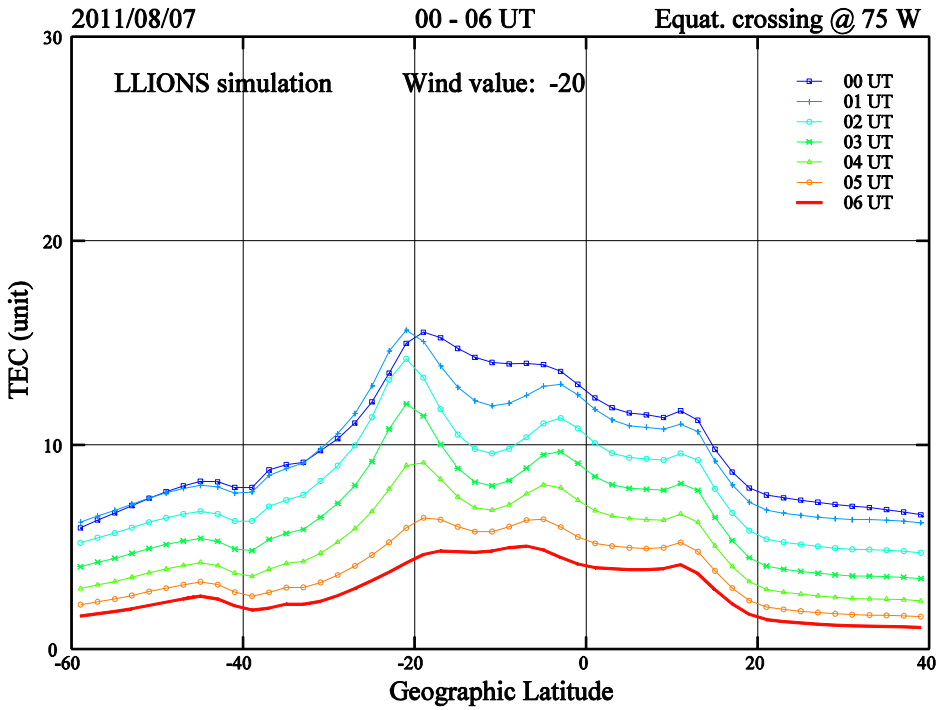




TEC observations and Model results comparison

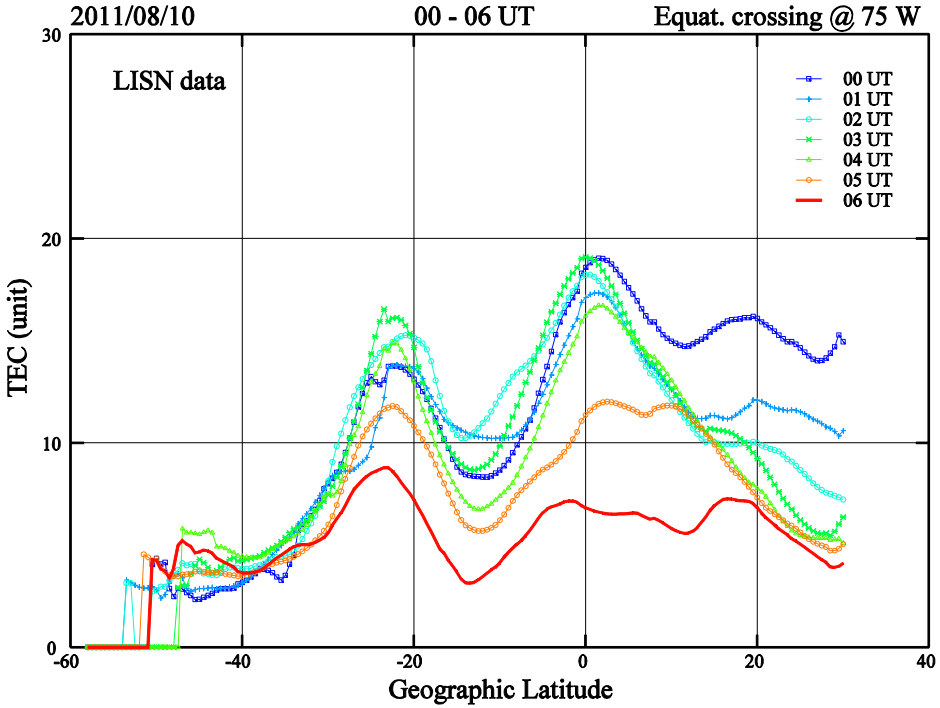


Observed

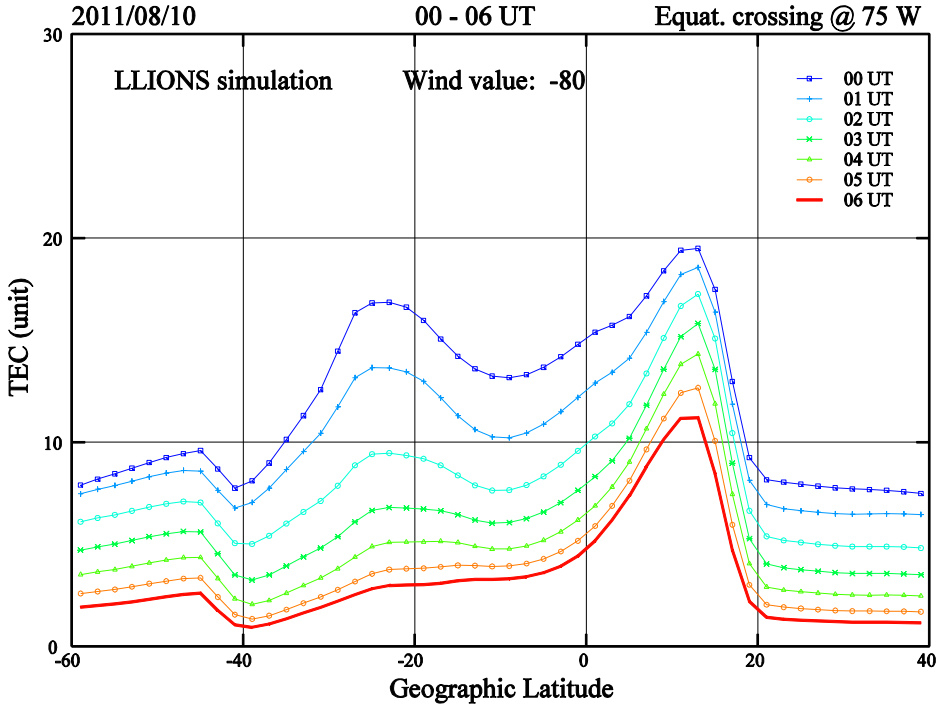


Modeled

TEC observations and Model results comparison



Observed



Modeled

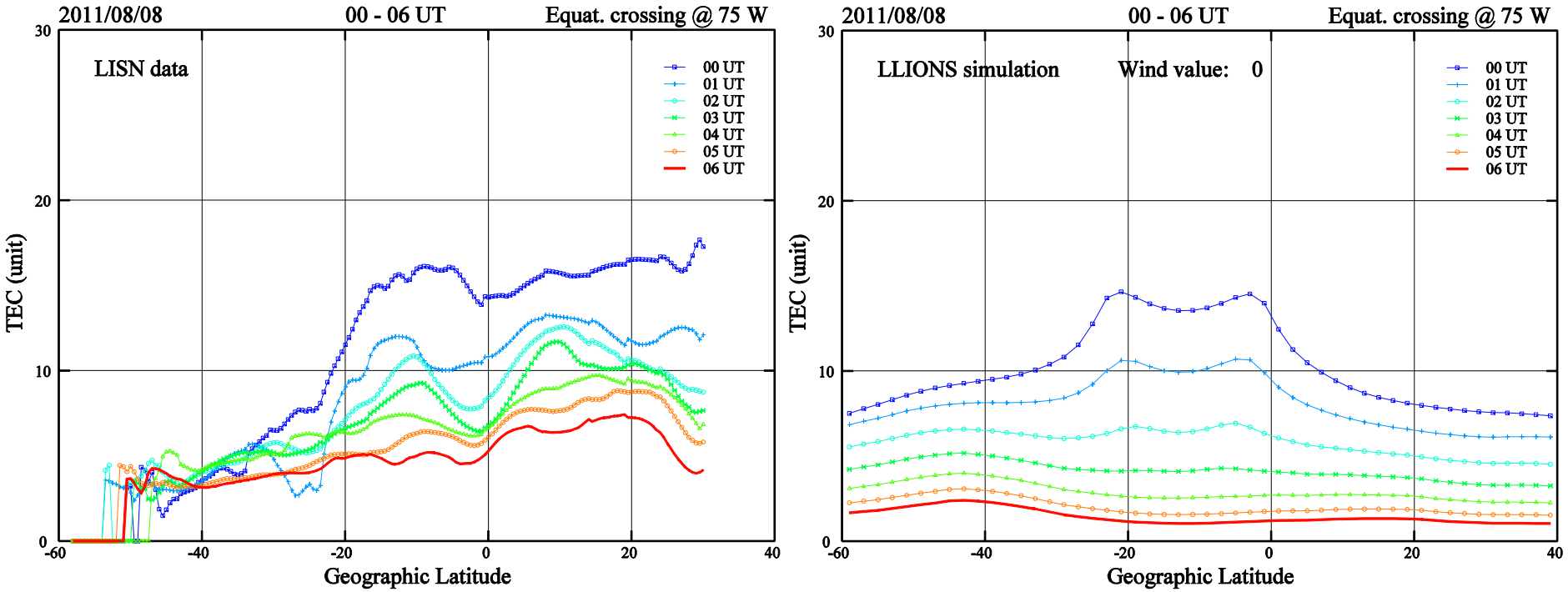
Summary

These are very preliminary results that show some qualitative agreement between observations and model results. However, some changes are needed.

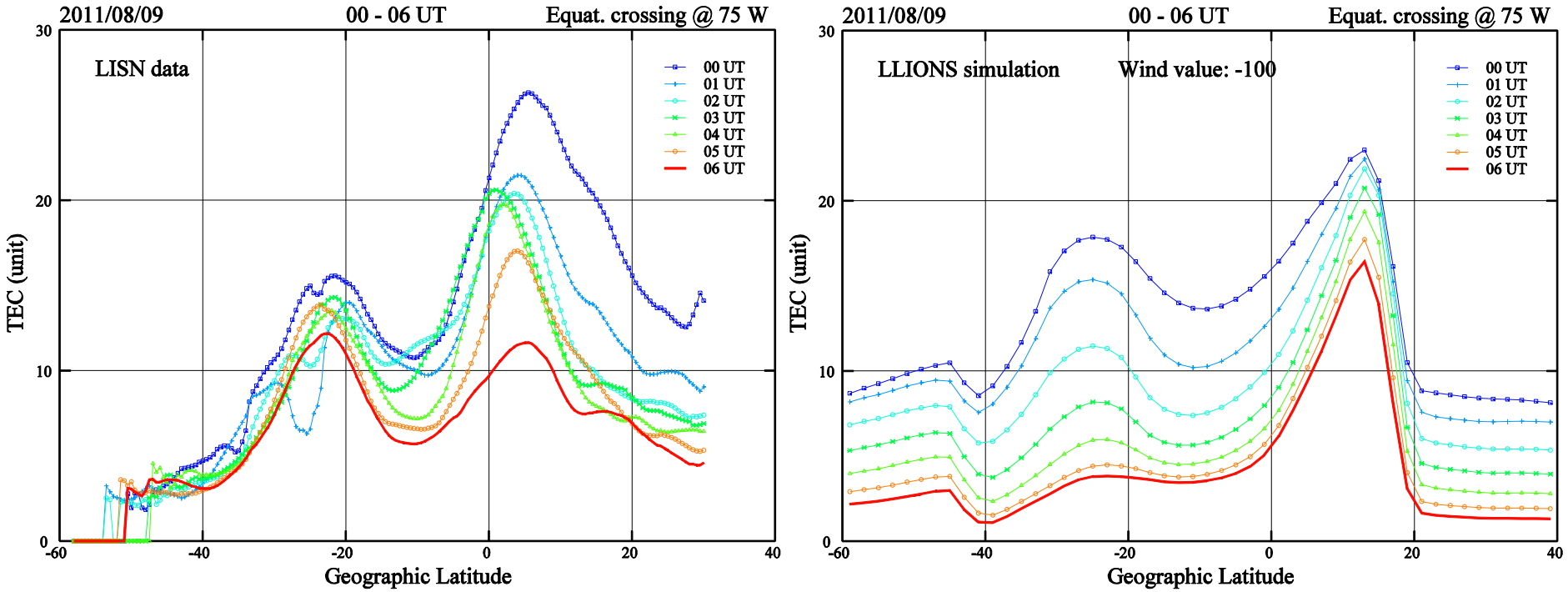
It is necessary:

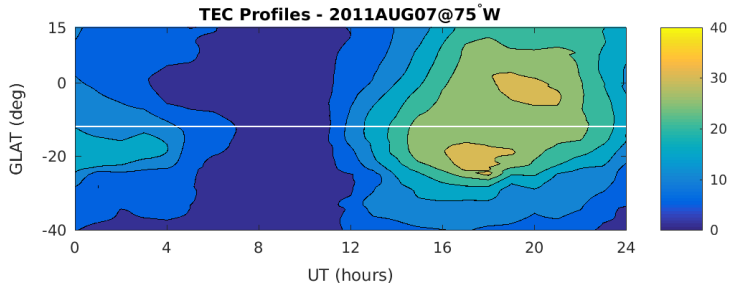
1) **To include the vertical variability of the vertical drifts measured by the Jicamarca radar.**
2) **To include Meridional wind that vary as a function of time and latitude.**
3) **To use density values measured by the Jicamarca ISR as a new constrain to calculate meridional winds.**

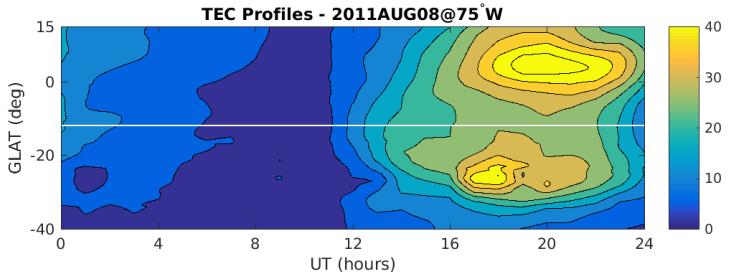
TEC observations and Model results comparison

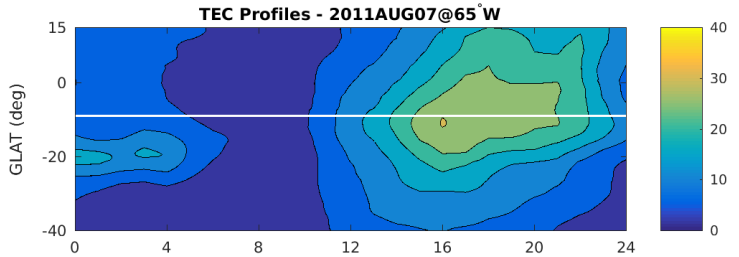


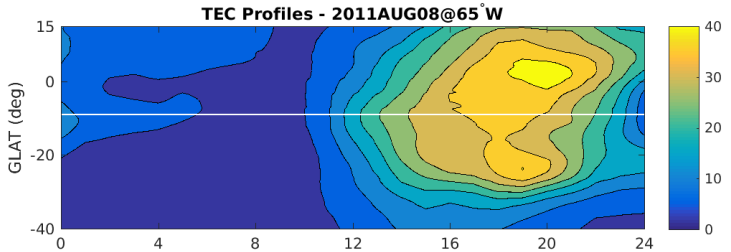
TEC observations and Model results comparison

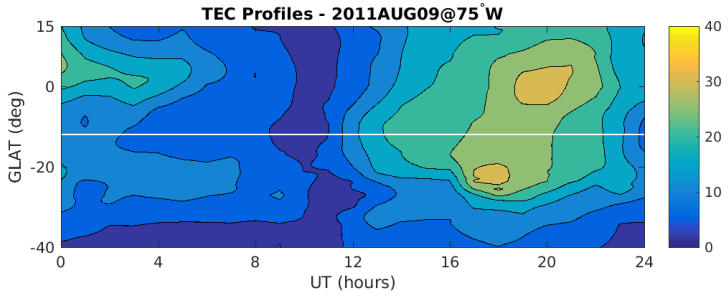


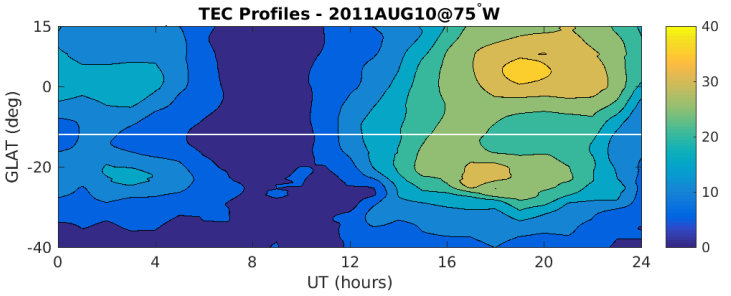

TEC Profiles - 2011AUG07@75°W
GLAT (deg)
UT (hours)

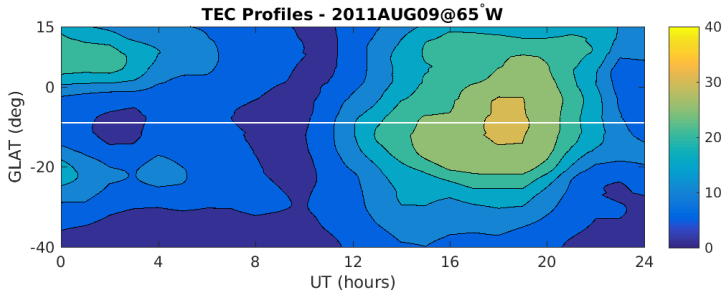

TEC Profiles - 2011AUG08@75°W
GLAT (deg)
UT (hours)

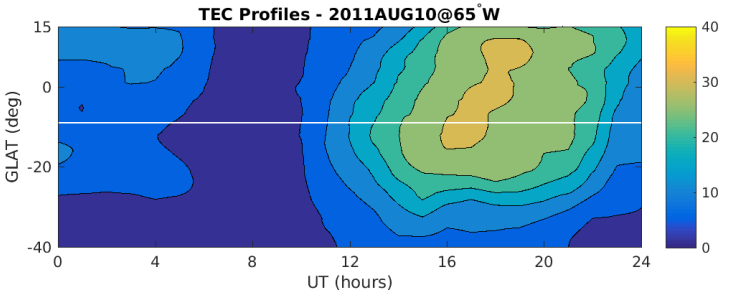

TEC Profiles - 2011AUG07@65°W
GLAT (deg)
UT (hours)


TEC Profiles - 2011AUG08@65°W
GLAT (deg)
UT (hours)


TEC Profiles - 2011AUG09@75°W
GLAT (deg)
UT (hours)


TEC Profiles - 2011AUG10@75°W
GLAT (deg)
UT (hours)


TEC Profiles - 2011AUG09@65°W
GLAT (deg)
UT (hours)


TEC Profiles - 2011AUG10@65°W
GLAT (deg)
UT (hours)