

LISN observations over the American continent

Cesar E. Valladares

University of Texas at Dallas

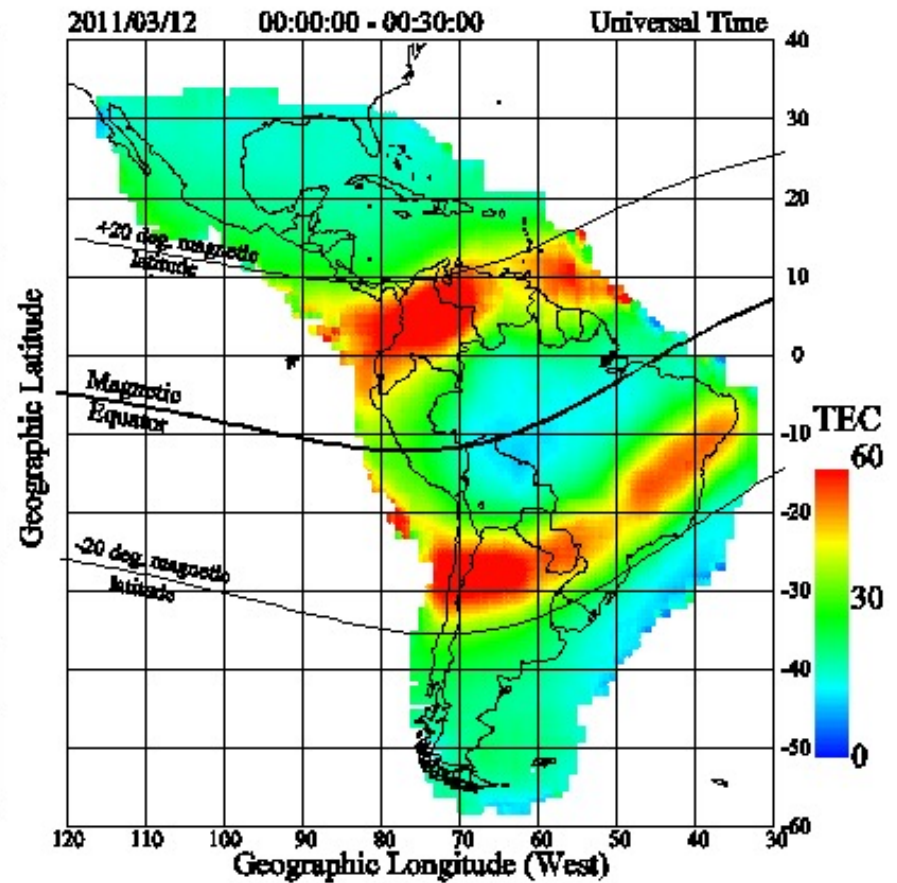
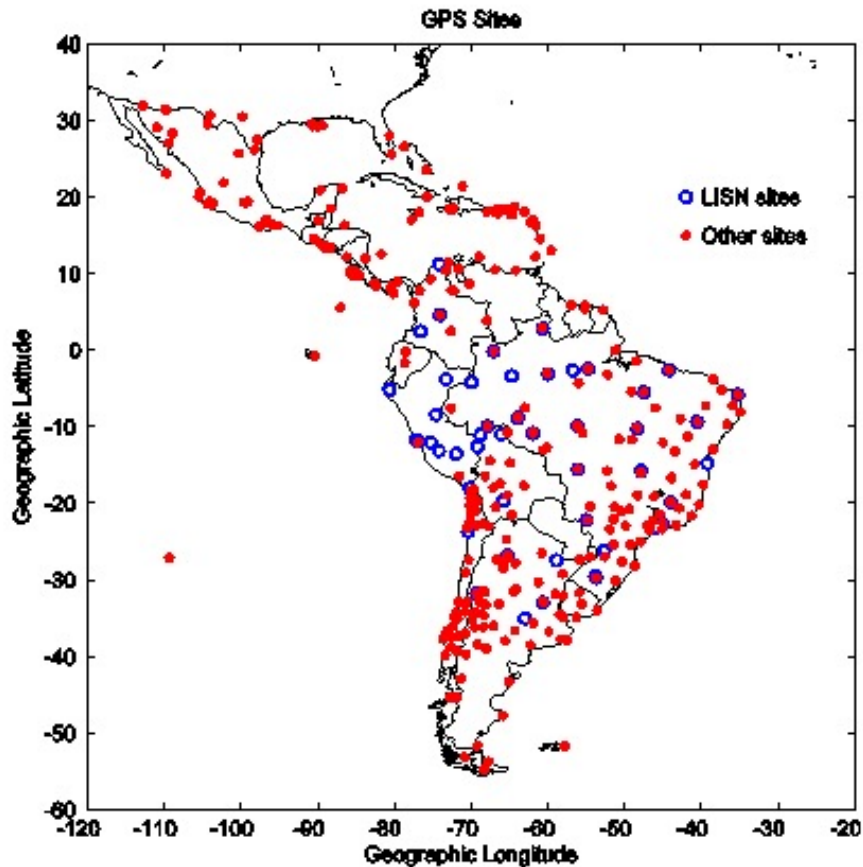


Outline

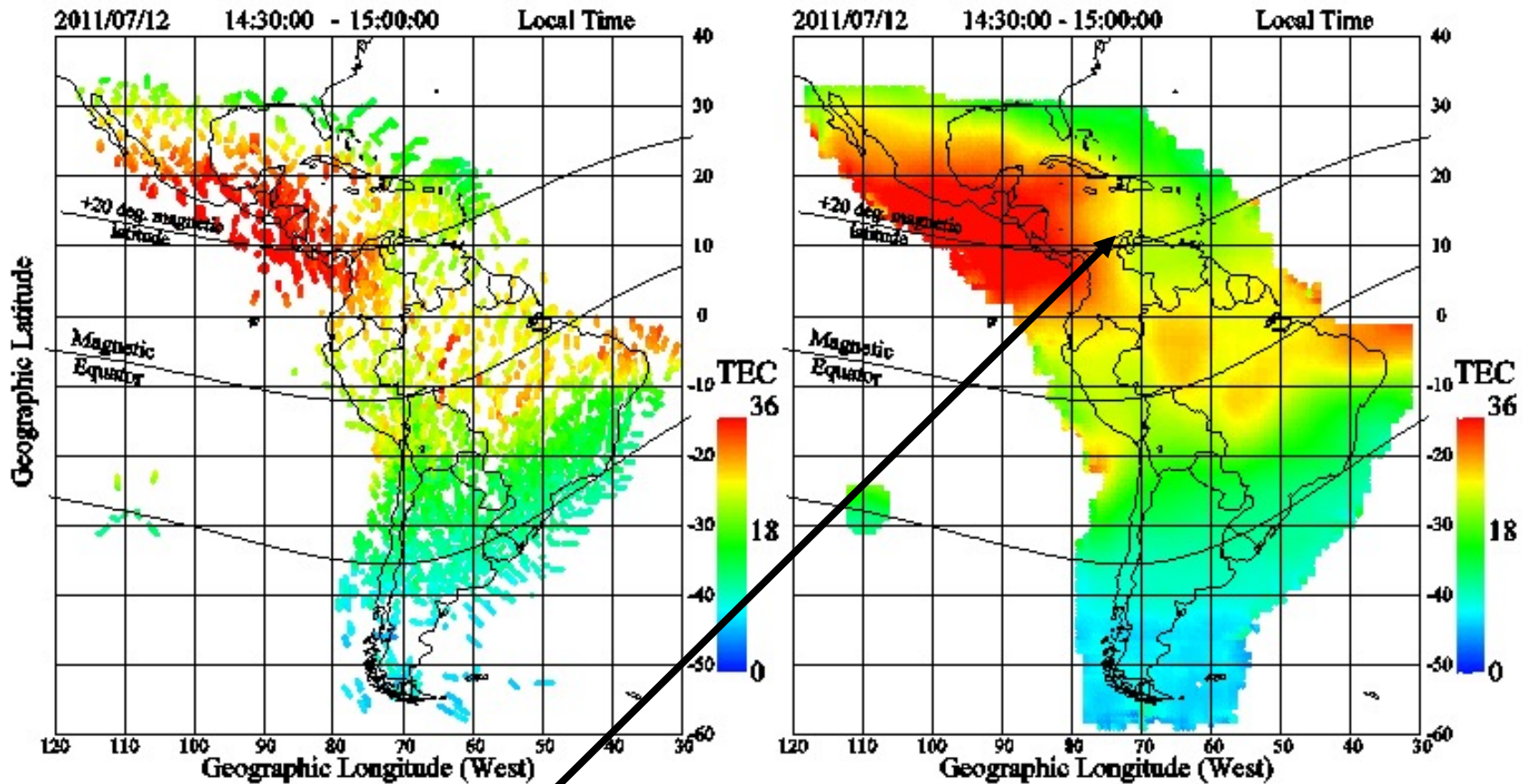
The tropical Ionization Anomaly, TEC anomaly observed with a large network of GPSs.

Observations of TIDs with GPS receivers and VIPIR ionosondes.

LISN GPS receivers and basic measurements

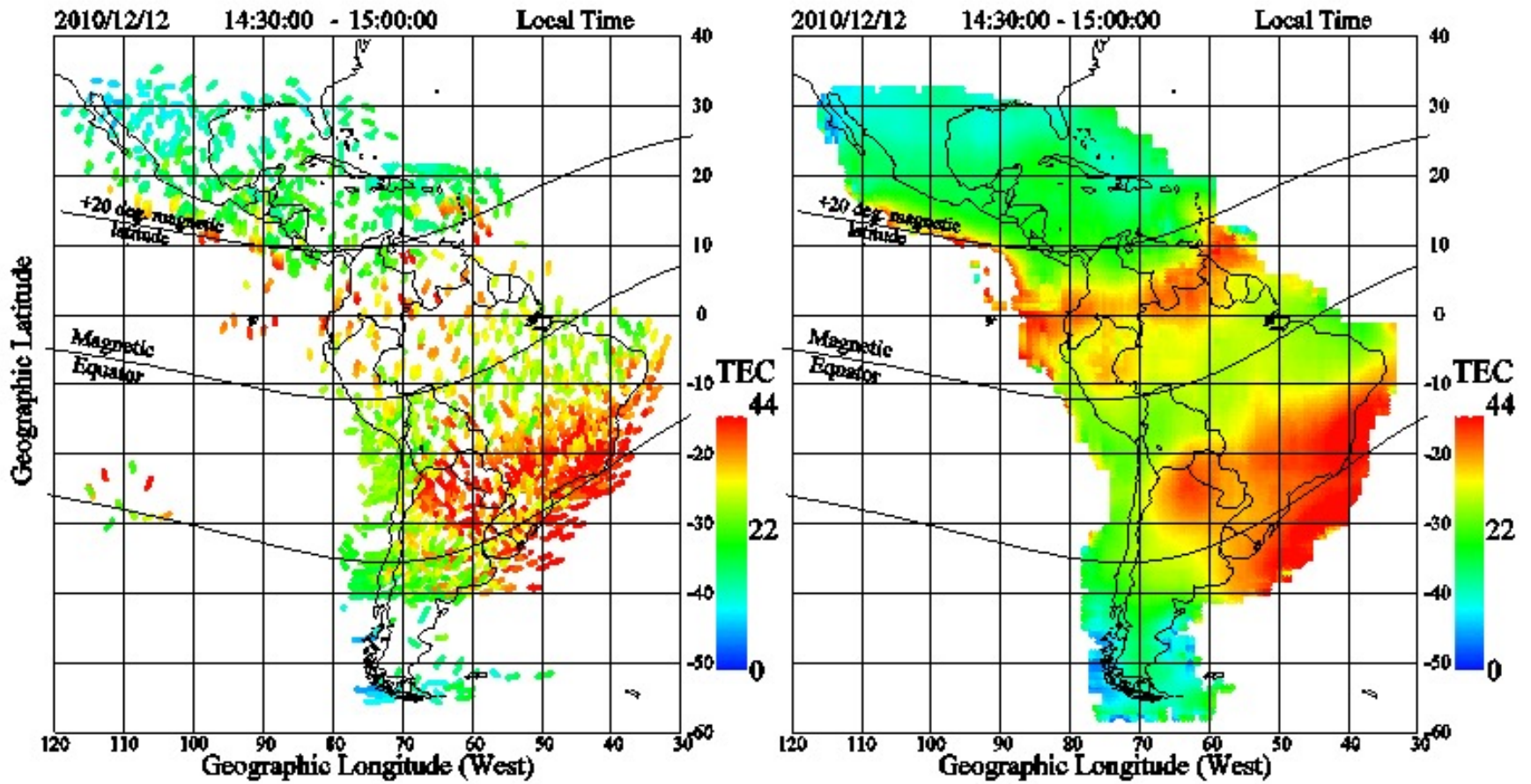


The tropical Ionization Anomaly. TEC values for July 12, 2011



Abrupt termination of TEC enhancement where declination changes. Occurs during afternoon hours.

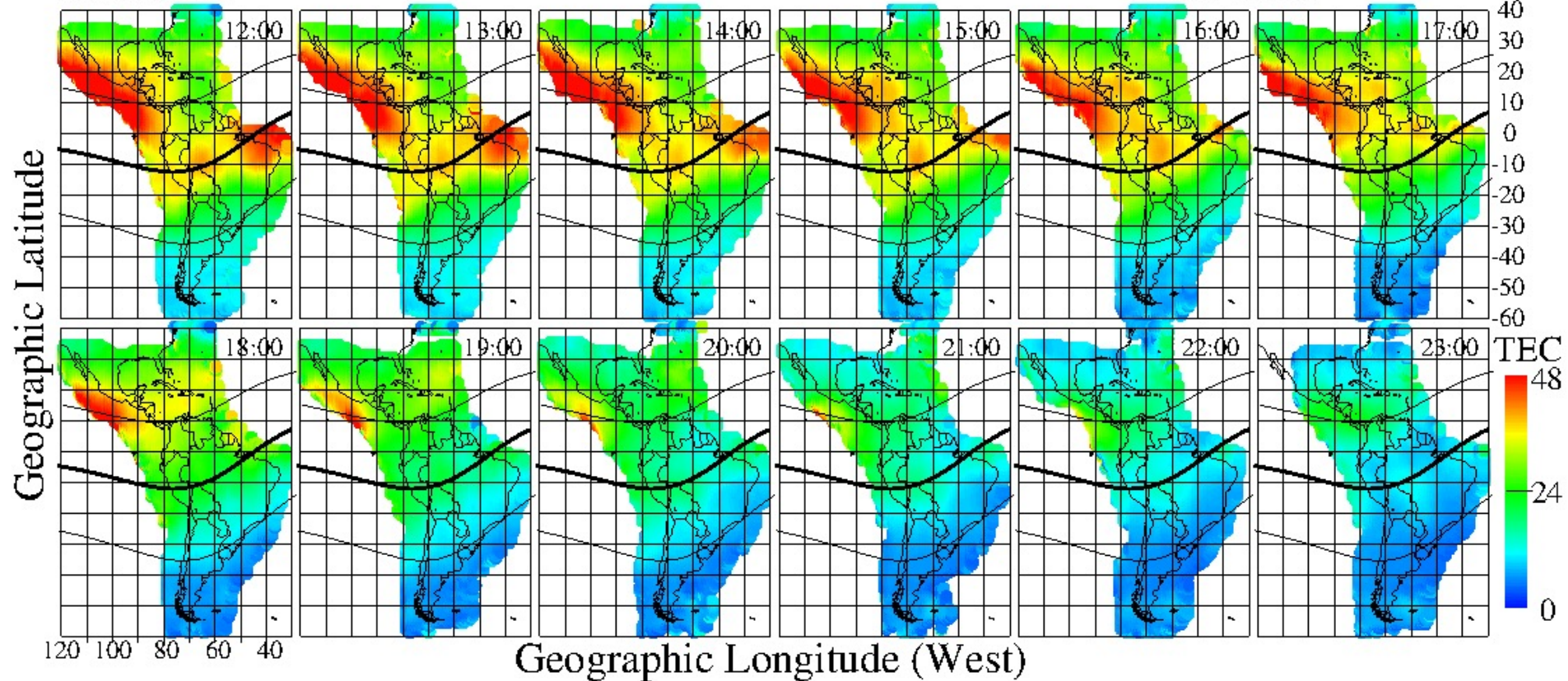
TEC values for December 12, 2011



Hour-by-hour variability of the TEC tropical ionization anomaly

2012/06/15

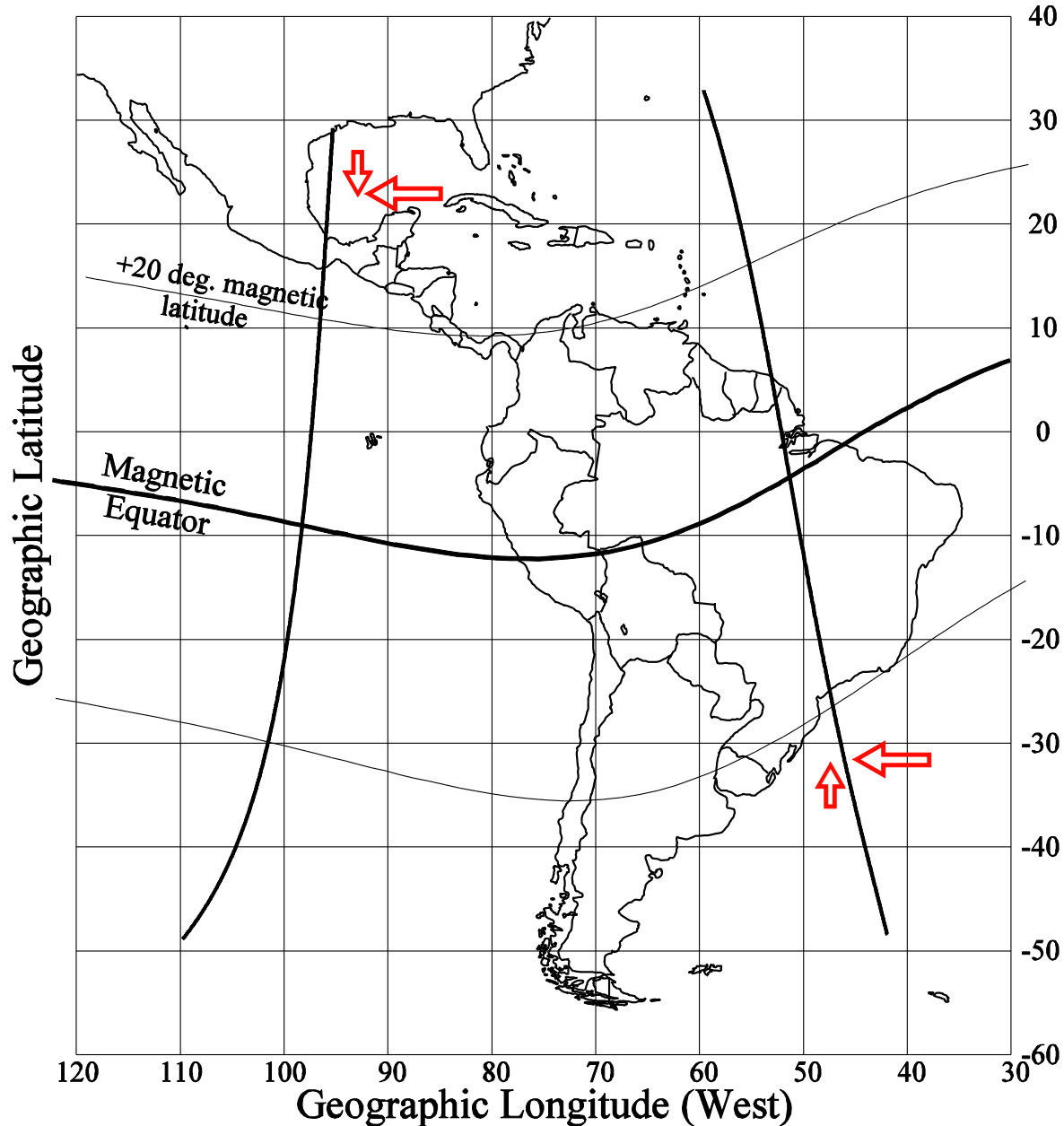
Local Time



Wind system associated with tropical TEC enhancement

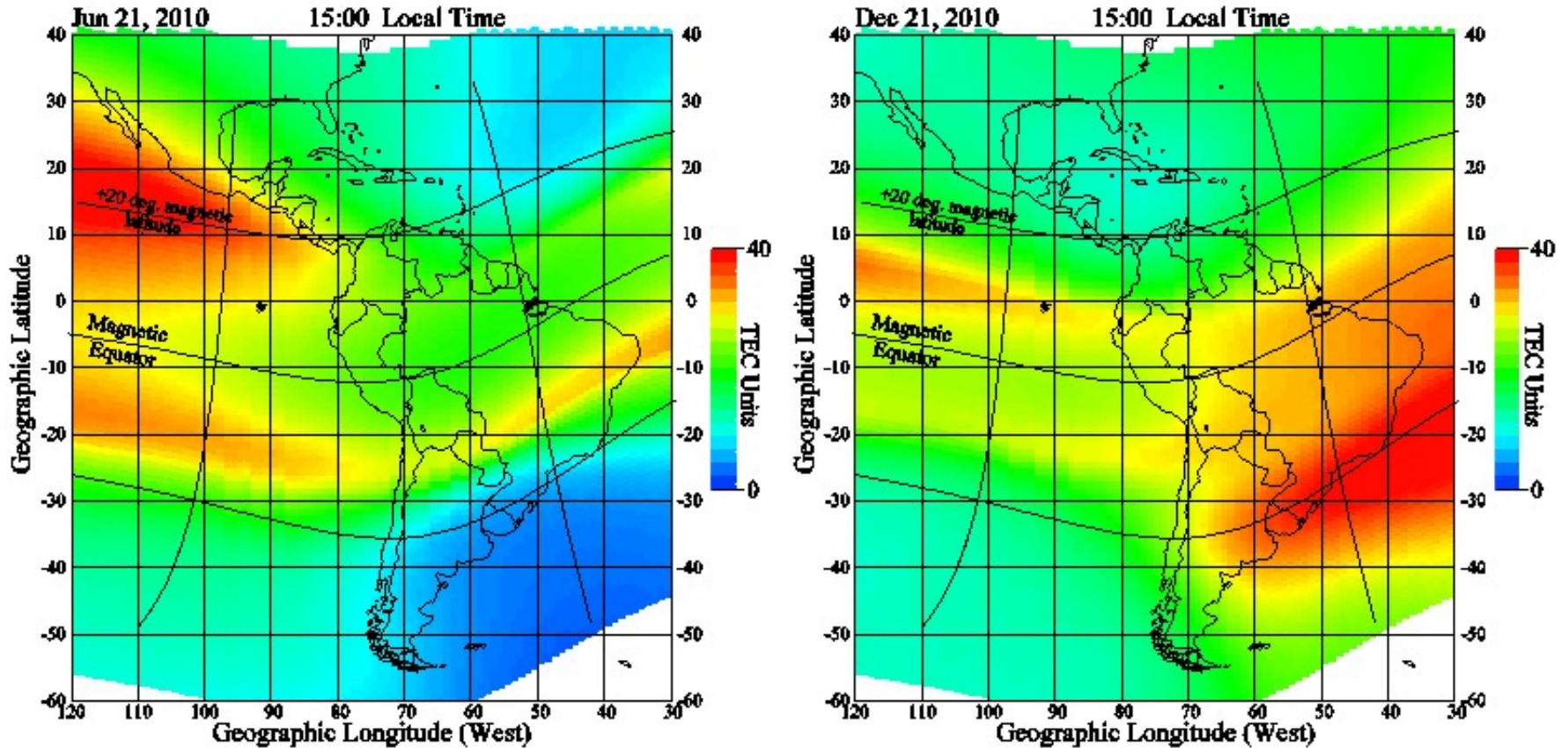
Operates during the June Solstice

Both the westward & North-south wind move plasma up the field lines.



Operates during the December Solstice

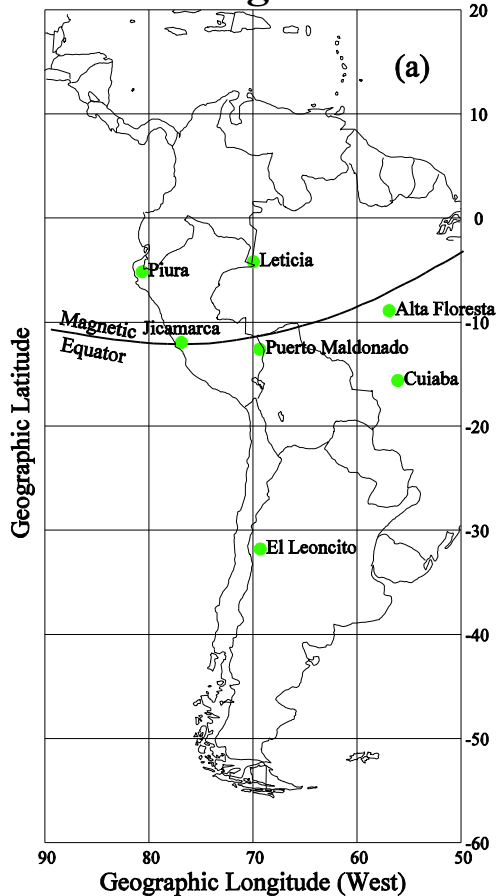
TEC results of the numerical model LLIONS using 90 planes along parallel field lines. One every degree between 120° W and 30° W.



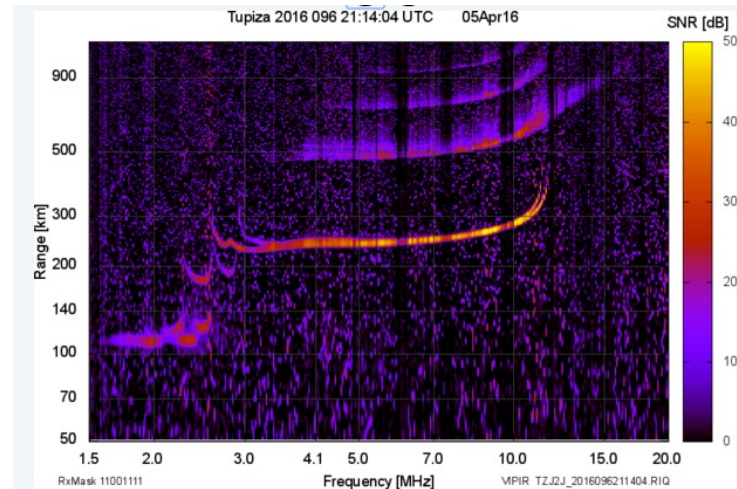
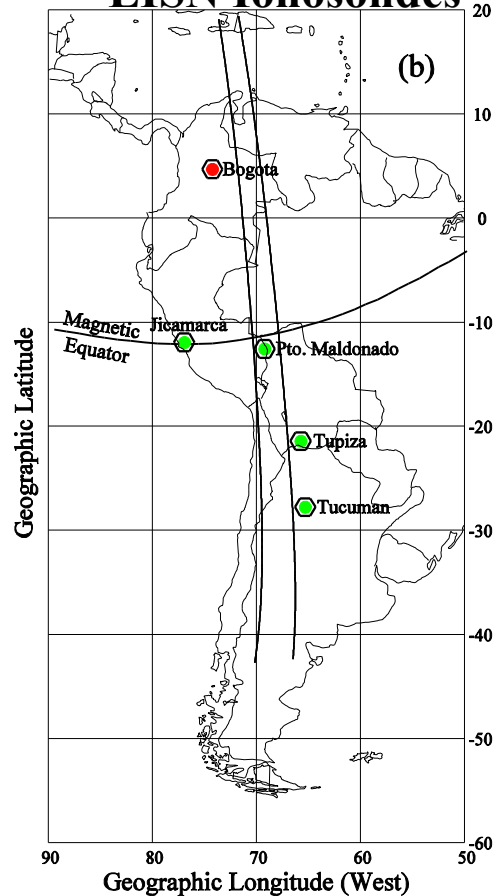
LISN VIPIR ionosondes and basic measurements

Tupiza: vertical sounding

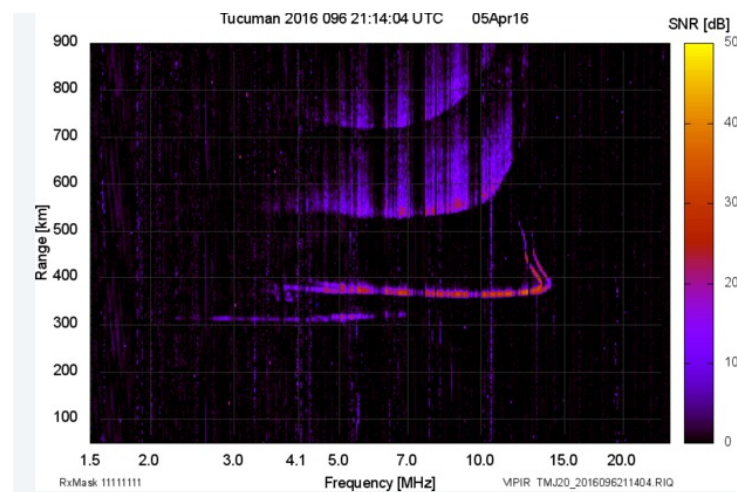
LISN magnetometers



LISN Ionosondes

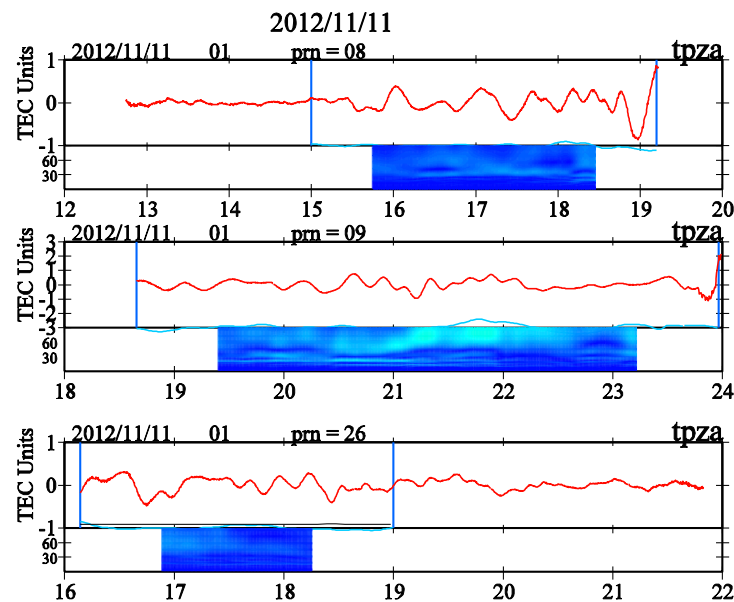
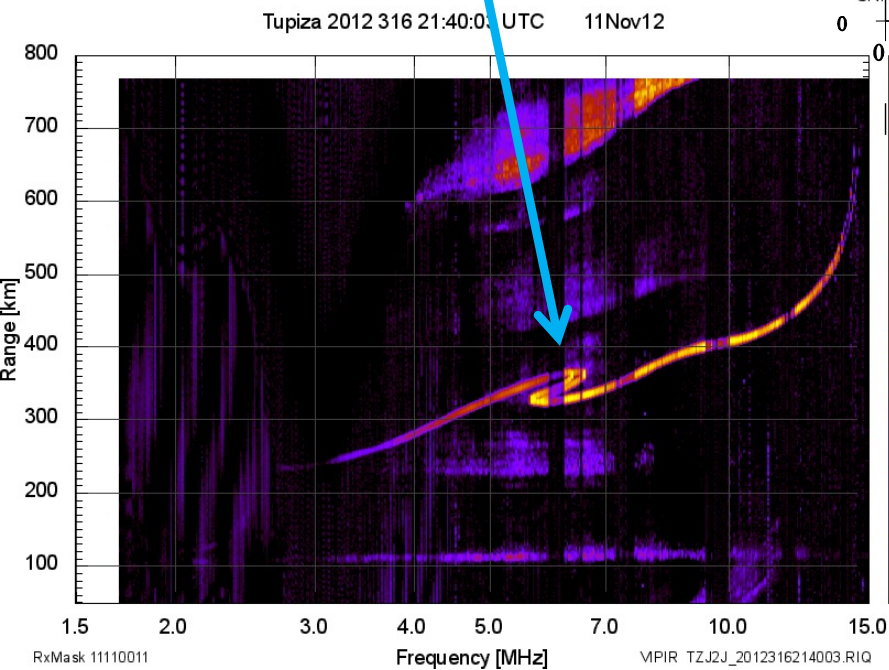
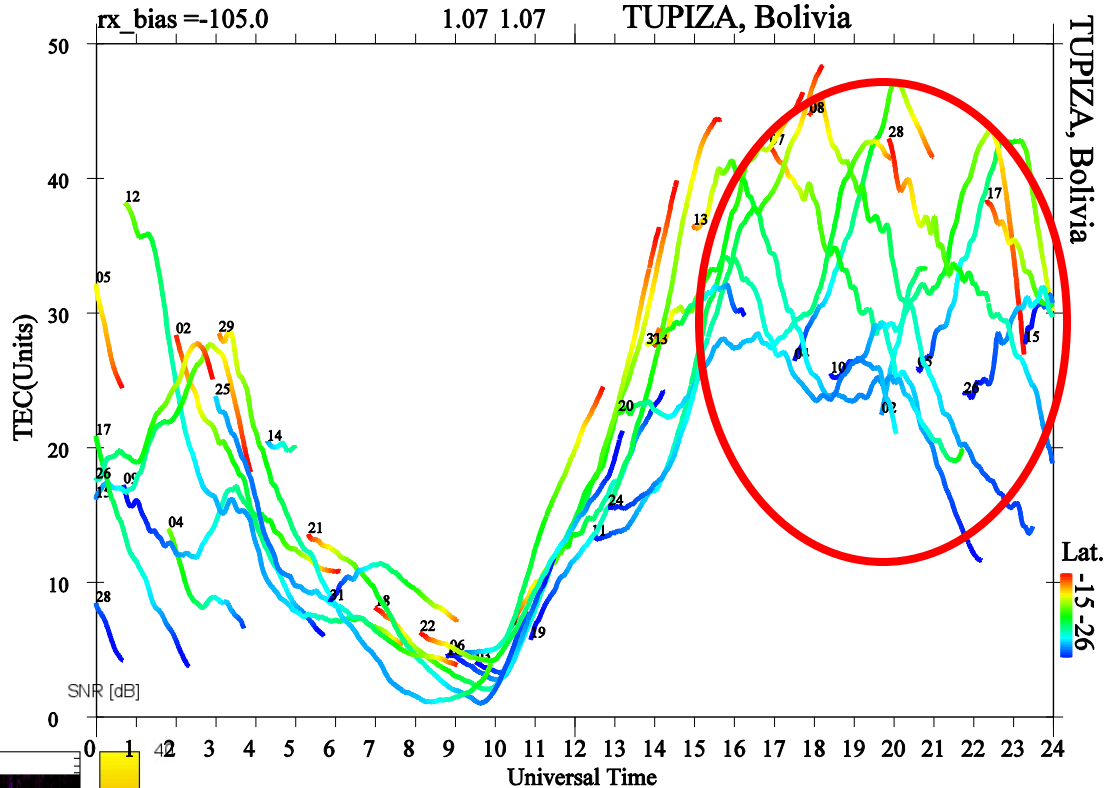


Tucuman: oblique sounding



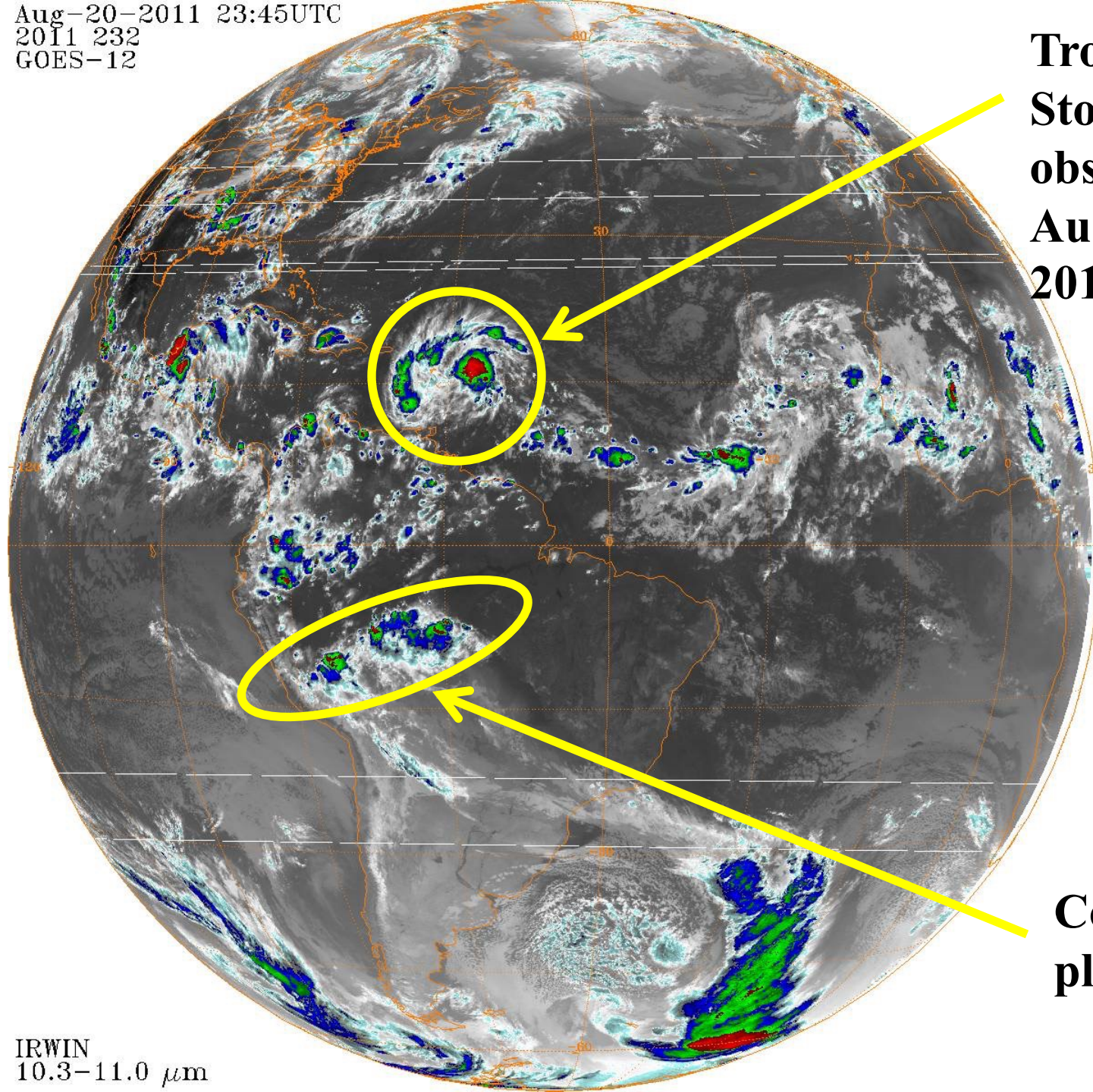
TEC perturbations associated with TIDs are detrended to study AGWs.

Due to passage of GW over field-of-view of VIPIR ionosonde.



Aug-20-2011 23:45UTC
2011 232
GOES-12

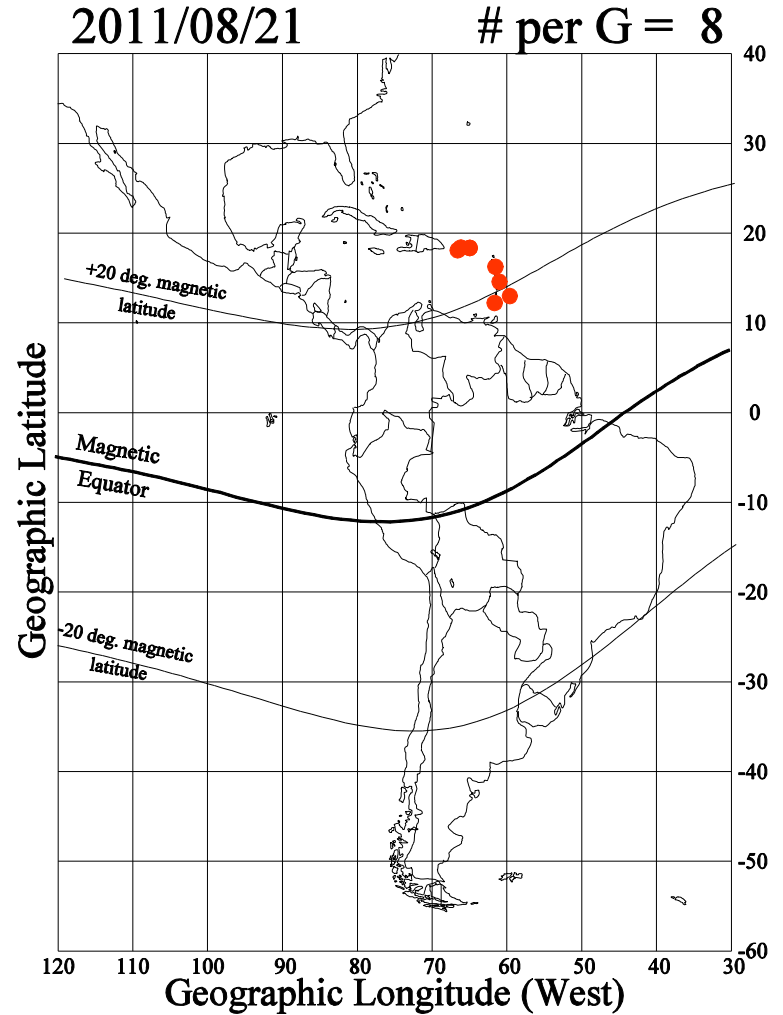
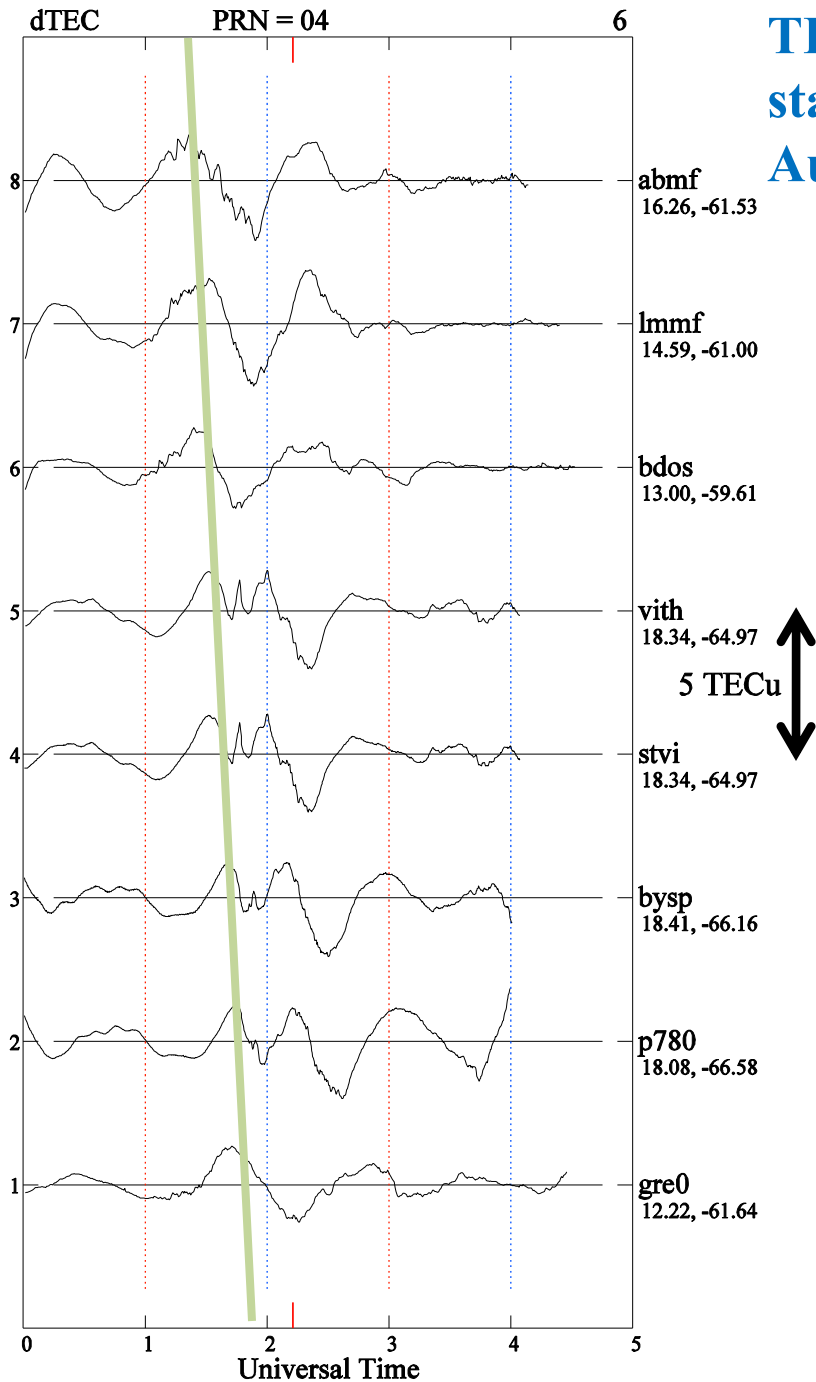
**Tropical
Storm Irene
observed on
August 21,
2011, at 00 UT**



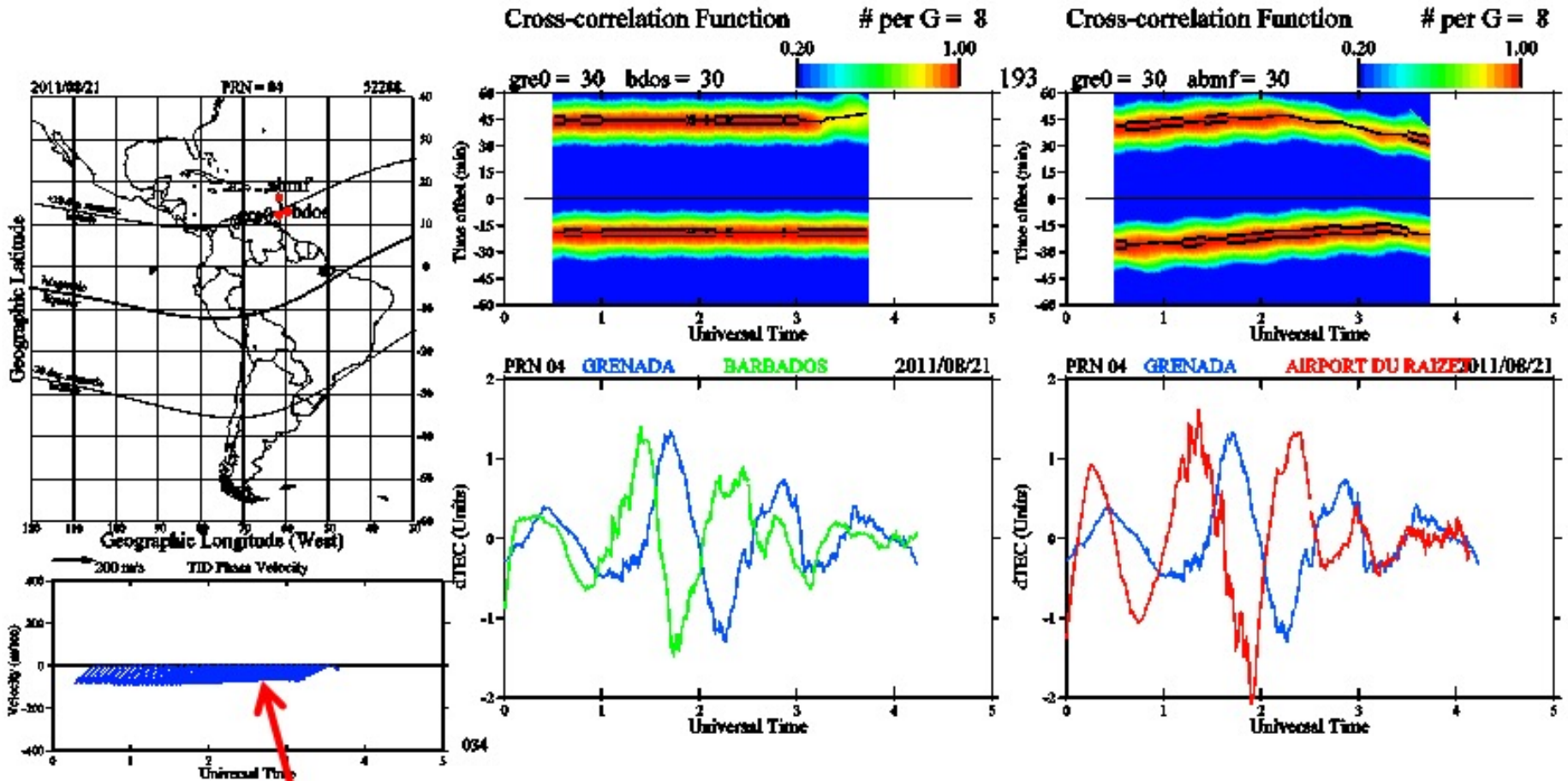
**Convective
plumes**

IRWIN
10.3-11.0 μm

TIDs (dTEC traces) observed at 8 stations in the Caribbean region on August 21, 2011 between 00 and 05 UT.

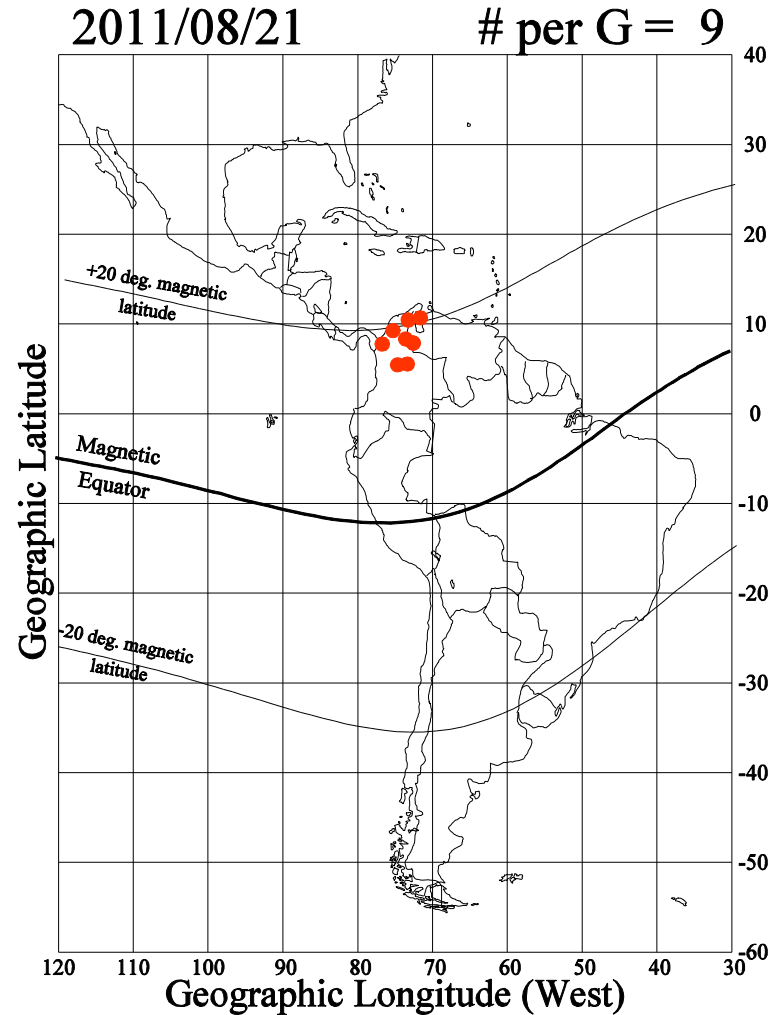
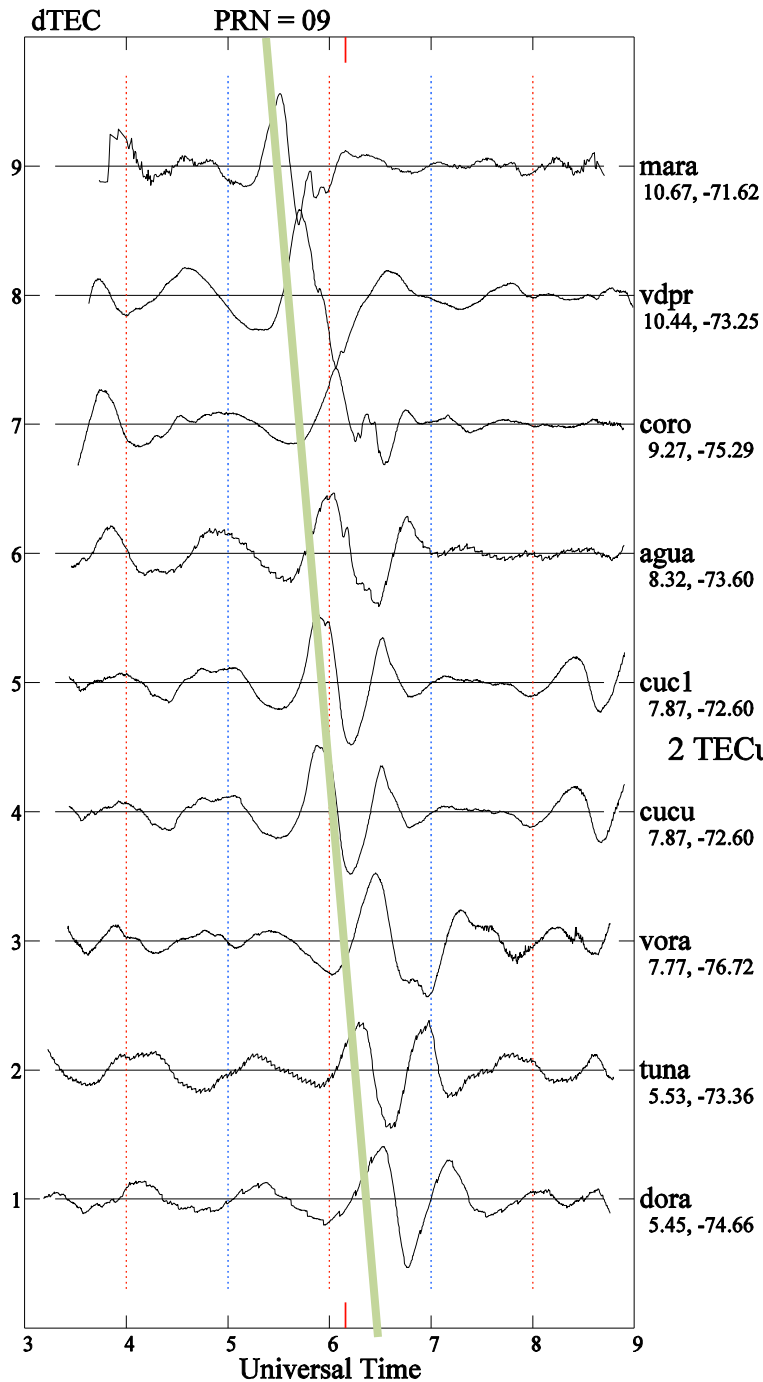


Cross-correlation method to derive wave velocities using dTEC values from 3 stations for August 21, 2011 between 00 and 03 UT

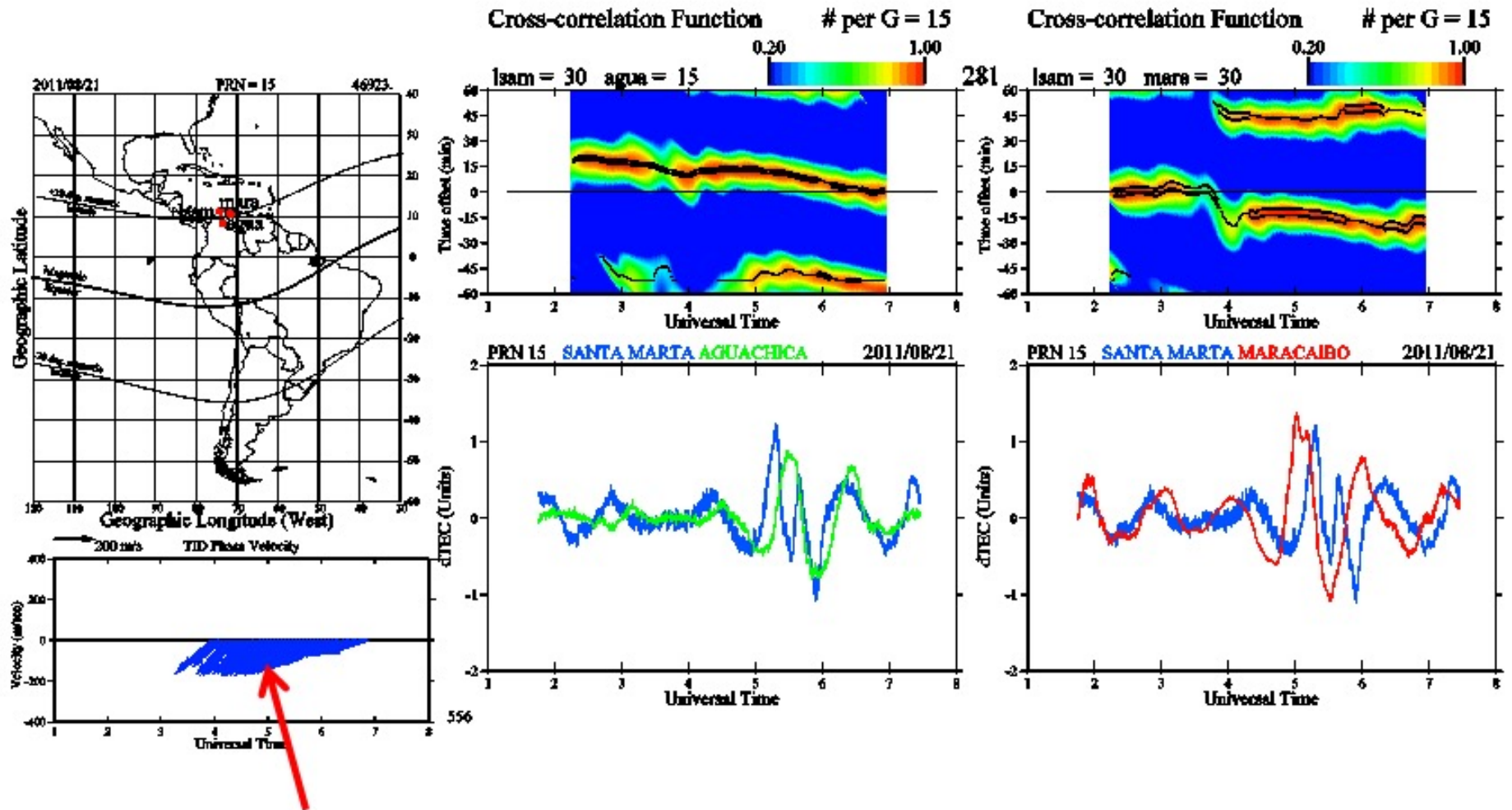


Velocities ~150 m/s

TIDs (dTEC traces) observed at 8 stations in Northern Colombia on August 21, 2011 between 03 and 09 UT.

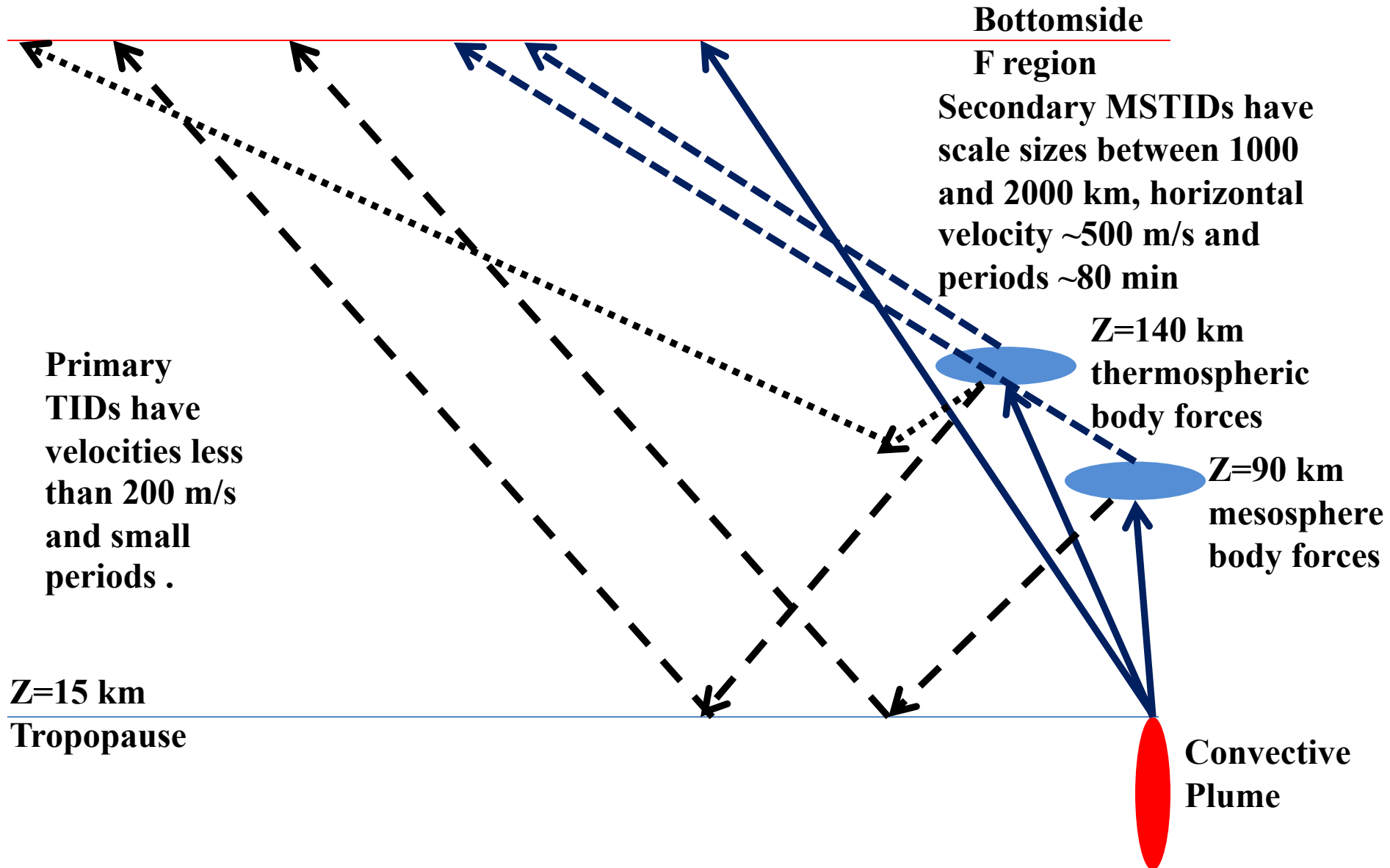


Cross-correlation method to derive wave velocities using dTEC values from 3 stations



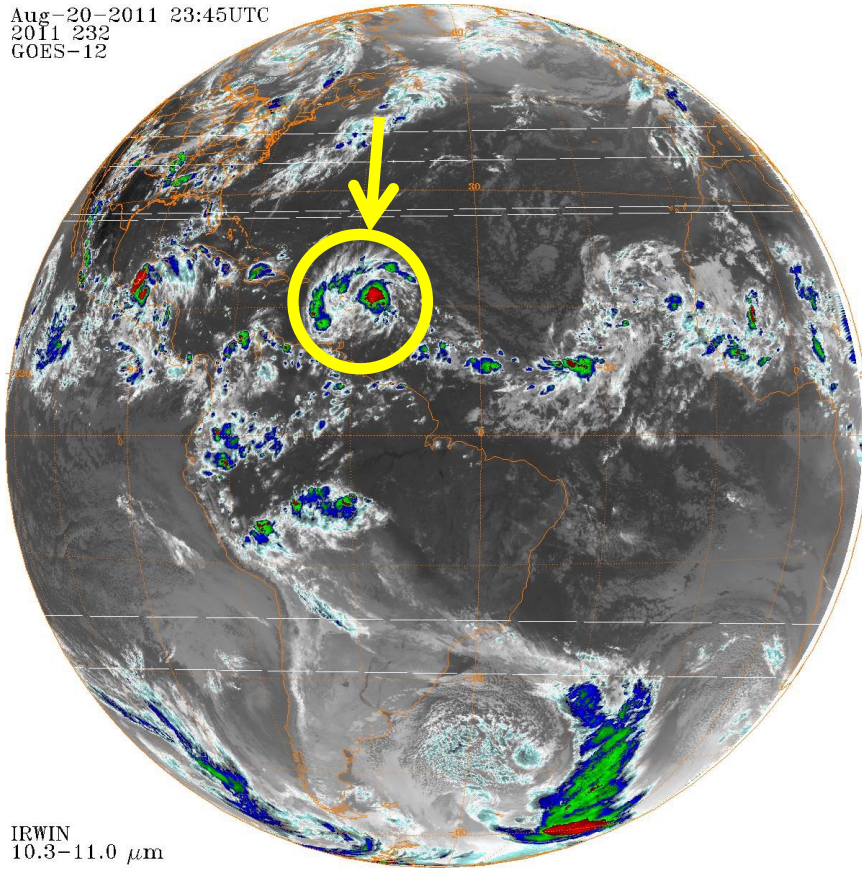
Velocites ~300 m/s

Vadas and Crowley (2010) JGR Sources of the traveling ionospheric disturbances observed by the ionospheric TIDDBIT sounder near Wallops Island on 30 October 2007.

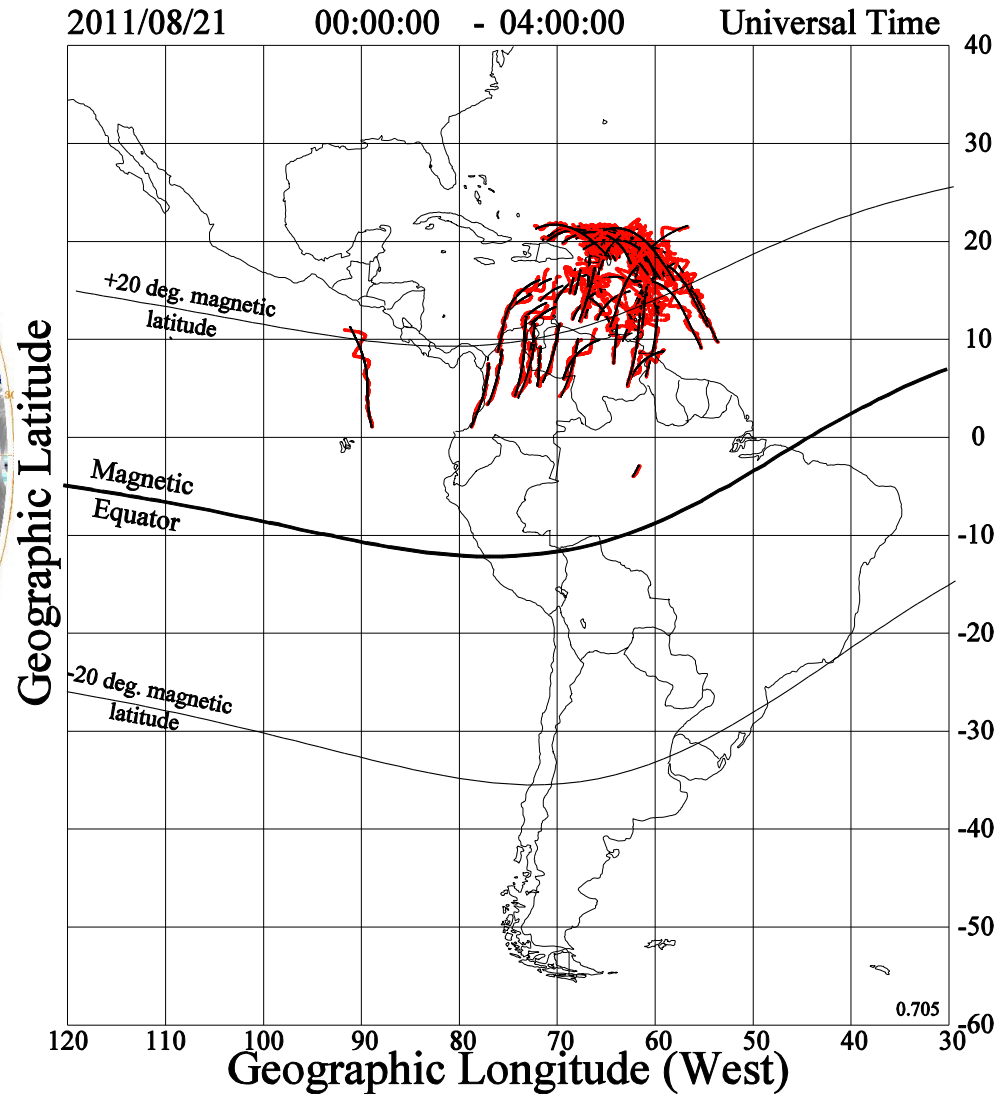


TIDs associated with Tropical storm Irene (August 20-21, 2011)

Aug-20-2011 23:45UTC
2011 232
GOES-12

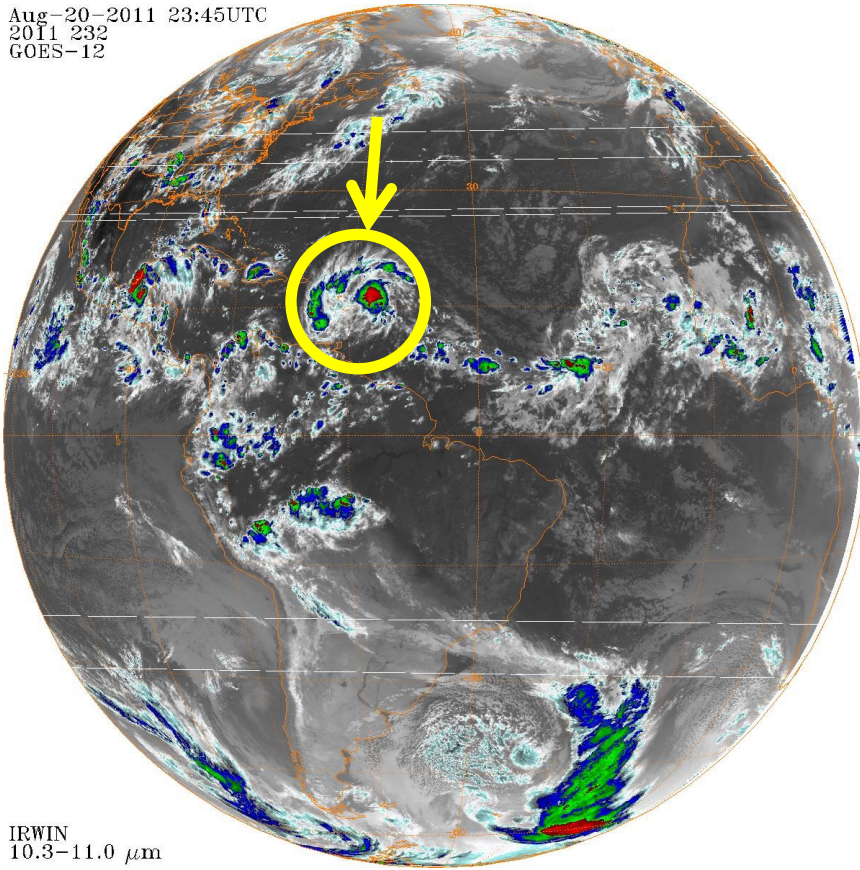


GOES 12 image showing Tropical storm Irene.



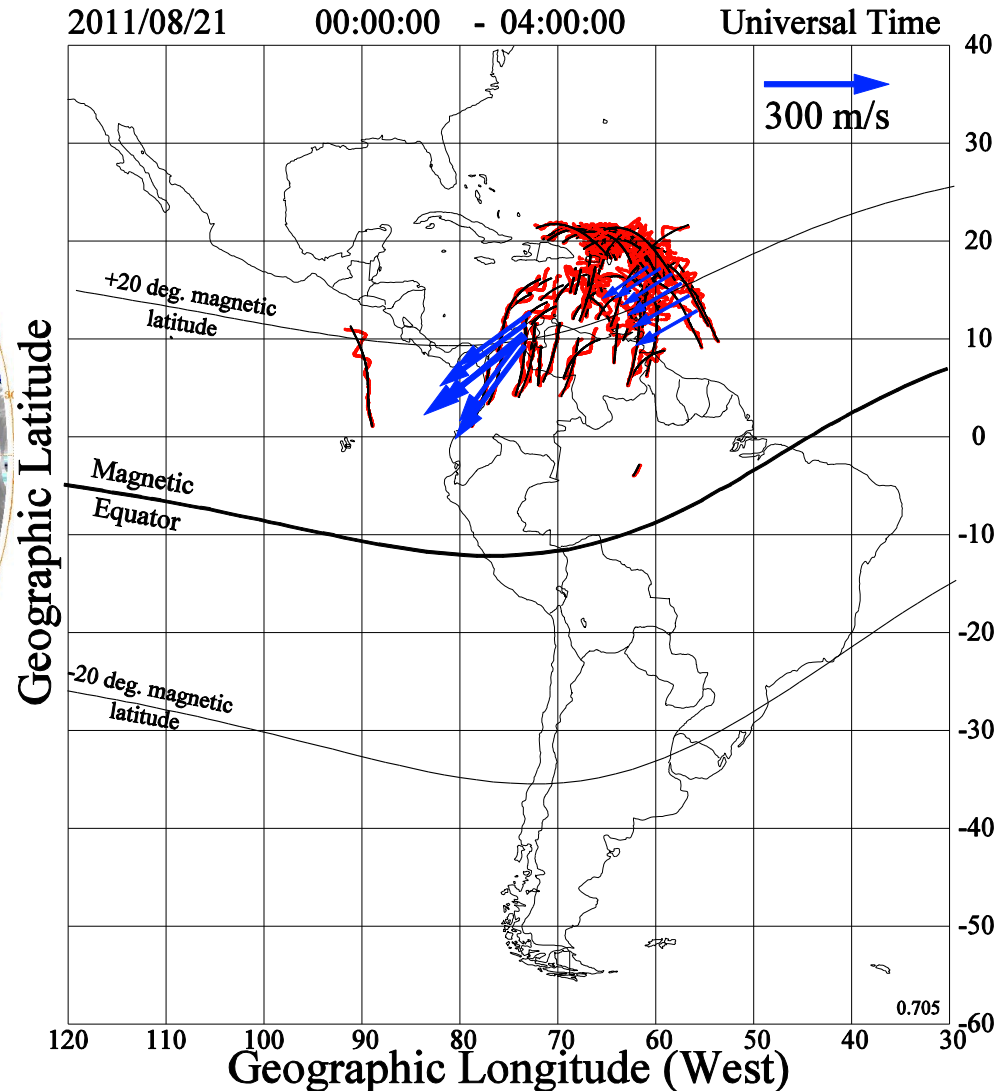
TIDs associated with Tropical storm Irene (August 20-21, 2011)

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GOES-12



IRWIN
10.3-11.0 μm

GOES 12 image showing Tropical storm Irene.



Summary

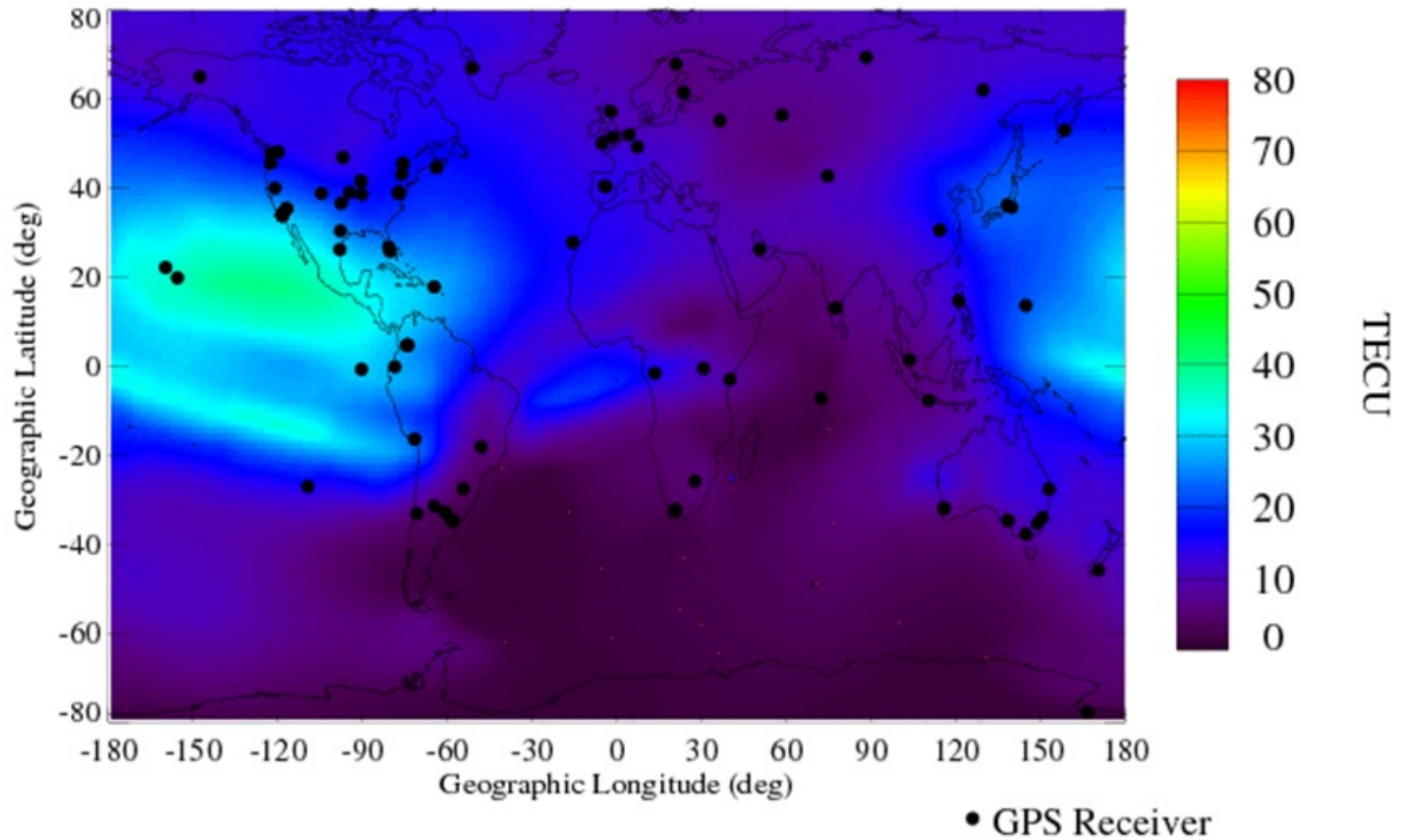
LISN is providing regional maps of TEC and TIDs over South and Central America and the Caribbean region.

The LISN network together with other networks of GPS receivers were used to obtain the characteristics of TEC enhancements that develop over Central America and the southern part of South America during the June and December Solstices.

We detected and analyzed TIDs signature associated with the tropical storm Irene that was observed in the Caribbean region on August 20-21, 2011. Our analysis suggest the detection of primary and secondary gravity waves.

07/21/14
22:20 UT

Ionospheric TEC Map



Mon Jul 21 15:22:09 2014

