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Valladares, Cesar  
Boston College

## **Observations of MSTIDs at Low and Mid Latitudes**

Abstract:

TEC values measured by GPS receivers that belong to the low-latitude ionosphere sensor network (LISN) and several other networks that operate in South and Central America were used to study the characteristics and origin of medium-scale traveling ionospheric disturbances (MSTID) in these regions. The TEC perturbations associated with these MSTIDs show a high degree of spatial coherence over distances  $\sim 1000$  km allowing us to use measurements from receivers spaced by hundreds of km to calculate the MSTID's travel velocities, propagation direction, and scale-size. A pronounced increase in MSTID activity was observed in South and Central America at 16 UT on August 20, 2011 lasting until the end of August 21, 2011. The MSTID velocities show a very variable pattern that depends upon their local time and location. Counter-streaming MSTIDs were observed over the western part of South America on August 21, 2011. Regional maps of tropospheric temperature brightness, measured by the GOES-12 satellite, are used to identify and follow the development of the tropical storm (TS) Irene and several deep convective plumes. MSTIDs were observed propagating away from the TS Irene. This storm moved into the Caribbean region and intensified earlier on August 20 spawning a train of atmospheric gravity waves (AGW). The small scale size, the velocity less than 150 m/s and the close location of several MSTIDs with respect to the TS Irene indicate that these MSTIDs may be the result of primary AGWs that reached the F-region bottomside. These results open the possibility to use TEC values measured by networks of GPS receivers to construct regional, and probably global, maps of MSTIDs, identify their origin and study in detail the characteristics of MSTIDs corresponding to primary and secondary AGWs.