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OBSERVATION OF TIDS USING THE LISN NETWORK

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Abstract. The Low-latitude Ionospheric Sensor Network (LISN) is a distributed observatory designed to provide regional coverage in South America and high-temporal resolution measurements to nowcast the state and dynamics of the low latitude ionosphere and to diagnose the initiation and development of medium-scale plasma structures. One of the goals of the LISN observatory is to define the role that gravity waves may have on seeding equatorial plasma bubbles.

This paper reports the results of several campaigns that were conducted in South America to study the passage of atmospheric gravity waves (AGW) and their ionospheric effects: TIDs. The first campaign dedicated to detect medium-scale TIDs was conducted at Huancayo, Peru in July 2008 using 3 GPS receivers spaced by 4-5 km and arranged in a triangular configuration. Proper analysis of the GPS data made it possible to estimate the TID traveling velocity, its propagation direction, and the scale-size of the disturbance. Measurements conducted on July 20, 2008 indicated that on this day the TIDs over South America produced TEC perturbations containing unusually high amplitudes (~ 1 TEC unit). The small network detected TIDs in the afternoon-evening hours containing phase velocities between 100 and 200 m/s, propagation direction due north, periods of order 1 hour, and wavelengths between 100 and 300 km. Several other GPS receivers of the LISN network located hundreds of km north and south of Huancayo detected periodic TIDs at the same time of the Huancayo TIDs. The second campaign was conducted in February 2009 using 3 GPS receivers installed at Ancon, Jicamarca and Lima using baselines displaced by 20-30 km. The third campaign was conducted in coordination with the VIPIR ionosonde at Jicamarca and several other instruments such as imagers and Fabry-Perot interferometers operating at several places in South America. This paper will provide the results of all 3 campaigns and will outline tasks to be conducted in the next few months to find the role of AGW on seeding plasma bubbles.