



Comparative Analysis of Gravity Wave Activity at Wallops Island and San Juan

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There are numerous gravity wave detection schemes currently in use, based on various data acquisition schemes and instrumentation types. We developed one such method based on dynasonde data, which include both electron density and electron density gradients. The results described in this work extend a range of 150-250 km in altitude, while being essentially continuous in time. In addition to this, we can fully diagnose the gravity wave field, simultaneously determining spatial and temporal characteristics. This paper describes a comparative analysis of wave activity at two locations: Wallops Island, Virginia, U.S.A. and San Juan, Puerto Rico. At both locations, we show cases of Traveling Ionospheric Disturbances (TID's) clearly caused by gravity wave activity. The dominant frequency is sometimes obvious, but generally we have a superposition of several waves, each with an associated bandwidth. We extract the frequency, amplitude, wavelength and direction of propagation for each mode detected, independent of all other modes present. The wave spectra can drastically change with altitude, time, season, geographical location, etc. The same is true for the other wave characteristics listed above, and this becomes even more complex when we consider waves propagating along the two horizontal axes separately. All these aspects are discussed in our work, separating effects due to these various factors. Finally, we describe how our work will be extended by adding several other stations to provide a global characterization of wave activity in the thermosphere system.