

Technical Page

Proposal Type: Long-term
 General Category: Terrestrial Aeronomy
 Sub-Category: Radar
 Observation Category: Thermosphere
 Total Time Requested: 240 Hours

Proposal Title: A Continuum of Gravity Waves in the Arecibo Thermosphere

ABSTRACT:

Previous 430 MHz radar studies conducted by Djuth et al. [1994, 1997] at Arecibo Observatory have demonstrated that 1-3% electron density "imprints" of internal gravity waves are consistently present in the Arecibo thermosphere. A special radar technique involving photoelectron enhanced plasma waves was used for these observations. Recently, it was discovered that the trails of these waves can be detected in standard incoherent power profiles when properly filtered. This opens up the possibility of monitoring thermospheric gravity waves day and night. Preliminary studies indicate that "sets" of gravity waves with a period of approximately 30-40 minutes are continually propagating through the Arecibo thermosphere. This is a major mystery that is theoretically unexpected. In part, the proposed observations are aimed at verifying the presence of the internal gravity waves during nighttime hours and determining the radar-beam-scanning signature of the waves. The latter investigation, if successful, would allow Arecibo power profiles recorded over the past 30 years to be unlocked for gravity wave studies. The source of the gravity waves is currently unknown but will be addressed with the aid of radar/optical/lidar diagnostics and supplemental microbarograph data.

Name	Institution	E-mail	Phone	Student
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Service Observing Request

Remote Observing Request

- None
- All of the observing run.
- Part of the observing run.
- Queue Observing

- No
- Maybe
- Yes

Instrument Setup

430 CH radar

Atmospheric Observation Instruments:

Ionosonde Lidar

Special Equipment or setup: none

RFI Considerations

Frequency Ranges Planned

429.5 - 430.5

422 - 427

433 - 438

This proposal requires coordination with AFTWF within the band 425-435 MHz.