

## Technical Page

Proposal Type: Regular  
 General Category: Terrestrial Aeronomy  
 Observation Category: Middle-Lower Atmosphere  
 Total Time Requested: 20 Hours

**Proposal Title:** Coordinated Multi-instrument Measurements of Gravity Wave Dynamics in the Night-time Mesopause Region at Arecibo, Puerto Rico

**ABSTRACT:**

Short-period internal gravity wave oscillations ( $T < 1$  hour) contribute significantly to the energy and momentum budget in the 80 to 150 km region of the Earth's atmosphere. Gravity waves have been studied for many years using several radar, optical and in-situ rocket techniques. All-sky imaging systems directly image the nighttime gravity wave activity in several naturally-occurring emission layers (OH, Na, and OI, for example) in the mesopause region (80–100 km). The local temperature and wind velocity profiles are important parameters governing wave propagation. Hence, a cluster of co-located instruments capable of making such measurements, and supported by modeling and interpretation, is necessary for a state-of-the-art analysis of a particular wave event imaged with an all-sky system. The Boston University All-Sky Imaging System (BUASIS) has recently been installed at Arecibo Observatory. It will be part of a proposed coordinated multi-instrument study to investigate the relationship between the occurrence of monochromatic gravity waves in the nighttime mesospheric OH, Na and OI emissions and the simultaneous temperature and wind structure in the region. Observing time with several optical instruments at Arecibo Observatory and with the Arecibo incoherent scatter radar is requested during two 5-day periods in May and June 2003. The campaign will also include near-simultaneous measurements by the NASA Thermosphere-Ionosphere-Mesosphere Energetics and Dynamics (TIMED) satellite mission. Six flyovers will occur during the proposed periods.

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**Service Observing Request**

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

**Remote Observing Request**

- No
- Maybe
- Yes

**Instrument Setup**

**Atmospheric Observation Instruments:**

Tilt-Photometer Spectrophotometer Fabry-Perot Lidar

**Description of Observer Equipment:** Bare CCD all-sky imager recording OH, Na and O(1S)

mesospheric emissions during campaign periods.

**Special Equipment or setup:** None

**RFI Considerations**

**Frequency Ranges Planned**