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Observations of Inertia-Gravity Waves in the Atlantic from Inverted Echo Sounders during FGGE

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ABSTRACT

The study is based on observations from inverted echo sounders anchored near the equator in the western Atlantic Ocean. It appears to be a good method of detecting inertia-gravity waves with large vertical scale. The spectral analysis of the records shows variable spectral density levels in the band of 2–5 days. Three of the four Inverted Echo Sounder (IES) records show an increase in the variance centered at 3.75 days. In addition, two sounders deployed during the latter half of the year (stronger winds) also show a peak in the variance at 2.14 and 2.31 days. The most likely interpretation of the spectral peak at 3.75 days is an atmospherically forced, vertically propagating inertia-gravity wave with a meridional structure given by the $n=3$ mode. The corresponding equivalent depth is $h=0.7$ m, and the vertical wavelength is ~ 730 m. The energy density, estimated from the variance in the IES records, is $E = 0.7 \times 10^3 \text{ J m}^{-2}$.

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