

## **Vertical group and phase velocities of ionospheric waves derived from the MU radar**

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The Middle and Upper atmosphere (MU) radar (34.85°N, 136.10°E) was operated in the incoherent scatter power-only mode to observe the ionosphere during 16-17 June 2001. Pronounced 200-300 min. waves in the echo power appeared in the F2 region during 0240 - 1250 LT on 17 June 2001. A procedure of Fourier analyses is conducted to derive power spectra, vertical phase, and group velocities of the pronounced waves. Results show that the center frequency of the waves is a function of the wave number. The directions of the phase and group velocities indicate that the altitude of the source of the waves is slightly above the F2 peak.