A MATHEMATICAL MODEL OF NEAR RESONANCE WAVE PERTURBATIONS IN THE ATMOSPHERE

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An original model of acoustic-gravity wave propagation in the Earth's atmosphere with a realistic model high-altitude temperature profile is analyzed. We carry out an analysis of acoustic-gravity wave behavior near the resonance level, at which the condition of equality of horizontal phase wave velocity is equal to the local value of the sound velocity. Shaping of a narrow domain with elevated pressure in the resonance region where the horizontal phase wave velocity is equal to the sound velocity is examined theoretically within the framework of the linearized equations. In this study generalized Lamb waves in a nonisothermal atmosphere have been examined theoretically. Our results suggest that the pressure component of the Lamb wave decreases exponentially upwards near the layer with an extremum of sound speed. Numerical simulations for the model profiles of atmospheric temperature and viscosity confirm analytical result for the special feature of wave fields.

References

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