

Reply to paper

Revisiting internal gravity waves analysis using GPS RO density profiles: comparison with temperature profiles and application for wave field stability study

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The manuscript is devoted to determination of characteristics of internal gravity waves (IGW) from the RO density vertical profiles. This interesting idea is being developed by the Authors in the course of several years.

1. The Authors have analyzed connection between IGW activity, wave breaking, background temperature, vertical rotation of zonal wind, its rotation with height) from GPS RO data.

2. The paper also presented a detailed study for the characterization of the regional wave field stability. The new selected stability parameters derived from the density profiles together with a study of the vertical rotation of the wind direction have been determined.

3. A potential IGW breaking area is detected in the western border of the Aleutian High where potential IGW breaking is detected.

4. The Authors' s results confirmed importance of the density profiles for IGW analysis. The Authors new message consists in using high-altitude air density in contrast to vertical temperature profiles for wave field stability study.

The content of the manuscript extends an applicable domain of the RO method and therefore the paper is important for AMT audience after minor revision.

Shortcomings.

For a reader it is difficult to understand the next incomprehensible statements:

1. *“The previously detected differences in the IGW spectra between dry temperature and density profiles are found only in the one specific data version”*. I suppose that this should be removed from paper.

2. The Authors stated: *“The differences between temperature and density perturbations do not have any physical origin and there is no information loss of IGW activity due to the GPS RO retrieval”*. Then the Authors claimed: *“We provide strong evidence that the differences in IGW perturbations between the real and retrieved temperature profiles (which are based on the assumption of hydrostatic balance) include a significant nonhydrostatic component that is present sporadically and might be either positive or negative...”*

These contradictions should be excluded (or explained carefully) in the manuscript.