

# ***Interactive comment on “Revisiting internal gravity waves analysis using GPS RO density profiles: comparison with temperature profiles and application for wave field stability study” by Petr Pisoft et al.***

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**Responses to the referee’s comment of paper “*Revisiting internal gravity waves analysis using GPS RO density profiles: comparison with temperature profiles and application for wave field stability study*” by Petr Pisoft et al.**

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.*

Thank you for pointing out that the statement is not easily comprehensible. We will reformulate the sentence in the following way: *“we show that the differences in the IGW spectra between the dry temperature and density profiles that were described in the previous study as a general issue are in fact present in one specific data version only”*.

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.*

Thank you for pointing out lack of clarity resulting in contradictions in our statements. The first statement is connected to the previous study where we speculated that the hydrostatic filtering is responsible for the differences in the IGW spectra between the dry temperature and density profiles. In the presented paper we show that those differences are in fact detected only in one specific data version, they do not have any physical origin and there is not the information loss of IGW activity that was suggested in the previous study. On the other hand in case of nonhydrostatic forcing, pressure and density are not hydrostatically linked and the induced dry density perturbations are connected with different temperature perturbations from those that are derived using the hydrostatic balance integration. Thus there is a difference between the real and retrieved temperature profiles (which are based on the assumption of hydrostatic balance) and the difference includes a significant nonhydrostatic component that is present sporadically and might be either positive or negative.

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To avoid the potential contradictions in the abstract we will reformulate the first statement in the following way: *“The differences between perturbations in the temperature and density GPS RO profiles do not have any physical origin and there is not the information loss of IGW activity that was suggested in Sacha et al., 2014”*.

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