

## ***Interactive comment on “Derivation of horizontal and vertical wavelengths using a scanning OH(3-1) airglow spectrometer” by Sabine Wüst et al.***

### **Anonymous Referee #3**

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This paper derives spatial information on gravity waves near the menopause using airglow observations made at locations made at widely spaced positions in the horizontal. Using wind measurements made with a meteor-wind radar it is possible to convert the ground-based frequencies of the waves observed with airglow to intrinsic frequencies (frequencies measured in a coordinate system moving with the background wind) to infer important quantities such as GW vertical wavelength, that otherwise cannot be made with conventional single optical wavelength airglow observations. Results are compared with estimates based on TIMED-SABER data acquired on near-time overpasses. It is good to see comprehensive error estimates.

The paper is reasonably well written, although many sentences are convoluted. The paper would benefit from strong editing to improve readability and impact. Overall, the

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results are relatively unique and merit publication in AMT, subject to improvements in language and clarification of some issues that are unclear.

When talking about wave periods or frequencies it should be made clear whether these are ground-based or intrinsic e.g. Abstracts, line 17 add “ground-based” before “periods”.

2. P2, L2, “is studied using” is better grammatically than “is addressed by”
3. P2, L9, The sentence starting “A sufficient number . . .” does not make sense and needs rewriting.
4. L12, delete “under”.
5. L16, delete “like they”
6. L29, “intrinsic frequency” not defined. Define here rather than later in the paper.
7. P4, section 21. The discussion of the FoV of the instrument is confusing. It is stated that the FoV triangle has an edge length of 90 km, but then it is stated that the FoV sizes are approximately 880 km. In what direction? If the field of view is 880 km x 880 km doesn't this average out all the detail in wave field? Schmidt et al (2013) claims that the GRIPS instrument has a FoV at 90 km equivalent to just a few km, which seems more reasonable. Please clarify.
8. L9, add “the” before “zenith”.
9. P5, the tense of “data’ is confusing - singular in L4, plural in L6. Plural is better.
10. P7, L19, “insert “the” before literature and move “not” from before “exceed” to after “do”.
11. L22, delete superfluous “steps”.
12. P8, L4, insert “density” before “scale height”.
13. L6, the order of “medium and low-frequency waves” should be reversed to corre-

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spond to the order of the bracketed definitions. i.e. low- and medium frequency waves ( $\sigma \sim f \dots$ )

14. Why not use the SABER temperature data to derive N? This will be more accurate than using outdated monthly mean CIRA-86 temperature profiles.

15. P10, L18. The sentence starting :Depending on ..” is confusing and needs re-writing.

16. L29, “twice” rather than “two times”

17. Table 2, is T the ground-based or intrinsic period? Define.

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