

Atmos. Meas. Tech. Discuss., referee comment RC1  
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## **Comment on amt-2021-195**

Anonymous Referee #1

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Referee comment on "Far-ultraviolet airglow remote sensing measurements on Feng Yun 3-D meteorological satellite" by Yungang Wang et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2021-195-RC1>, 2021

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General comments:

The most significant issue is that some information how the reported O/N<sub>2</sub> values (and the brightness of the O and N<sub>2</sub> emissions used in deriving the O/N<sub>2</sub>) compare with other observations, as was done from the NmF<sub>2</sub> observations, is needed. The lack of such information is a major shortcoming of the current paper. Such information is needed for others to understand the value of the observations and their limitations.

A minor issue is that substantial editing for clarity is also needed throughout the paper. Some specific suggestions are included below.

The observations described are potentially very valuable for understanding the effects of geomagnetic activity on the composition of the thermosphere and worthy of publication if their relative differences from and consistency with other O/N<sub>2</sub> observations can be quantified.

Specific comments and technical corrections:

Line 19: delete "properly".

Line 21: change "designed requirement" to "design requirements"

Line 26: "can present" doesn't work well, perhaps "represents the" or "is representative of the"?

Line 27: add space between "N2" and "LBH" (also throughout the paper) and "can be" to "is". Wording of the sentences could be more concise ("FUV radiation" is repeated).

Line 28: delete "characteristics of"

Line 29: Delete the sentence that begins on this line or reword to combine with previous sentence. It's redundant with the previous sentence.

Line 31-33: move "based on satellites" to after "ionosphere" and reword slightly ("from

satellites" perhaps). Also, delete comma after "as" and "2003)"

Line 35: If the photometer is being used for the thermosphere also, why is it an "ionospheric photometer"? change "equipment" to "instrument".

Line 36: Photometer suitable for observations of the nighttime ionosphere were made and flown decades before NRL's instrument (e.g., <https://doi.org/10.1029/JA085iA05p02201>, and there are probably earlier examples).

Line 46: "leak" to "leaks"

Line 52: suggest changing "and designed" to "and is designed"

Line 57: delete "parameters"

Line 59: use plural "photometers"

Line 81: "added in" to "added in the"

Line 82: Rewording is needed. Airglow at longer wavelengths is the problem, the wording "airglow below 180 nm" indicates that it is the shorter wavelengths. May be clearer to say whether it is longer or shorter wavelengths.

Lines 91-93: delete "times" and use plural "observations" for cases with >1 observation.

Line 96: first "ground" to "the" and delete "in the ground laboratory".

Line 101-102: The deuterium lamp is completely with a vacuum environment, and the monochromator? That's what the wording indicates. Seems unlikely and at least unnecessary. A more accurate description may be needed. Typical facility would have vacuum only within the monochromator.

Line 106: delete "following" and "from a" to "from the" (unless multiple lamps are attached at the same time).

Lines 107, 108, 109, 110, 111: "wavelength-selected light" to "wavelength selected"?

Line 109: "counts", plural, or "signal"; possible "for" rather than "of". ???

line 126: "red-leak in daytime" to "red-leak contributions in the daytime"?

line 127: "red-leak in daytime" to "red-leak contributions"?

Line 137: < 10 per second, or what time interval?

Line 138: delete "a peak" and "high". 2000 counts for what time interval? Might also substitute "in" for "over" since the satellite is flying through region containing energetic particles.

Line 145: by "without red-leak" you mean "with the red-leak signal subtracted"?

Line 146: delete "which deducted the count of red-leak"? (phrase seems redundant)

Line 149: "deduct"? ???

Line 150: "The" to "An"

Line 153: "condition kept quiet relatively" to "conditions were relatively quiet"

Line 154: "The example" to "An example", unless these are the only data collected.

Line 155: "oneither" needs a space between words.

Line 156: "EIA has" to "The EIA has"?

Line 163: "have been" to "have also been"?

Line 166: "further" rather than "furtherly"

Line 187: "2014)."? Something seems to be missing.

Line 181-190: is this agreement you give with NmF2 and TEC typical when observations are compared?

Lines 194-195: wording in the phrase "that the...F2-layer" doesn't make complete sense, it almost does but something seems off.

Line 196-198: wording, "at day the contribution...of the ionosphere." Needs some rewording to be clear (unclear what "less than one of the ionosphere" means) and somewhat odd use of prepositions ("at day the contribution" to "on the dayside, contributions" perhaps).

Line 201: "Auroral emission can be derived from the 135.6..."? But 135.6 nm is an auroral emission, nothing to derive, just observe it.

Lines 203-205: Unclear why the sentence that begins on line 203 is included. This is the only mention of the WAI instrument in the paper. If it is included, more relevance to the current paper should be added.

Lines 210-213: The two sentences, immediately following the auroral discussion, may give an incorrect impression. Column O/N2 derivation would be from dayglow observations, but not from auroral.

Line 219-220: Needs some minor rewording for clarity, unless the 135.6 nm brightness can be derived from either channel. Maybe just say the 135.6 nm brightness can be derived "using" the dayside 135.6 nm and N2 LBH channels?

Line 221: "cloud top" to "cloud tops"

Line 223-224: "result of column O and N2 ratio", simplify to "column O/N2 ratio"?

Line 230: suggest spelling out the name of the satellite (FY3D) the first time it's mentioned in the conclusions, then using the abbreviation (as on line 231) if desired.

Line 235: How do the changes seen in O/N2 compare with other observations? There are probably TIMED/GUVI observations available to compare against. Later storms could possibly be compared with O/N2 observations from the GOLD mission, in addition to GUVI. Some comparison of the reported O/N2 values with other observations, as was done from the NmF2 observations, is needed in the paper.