

Atmos. Meas. Tech. Discuss., referee comment RC3
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Comment on amt-2021-290

Anonymous Referee #3

Referee comment on "Simulated multispectral temperature and atmospheric composition retrievals for the JPL GEO-IR Sounder" by Vijay Natraj et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2021-290-RC3>, 2021

General comments:

Interesting and informative article, especially that it includes temperature, moisture and trace gases. There are many benefits to a full spectral (VIS/NIR/IR/LWIR) coverage instrument.

While it's stated in the manuscript, there is no mention of deriving wind fields in the abstract. Please add something about winds in the abstract, as it's a key to what the geostationary perspective supplies.

Please consider including these references:

https://journals.ametsoc.org/view/journals/atot/26/11/2009jtecha1248_1.xml (JTECH Why geo sounder?)

<https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2021GL093672> (FY-4A GIIRS winds)

<http://www.iapjournals.ac.cn/aas/en/article/doi/10.1007/s00376-018-8036-3> (AAS Local storm OSSE)

<https://journals.ametsoc.org/view/journals/bams/102/5/BAMS-D-19-0304.1.xml> (BAMS MTG)

<https://repository.library.noaa.gov/view/noaa/32921> (NOAA Value Assessment)

<https://journals.ametsoc.org/view/journals/bams/98/8/bams-d-16-0065.1.xml> (BAMS FY-4A)

Given that an advanced IR sounder is slated for the GeoXO mission (<https://www.nesdis.noaa.gov/next-generation-satellites/geostationary-extended-observations-geoXO>) should be noted.

Detailed comments:

Line 63. At least add Suomi to Suomi-NPP.

Line 64. Assume you are talking about geo sounders, if so, that should be stated. Don't think that 1 hour refresh is a fine as what geo can provide (ABI provides 1min data). FY-4A GIIRS has provided 15 min data over regional areas. If you are referring to only full disk (or full sounding disk) coverage, than that should be stated.

Line 67. Consider to add a winds column for Table 2. Would be "yes" for the geo's.

Figures 2-4. Please add wavelength labels along the top of each plot. Many 'think' in this space and not cm-1.

Line 113. How does this database compare to the IREMIS database (<https://cimss.ssec.wisc.edu/iremIS/>)? (in overlapping spectral regions).

Line 263 seems wordy. Maybe delete that sentence and modify the following sentence: Simulations have been performed for the idealized clear-sky/no aerosols conditions.

Line 269. Remove 'here'.

Line 315. If you average 25 pixels, might you bring in more (un-detected) cloud "noise"?

Line 384. Isn't a 4d-var approach supposed to better handle more frequent observations?

Table 4. Should include the 2nd GIIRS as well, or at least be clear that table 4 refers to the demo unit.

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