

The suggestions from the editor are greatly appreciated. The manuscript has been revised accordingly.

1) Line 34 -- Re-word "among remote sensing sensors" to avoid repeating "sensing" with "sensors". Suggest to change to "between different remote sensing instruments" or similar.

Line 34: changed to "inter-comparison between different remote sensing instruments"

2) Line 35 -- This short sentence needs to be re-worded to be clearer what's meant by "a sensor-based radiative transfer model" -- suggest re-phrasing that as "a radiative transfer model used extensively within satellite and remote sensing systems", or similar more specific scientific description of what was meant by "sensor-based radiative transfer model".

Lines 35-36: changed to "is a radiative transfer model used extensively within satellite and remote sensing systems"

3) Line 36 -- Suggest to insert "extensively" after "been used" or insert "widely" after "been".

Line 37: changed to "has been widely used"

4) Line 41 -- Re-word this sentence -- the word "broadband" is confusing here -- I think you mean spectral wavebands here. Also "to describe" doesn't seem quite right -- suggest to replace with the more specific "to enact composition-radiation interaction effects within...". I'd suggest simply to make that change, and simply delete the word "broadband", inserting "spectral" before "longwave. And also to add "calculations" after "transfer" and replace "model applications" with "models".

Also insert "the" before "CRTM" near the start of the sentence, and replace "is not" with "was not", the re-wording then to read:

"Note that the CRTM was not designed to enact composition-radiation interaction effects within spectral longwave and shortwave radiative transfer calculations in general circulation models."

See response #5.

5) Line 42 -- I think you need to specify the word "monochromatic" after "to support", and possibly also to add "longwave and microwave", deleting "data" before "assimilation". Also rather than "it" better to be specific that you mean "CRTM" there, and again use "was" rather than "is". Suggest also to insert "algorithm" or "system" after "retrieval".

I mean I'm suggesting the sentence to read "Instead, the CRTM was developed to support monochromatic satellite radiance assimilation from longwave and microwave sensors, and for satellite retrieval algorithm development." Or something similar to this.

Lines 41-44: changed to "Note that the CRTM was not designed to enact composition-radiation interaction effects within spectral longwave and shortwave radiative transfer calculations in general circulation models. Instead, the CRTM was developed to support monochromatic satellite radiance assimilation from longwave and microwave sensors, and for satellite retrieval algorithm development"

6) Line 56 -- need to add a citation in brackets here for the GDAS, as this is the first time it is mentioned in the manuscript. Also -- with the start of this sentence mentioning GDAS for the first time, it's not appropriate to then later in the sentence say "to assess the aerosol impact on the GDAS analysis". Maybe it's just a case of replacing that "GDAS analysis" with "meteorological analysis" (assuming that's what was meant).

Line 58: changed to "the Global Data Assimilation System (GDAS, Kleist et al., 2009) to assess the aerosol impact on the meteorological analysis."

7) Lines 120-122 -- This 2nd sentence of the new para added here needs to be revised, as the current wording is clunky, and slightly repetitive. Suggest to change the start of the sentence from "Scattering and absorption by aerosols are calculated based on..." to instead be "For enacting aerosol attenuation effects, the CRTM uses...", then also replacing "containing" with ", which calculate", changing "including extinction coefficient" to ", specifically the extinction coefficient."

Lines 122-124: "For enacting aerosol attenuation effects, the CRTM uses pre-computed lookup tables, which calculate aerosol optical properties, specifically the extinction coefficient, single-scattering albedo, asymmetry factor, and phase function coefficients."

8) Lines 122-124 -- This sentence here refers to "given aerosol types", but I think these aerosol types must actually be the specific aerosol types given in the GOCART aerosol module, right? Assuming that's correct, then it makes much more sense to have this 3rd sentence come after the current 4th sentence, that 4th sentence mentioning the GOCART aerosol model.

See response #9.

9) Lines 124-126 -- Assuming the authors agree that change 8) above makes sense, then I think this sentence should be re-worded to also mention the aerosol types of the GOCART module. I mean then to delete "that is" before "based on the" and insert "aerosol types of the mass-based" before "Goddard Chemistry". Then also replacing "model for the spectrum from ultraviolet to IR" instead to "module, for their radiative effects from the ultraviolet to the infra-red".

Lines 124-128: The 4d sentence comes before the 3<sup>rd</sup> sentence. Also the current 3<sup>rd</sup> sentence becomes "contain the optical look-up table based on the aerosol types of the mass-based Goddard Chemistry Aerosol Radiation and Transport (GOCART, Chin et al., 2002; Colarco et al, 2010) module, for their radiative effects from the ultraviolet to the infra-red"