

Interactive comment on “Comparative analysis of atmospheric radiative transfer models using the Atmospheric Look-up table Generator (ALG) toolbox (version 2.0)” by Jorge Vicent et al.

Anonymous Referee #1

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OVERVIEW

The authors describe a model that can have utility for inter-comparing radiative transfer models. There is clearly a scientific community that could use such a model. The authors present a sound and systematic approach to addressing this need. The material is topical to the journal it has been submitted to.

With that said, I feel there is a pressing need for a substantial reorganization of Section 3. The authors present two figures to illustrate the programmatic flow of their ALG model. Those flow diagrams define a natural process for describing the functionality of

C1

the model but the text didn't clearly follow the diagrams. As a reader new to this model, I found myself constantly jumping between the prose and the figures and working to determine how the text connects to the process. As an example, consider Figure 2 ("LUT Configuration"). I presume this is the same as the "LUT config." box referenced in the GUI box of figure 1, but it's never explicitly stated. Then, within Figure 2 itself, there are numbered boxes, but those numbers are never explicitly made use of in the prose: either omit the numbers because they don't add value to your discussion, or mention them in the text because they do.

SECTION 3 PROPOSAL

I'd like to propose the following sequencing:

1. consider turning Figure 1 into a high-level architecture diagram with just a few boxes (the three boxes currently in GUI, the mention of an output config file, and a single box representing "Internal Functions"). I count five potential boxes: mention each of the functions of these five boxes in a logical sequence. For two of those boxes (LUT config and Internal Functions), you can be very brief and conclude with "We will discuss LUT Configuration in greater detail in section 3.x"
2. Then, take your existing Figure 2 ("LUT Configuration") and give a brief, sequential discussion of the purpose of each of the five boxes. The text is mostly already in the manuscript, but should be organized around the figure itself. The figure has five boxes: I should see five paragraphs - or, more generally, five logical groupings of information. Finally, the bottom half of your Figure 1 ("ALG - Internal Functions") can be turned into its own Figure 3. It should follow Figure 2 in the sense that you have to configure before you can run. Once again, five boxes means five paragraphs. Some of this text will be new and some can be derived from the existing section 3.

C2

3. You will end up with some text that doesn't fit neatly into the flow but you likely want to keep (because you're making important points about ALG). This content can appear as a lead-in to the section (before Figure 1), as concluding remarks about the benefit of this approach (after describing Figure 3), or as part of your concluding remarks

The authors are certainly free to take a different approach if they feel there is a better way to get at the heart of the problem. Regardless, the authors need to help the reader, presumed to be totally new to ALG, with a logical walk-through of what this model does and why.

ADDITIONAL COMMENTS

1. Lines 161-168 + Lines 198-200: This discussion belongs somewhere else. You're telling the user that once you've built the LUT on a discrete grid, you can interpolate to any continuous value within that grid without losing much accuracy. That information should appear in the paper, but Section 3 really focuses how the model gets constructed (not used). I'd propose deferring this paragraph until you've completed your description of how the LUT was created in the first place. The second set of lines discusses details of how the interpolation occurs. If you aggregate these two blocks, you end up with a useful description of how ALG gets used in real-world situations.
2. Lines 207-218 + Lines 230-232: This is an important paragraph that tells the user exactly what you store in your LUT. Give motivation as to why these particular quantities. Also, you list several quantities in the LUT as bullet points, then switch gears to discuss a technical issue that differs between codes, and then back to completing LUT quantities, this time as numbered items. Why not complete the bulleted list first and then follow up with the difficult LUT entry. Finally, this is the

C3

spot where the authors have the opportunity to tell the reader the hard work that has clearly been done to make different radiative transfer codes, with different types of outputs, fill the exact same LUT.

3. Lines 219-230: The text is fine, but please lead in with a motivating sentence. Something like "Most values stored in the ALG LUT can be obtained directly from standard RTM outputs. The exception is TOA radiance: obtaining this value differs depending on the RTM being used."
4. Figure 4: Please define "SI" somewhere (in the figure or in the text)

COMMENT TO EDITORS

Some symbols did not print for me (e.g., a lot, but not all, capital "A" values were missing. This could be a quirk of my system and there might be nothing wrong with the PDF. Just in case, I ask the editors to perform a typographic check prior to publication.

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