Responses to Reviewer #3

"A synthetic optical database generated by radiative transfer simulations in support of studies in ocean optics and optical remote sensing of the global ocean"

Hubert Loisel, Daniel Schaffer Ferreira Jorge, Rick A. Reynolds, and Dariusz Stramski

We appreciate the constructive comments by the Reviewer. Here we provide our detailed point-by-point responses and a description of any actions taken in regard to these comments. The Reviewer's comments are shown in italicized font; our responses follow each comment in normal font. Line numbers and figures indicated in our responses refer to the revised manuscript unless otherwise noted.

The Authors present a new synthetic dataset for use in satellite ocean color algorithm development and refinement activities. In my opinion, this dataset improves upon previous versions (that also focused on the global ocean) in its attention to realistic distributions of bio-optical inputs, inclusion of various flavors of inelastic scattering, and the utility of including depth-resolved parameters as output. Overall, I found the manuscript to be mostly clear and otherwise very well written. I have no major concerns regarding its acceptance and publication. I have several minor editorial comments provided below that might be addressed.

Response: We thank the Reviewer for positive comments on our manuscript.

Line 49: Suggest providing units the first time a variable is introduced.

Response: Done.

Line 59: Suggest expanding the SeaBASS acronym and providing a URL or reference.

Response: Done.

Line 78: Suggest changing "the publicly available" to "a widely-used publicly available".

Response: Done.

Lines 83, 126, 131, 141, elsewhere (please check throughout the manuscript): which -> that

Response: Checked and changes were made where appropriate.

Line 93: By "driven" do you mean "described"?

Response: Changed to "described by"

Line 98: No "and" in the PACE acronym.

Response: Corrected.

Line 246: Suggest changing "a couple of" to "several".

Response: Done.

Lines 242-264: So, I think I understand what was done, but it took me several reads. The paragraph reads clumsily to me – wondering if there's a way to tighten it up (make it more concise and clear) and/or add a flow chart? Also, how many aph's were originally hyperspectral and how many fit into each of the two multispectral categories?

Response: We agree that reading information related to creation of $a_{ph}(\lambda)$ dataset can be somewhat challenging because of various details involved in this process. However, we think we have done a reasonably good job to balance the general concept and various details underlying this task and we believe it is important to have sufficiently detailed description of IOP dataset and how it was created because the database obtained through RT simulations depends critically on IOPs. Readers who may be less interested in the IOP-related details can skip this section with only minor implications to reading or understanding of RT-related section.

For all final spectra that passed the described analysis and criteria (i.e., 2204 spectra), 593 measurements were originally hyperspectral, 65 spectra were created from spectra with 30 to 200 spectral bands, and the remaining 1546 spectra were created from measurements with a number of spectral bands lower than 30. Text relevant to this question was added to the revised manuscript (lines 272-277).

Lines 275-277: I'm wondering if it's unequivocally ok to assume that just because two spectra match in the 400-750 nm region that they will also match in the 350-400 nm region. Could you comment on this?

Response: While we recognize that this assumption is not necessarily satisfied (although it is possible that in many cases can be approximately satisfied), we consider it satisfactory for the purposes of extending some a_{ph} spectra into the near-UV, especially that we do not expect significant or detrimental consequences of this assumption to the creation of synthetic database from RT simulations.

Line 472: Suggest adding a reference for the 0.01 value.

Response: The references of IOCCG (2006) and Loisel et al. (2007) have been added.

Line 486: Suggest adding a reference for the 0.018 value.

Response: The references of Petzold (1972) and Mobley (1994) have been added.

Table 1: Please add references for the expressions or reiterate in the caption that these expressions are those used in previous studies (e.g., IOCCG 2006, Craig et al. 2020).

Response: A new column was added to Table 1 in the revised manuscript that indicates references for each expression.