

## ***Interactive comment on “Hyperspectral ultraviolet to shortwave infrared characteristics of marine-harvested, washed ashore and virgin plastics” by Shungudzemwoyo P. Garaba and Heidi M. Dierssen***

**Anonymous Referee #2**

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This paper presents reflectance spectra for various types of plastics in the marine environment (dry vs wet, macro and micro, washed ashore and marine collected) plus virgin plastic pellets. While spectral reflectance at an arbitrary viewing geometry and illumination environment is not a sufficient input for formal radiative transfer simulations as the authors suggest, these spectra do have value in that they can be used to identify spectral absorption features of potential value for remote sensing.

We follow the review guidelines for the ESSD journal, indicated in italics.

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*Read the manuscript: Are the data and methods presented new? Is there any potential of the data being useful in the future? Are methods and materials described in sufficient detail? Are any references/citations to other data sets or articles missing or inappropriate?*

Overall, the data and methods are new, useful, and presented in sufficient detail. A few terms could use a bit more explanation to make this paper useful as a stand alone product. For example: 1. the Spectral Shape Similarity is described in Garaba and Dierssen 2018, but I think this would be much more powerful if equation 1 from that paper was also included here. 2. I feel that the sphericity and roundness scale from Powers 1953 is outdated and inappropriate for use if the goal is radiative transfer simulation a simple aspect ratio would suffice. Table 1 has this, great, but was that table in the data files? Perhaps I missed it. 3. Derivative analysis needs to be defined. Again, this is in the Garaba and Dierssen 2018 paper, but definition is needed here. I find the description of what exactly constitutes a spectral ‘feature’ lacking (both here and the 2018 paper), and the listing of these features inconsistent in this paper. For example, the abstract lists four, apparently strong features. Section 3.1 shows eight. Qualitatively, I also question a few of the features – 2046 seems inconsistent, and 2313 seems too close to the edge of the spectral range to be valid. 1417 seems too close to other (water?) absorption features to be useful.

*Is the article itself appropriate to support the publication of a data set?*

Yes, with the modifications noted above.

*Check the data quality: Is the data set accessible via the given identifier? Is the data set complete? Are error estimates and sources of errors given (and discussed in the article)? Are the accuracy, calibration, processing, etc. state of the art? Are common standards used for comparison?*

The data do appear available as noted, although the link for the “dry washed ashore macroplastics” appears broken in the abstract (but not the link in section 4). As far as I

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can tell, no uncertainty metrics were provided for the ASD observations, a key missing component. If this exists, it should be included. Although the paper notes differences in viewing geometry, foreoptic aperture and spectralon plaque reflectance for both the macro and micro plastics, no explanation for these different choices was given. This should be rectified.

*Is the data set significant – unique, useful, and complete?*

Yes

*Consider article and data set: Are there any inconsistencies within these, implausible assertions or data, or noticeable problems which would suggest the data are erroneous (or worse). If possible, apply tests (e.g. statistics). Unusual formats or other circumstances which impede such tests in your discipline may raise suspicion.*

The data set, to the best of my ability to confirm, looks good.

*Is the data set itself of high quality?*

yes

*Check the presentation quality: Is the data set usable in its current format and size? Are the formal metadata appropriate? Check the publication: Is the length of the article appropriate? Is the overall structure of the article well structured and clear? Is the language consistent and precise? Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? Are figures and tables correct and of high quality?*

Yes to all of these

*Is the data set publication, as submitted, of high quality?*

yes

*Finally: By reading the article and downloading the data set, would you be able to*

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*understand and (re-)use the data set in the future?*

Yes, if the above issues are resolved. This could be used to help identify spectral absorption features for qualitative remote sensing algorithms, but not for input to radiative transfer simulations as the authors suggest. The latter requires spectrally resolved complex refractive indices, measurements of size distribution and sphericity. Hopefully these data will be measured in the future.

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