Reviewer 2 Comments

The MS is well organized, focusing on a relevant issue concerning marine litter detection. The idea to create a spectral library, facing the main issue connected with laboratory experiments, is essential. The MS is well structured and the writing is clear.

We thank the reviewer for the positive feedback on our manuscript. Below, each comment has been carefully addressed with specific details on how and where revisions were added, with additional text shown in *italics*.

Following are reported some suggestions:

C1: Figure 5b is not clear; is it regards the meac od the spectra among all datasets?

R1: Data within MADLib are available as means, medians, and standard deviations of the replicate measurements for each sample. The following was added to the beginning of the results for clarity (line 231): "*To ensure consistency, all spectra plotted in this study correspond to the mean of replicate measurements for each sample*."

The caption for Figure 5b was updated to: "(b) *example reflectance* spectra for each polymer type in MADLib".

C2: Figure 5d: why the authors refer to PP samples? does it have a different signature than the others?

R2: Figures 5c and 5d are example plots of two polymer types in MADLib to demonstrate intra-variability for polymers. An explanation for polymer selection was added to section 3.1 (line 242): "*The reflectance spectra of all pristine, dry PP and HDPE samples are isolated and presented separately to inspect intra-variability in spectral features of measured polymers (Figure 5c, d). These polymers were selected because they are well represented in MADLib, with numerous samples originating from several independent datasets."*

C3: Figure 5: the spectra compared are acquired in the same way?

R3: : Good point, all of the compared spectra come from the different datasets included in MADLib. We added the following phrase in section 3.1 to clarify this (line 252): "*Measurements between datasets also differed in acquisition, such as fiber optic field of view and height of instrument from sample at time of measurement, which may affect pixel coverage*."

C4: Figure 7: the spectra are referring to the same polymer having different color?

R4: Yes, Figure 7b refers to the same polymer (polypropylene) in three different colors. Figure 7b caption was updated to "*reflectance spectra of the same polymer and object (polypropylene placemat) in three different colors*".

C5: For the abstract and introduction, I was expecting to read more information about the protocol to be used to acquire the spectra via a laboratory experiment. However, no information are reported regarding the different techniques and the differences in spectral data.

R5: We agree that the protocols used to gather the data are important. We believe this addition fits best in methods section 2.4.6 (line 225) rather than the introduction: "*Further information on protocols specific to each dataset may be found in the original publications (Corbari et al., 2024; Corbari et al., 2020; de Vries et al., 2023a; English and Hu, 2020; Garaba and Dierssen, 2020; Knaeps et al., 2021; Garaba et al., 2021a; Garaba et al., 2021b; Leone et al., 2023)*."

Additionally in the introduction, line 62 was updated: "However, current marine debris reflectance datasets *have been gathered using variable methodologies, data processing, and metadata curation, making it* challenging to combine them for algorithm development and to identify gaps in the field."