

Earth Syst. Sci. Data Discuss., referee comment RC1
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Comment on **essd-2021-321**

Patrick Launeau (Referee)

Referee comment on "Hyperspectral reflectance spectra of floating matters derived from Hyperspectral Imager for the Coastal Ocean (HICO) observations" by Chuanmin Hu, Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-321-RC1>, 2021

FRGB is in fact R NIR B color composite image. You could use NIR R B color composition like it is usually done with standard satellite images such as SPOT for instance.

The red edge has two origins: the pigment absorption and the cell arrangement.

The pigment absorption is a pure absorption without any reflectance as shown by [doi:10.1016/j.jqsrt.2010.08.029](https://doi.org/10.1016/j.jqsrt.2010.08.029) for diatoms. This is only one example. In this case, without reflectance component such microorganisms are transparent in the infrared and must be layering on a reflector to be detected. This has been stressed out in the same work by moving the diatom apart from each other in agarose. But you are apparently awarded of this effect since you discuss the NIR level of scum in discussion line 243. This is also the case of many other microorganisms like chlorophyte, cyanobacteria and rhodophyte as shown in this other example [doi:10.3390/rs10050716](https://doi.org/10.3390/rs10050716)

Therefore all pure absorbing pigment distributions of microorganisms cannot be detected in infrared without any reflector at the background like turbid water or scum with reflectance component in near infrared or any other materiel including leaves. This is not the case in the visible spectral range. In your Figure 5 a Monterey, c Taganrog and d both plots are typical shapes of microorganism in NIR absorbing water displaying a pic of reflectance around 700 nm at the end of the pigment absorption and at the beginning of the water absorption as shown in this other example among many others doi.org/10.1016/j.oceano.2017.08.001.

Somehow you agree with this effect since you calculate a SAM in a 450-670 spectral range in Table 1, however missing the deepest absorption feature of the Chlorophyll a at 673 nm. The reflectance plots of the Figure 2 are mainly brown algae characterized by a Chlorophyll c absorption feature at 633 nm with carotenoid while those of the Figure 3 are green algae with Chlorophyll b without carotenoid giving a nice pic of green reflectance at

550 nm. We must wait for line 248 in discussion to discover that a phycocyanin pigment can explain the spectral shape of cyanobacteria... this could have been presented earlier as one of the basic knowledge required for a comprehensive analysis of the results.

So sargassum could be any brown algae and ulva could be any green algae or grass floating on the water... Line 226: "all these floating matters can be differentiated through spectroscopy analysis without any other ancillary information" is probably overstat.

In fact the discussion of chapter 4 contains the basic knowledge that could have been presented in chapter 2 which could avoid some confusion. All would have been easier to read with a preliminary presentation of the spectral features need for the study from which certain materials and satellite are required.

So I am basically suggesting a reorganization bringing in the front the raison why hyperspectral data are required.