## Reviewer 2

As the title suggests, this manuscript discusses the ability of satellite spectral sensors to distinguish seagrass and algal species – in shallow waters. Laboratory experiments simulated the marine conditions using field-collected samples in various combinations and proportions of coverage. Results indicate that as much spectral information as possible is beneficial to discrimination between species but the two satellite-borne sensors (MSI, OLI) are closely comparable and can be used jointly. Nevertheless severe challenges to species discrimination remain. The topic and monitoring ability are important given the growing recognition of seagrass and algae in the marine ecosystem and carbon cycling. This importance is described at length in the Introduction. There is also extensive description of the "state of the art" in the Introduction and following ". . review" section. The objectives are given towards the end of the Introduction (lines 123-126), i.e. before the review which therefore curiously provides no input to the objectives. Indeed the review provides much detail but little synthesis or rationale for what work is now wanted. Section 3.5 lines 373-411 is more description of the "state of the art" and appears misplaced.

The last paragraph of the Discussion (lines 765 to 785) begins "These results corroborate the finding of Wicaksono et al. (2019) . ." and carries on with other corroborations to line 779. There needs to be more emphasis on how the results from this manuscript are new or more robust.

Done, this paragraph was revised and reduced. However, please note that this research was accomplished for the first time in coastal region of the Arabian Gulf using new species of seagrass and algae, as well as applying different methods for processing and analysis, which is really a significant contribution. Obviously, we should make a comparison between our results and the findings of other scientists that have been conducted in many geographic locations worldwide and have considered other seagrass and algae types and other type of processing. However, we achieved similar conclusions, and highlighting the importance of the compatibility between Sentinel-MSI (2A/2B) and Landsat-OLI (8/9) for seagrass discrimination and mapping.

The authors appear to be extremely well-versed in the topic and I have no reason to doubt the methodology or validity of results. These are significant albeit somewhat disappointing for the stated purpose. The work should be published in due course. However, this manuscript is very long and I think the authors need to consider what content is really needed to support their results. Incidental material can obscure the "message".

Done, the paper was revised and section reduced.

Detailed comments

Abstract. This is what most potential readers will use to decide whether they want to read more. It needs to be appealing to a broad range of readers. The present abstract is too long and "technical" to be appealing. Less methodology and more emphasis on results would help.

Done, the abstract was revised and reduced relatively, keeping important information for clear scientific understanding.

Line 11 and many places later. The meaning of "homologous" needs definition because it is not in general use or specific to spectral bands. The definition is best in the main text and use of such a technical word should be avoided in the abstract.

Done, clarification is added in the introduction in the lines 109 and 110. However, "homologous" means "having analogous manner for relative spectral filters position and bandwidths between symmetric bands of two (or more) sensors". This is a remote sensing terminology and it well known internationally. Please, see the following reference:

- Guyot, G. and Gu, X. (1994) Effect of radiometric correction on NDVI determination from SPOT-HRV and Landsat-TM data. **Remote Sensing of Environment**, Vol. 49, Issue 3, pp. 169-180.
- Bannari, A., Teillet, P.M. and R. Landry (2004) Comparison of Natural Surfaces Reflectances in the Homologous Spectral Bands of Landsat-TM and Landsat-ETM+ Sensors / Comparaison des réflectances des surfaces naturelles dans les bandes spectrales homologues des capteurs TM de Landsat-5 et TME+ de Landsat-7. **Revue Télédétection**, vol. 4, no. 3, p. 263-275.

Line 18 and many places later. "clear" tends to mean transparent, probably not the intended meaning. The opposite of "dark" is "pale" or perhaps "light". Later you also use "bright" which I suppose means very light-reflective and is OK.

Please, by definition the color is defined by hue, saturation and brightness. The color adjectives such as clear, bright, or dark in the paper does mean transparency but it means the color of sediments in the bottom of water column. Obviously, sediments are not transparent!

Line 186. "very high pixel size and narrow spectral resolutions". Wrong adjectives (high, narrow). Are the pixels large or small? Is the spectral resolution fine or coarse?

I am sorry; this is the correct, standard and international used terminology: high pixel size and narrow spectral resolution. I am a remote sensing specialist with 35 years' experience (retired professor from the University of Ottawa, Canada), I published 245 papers in this domain, and it is impossible for me to use WRONG adjectives. The information about resolutions definition is available in any fundamental remote sensing books. Moreover, a very simple and rapid research in google provide you this international terminology. Indeed, for instance for spatial resolution:

- When the pixel size is around 0.50 m to 1.0 m (commercial satellites), this is high or very high spatial resolution, like IKONOS, Quikbird, Pleiades, etc.
- When the pixel size is around 5 to 10 m, this is fine spatial resolution, like SPOT or Sentinel-MSI (for the band in the VNIR).
- When the pixel size is 30 m, this is medium spatial resolution, like Landsat sensor series: TM, ETM+ and OLI. Then,

- When the pixel size is around 1.1 Km, this is coarse spatial resolution, like MODIS, AVHRR, SPOT-Vegetation, etc.

For spectral resolution:

- We have hyperspectral resolution, like Hyperion with 5 to 10 nm resolution.
- We have narrow spectral resolution such as Worldview, Sentinel-MSI (some bands), etc. whit 20 to 50 nm spectral resolution.
- We have broadband for Landsat sensors (MSS, TM, ETM+, and OLI), whit around 100 nm spectral resolution.

Please, see the following references that are published in the most relevant journals of remote sensing:

- Pu et al. (2012) A comparative analysis of high spatial resolution IKONOS and Worldview-2 imagery for mapping urban tree species. **Remote sensing of environment**, Vol. 124, pp. 516-533.
- Bannari, A., A. Pacheco, K. Staenz; H. McNairn and K. Omari (2006) Estimating and Mapping Crop Residue Cover in Agricultural Lands Using Hyperspectral and IKONOS data. **Remote Sensing of Environment**, Vol. 104, p. 447-459.
- Bannari, A. and Al-Ali, Z.M. (2020) Assessing Climate Change Impact on Soil Salinity Dynamics Between 1987-2017 in Arid Landscape using Landsat TM, ETM+ and OLI data. **Remote Sensing**, 12, 2794, pp. 1-32; https://doi:10.3390/rs12172794.
- Khurshid, K.S., K. Staenz, A. Bannari, L. Sun, R. Neville, H.P. White, C.M. Champagne and R. Hitchcock. (2006) Pre-processing of EO-1 Hyperion Data. **Canadian Journal of Remote Sensing**, Vol. 32, No. 2, p. 84-97.

Line 192. Delete “high”.

Done

Equations 2 to 10. Where are the wave-length ranges of the various bands NIR, red etc. defined?

Done, clarification is added in the line 461. As well Table 1 summarize the wavelength ranges of the used bands for Sentinel-MSI and Landsat-OLI.

Lines 529-530 and Figure 7. The caption (rather than the main text) should explain the other coloured lines in panels e, f, g, h, and that the % refer to coverage (which need not be repeated for every item in the figure).

Done, clarification about % rates that are related to panels (e, f, g, and h) is added in the title of Figure 7. However, please note that the coloured lines (spectral signatures) are indicated by an abbreviation of each seagrass or algae specie (HU, HS, GAL, and BAL) that are explained in the section 3.2 (Field sampling).

Line 682. “absorption characteristics become very narrow” – I think “narrow” is the wrong word. Maybe “absorption characteristics are all very similar”?

Done

Line 695. “pure and homogenize species” – “homogenize” is a verb, meaning additional to “pure” is unclear.

Done

Line 783. “Nevertheless” gives the wrong relation to the previous sentence. Maybe better “Green rather than blue band integration may be preferable due to its better sensitivity . . scattering.”

Done

**Thank you for your time and comments to improve the quality of this paper.**