Interactive comment on* "Floodwater Impact on Galveston Bay Phytoplankton Taxonomy, Pigment Composition and Photo-Physiological State following Hurricane Harvey from Field and Ocean Color (Sentinel-3A OLCI) Observations"** ***by **Bingqing Liu, Eurico J. D'Sa and Ishan D. Joshi**

The authors would like to thank Reviewer #2 for the valuable comments and suggestions.

Response to Reviewer #2

Overall Comments

"Summary The authors utilized field data collected after the passage of hurricane Harvey along with OLCI imagery to characterize phytoplankton compositional changes. They use existing methods to invert Rrs to IOPs and the estimating of phytoplankton pigments. The paper is well written and organized. The methods are well documented and easy to follow."

Response: *Thanks for the encouraging comments.*

"The errors associated with the phytoplankton pigment retrievals should be more clearly reported, similarly to those of the IOPs."

Response: *Thanks for the suggestion. The mean errors of retrieved phytoplankton pigments have been calculated using* $\%error = \left|\frac{X_{modeled} - X_{measured}}{X_{measured}}\right| \times 100$ *and added in Table 4.*

Pigments	Sep 29, 2017 (R^2)	Oct 29, 2017 (R^2)	Oct 30, 2017 (R^2)	Averaged (R^2)	Mean error (%)
Chl a	0.95	0.97	0.98	0.97	11.36
Chl b	0.76	0.77	0.95	0.82	24.58
Chl c_1	0.56	0.42	0.79	0.59	34.23
Chl c_2	0.49	0.45	0.74	0.56	31.13
Pheophythin a	0.76	0.79	0.72	0.75	17.77
Pheophythin b	0.75	0.88	0.76	0.79	15.65
Peridinin	0.65	0.48	0.51	0.54	42.26
Fucoxanthin	0.65	0.45	0.85	0.60	30.51
Neoxanthin	0.55	0.63	0.79	0.65	31.13
Lutein	0.61	0.78	0.72	0.70	32.54
Violaxanthin	0.43	0.34	0.39	0.39	60.98
Alloxanthin	0.81	0.40	0.91	0.72	32.90
Diadinoxanthin	0.69	0.40	0.89	0.66	48.12
Diatoxanthin	0.49	0.43	0.49	0.47	54.23
Zeaxanthin	0.76	0.65	0.78	0.73	19.03
β-carotenoid	0.41	0.42	0.82	0.55	44.02

"The paper could be improved by providing greater context surrounding the hurricane. It would be helpful to characterize what the phytoplankton pigments were before the hurricane and for some restoration period after the hurricane (how long did it take for conditions to return to more normal levels?)."

(1) **Response:** *Thanks for this very important suggestion. The revised manuscript now includes Chl a evolution in GB before and after the hurricane-induced flooding event along with a new section:* ***Section 3.2.2*** *"Long-term Chl a Observations in Comparison with Hurricane Harvey Event". Further,*

sequence of Sentinel 3A-OLCI derived Chl a and river discharge information for the period of ***08/01/2016-12/01/2017*** *have been made (Fig. 11). The hurricane-induced Chl a variations are clearly observed in Fig. 11 as described in the manuscript between line 530-546.*

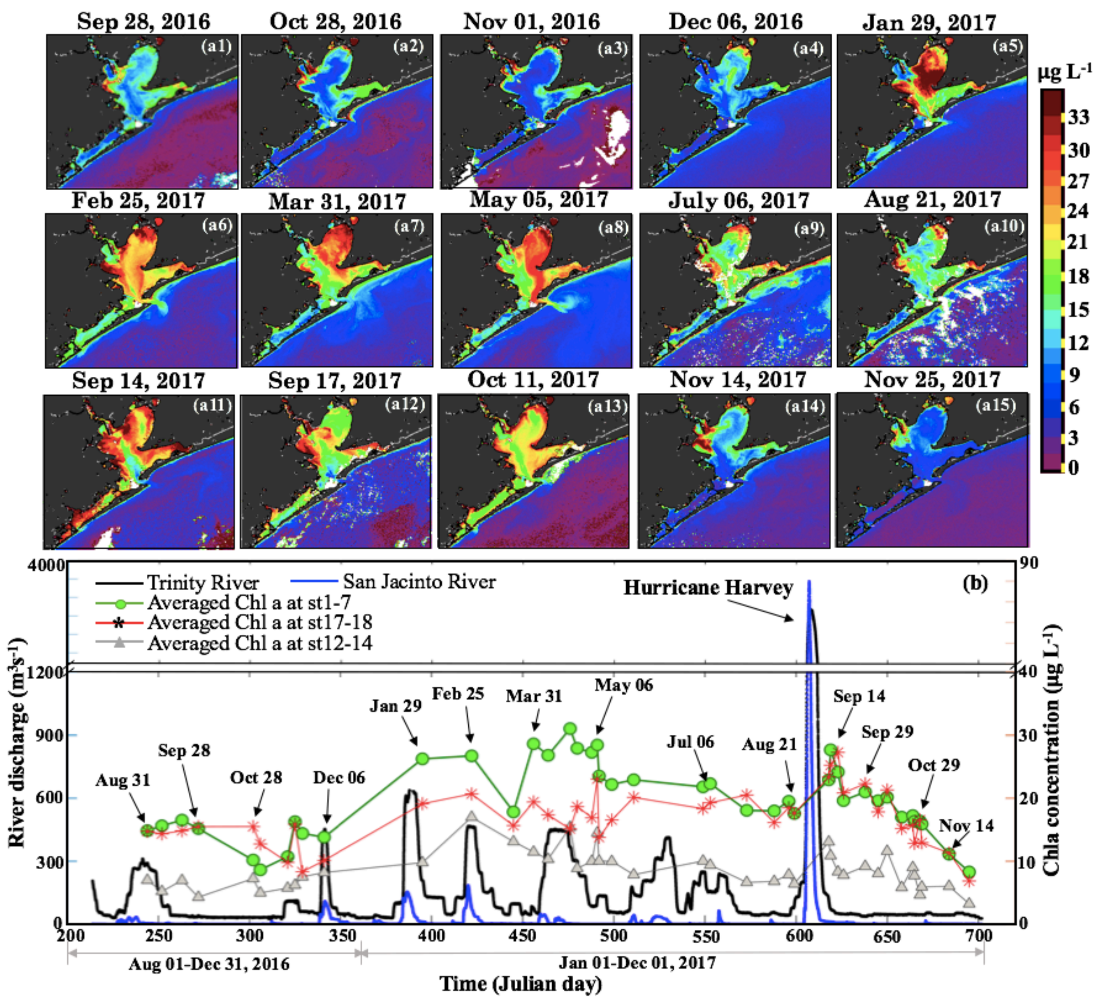

Figure 11. **(a_{1-15})** OLCI-derived Chl a shown for the period of August 31, 2016-November 25, 2017. **(b)** Trinity River discharge at Romayor, Texas (USGS 08066500, black line) and the west flank of the San Jacinto River (USGS 08067650; blue line); the green, red and gray lines/symbols represent the mean Chl a at stations 1-7 in Trinity Bay, at stations 17-18 in East Bay and at stations 12-14 close to the entrance of GB corresponding to 43 cloud free Sentinel 3A-OLCI images (colored symbols) and dated values corresponding to images $\mathbf{a_{1-15}}$.

(2) **Response:** *The NNLS pigment algorithm has further been applied to two more OLCI-derived Chla maps, one on July 06, 2017 (pre-hurricane) and another one on November, 25, 2017 (normal condition, Fig. 14). In addition, freely available data of microplankton (10 to 150 μm) pictures recorded by an Imaging FlowCytobot (IFCB) at the entrance of GB (http://dq-cytobot-pc.tamug.edu/tamugifcb) have been added to Fig. 14 to support pigment retrievals for July 06, 2017, and November 25, 2017 due to the absence of HPLC measurements on these two days. Pigment maps along with IFCB data both indicate marine dinoflagellates, and cyanobacteria to be dominant before the hurricane on July 06, 2017, whereas, marine diatoms showed dominance in November, 2017, when typical conditions*

were restored. More detailed results and discussions have been added in Section 3.3.1 and Section 4.3 of the manuscript.

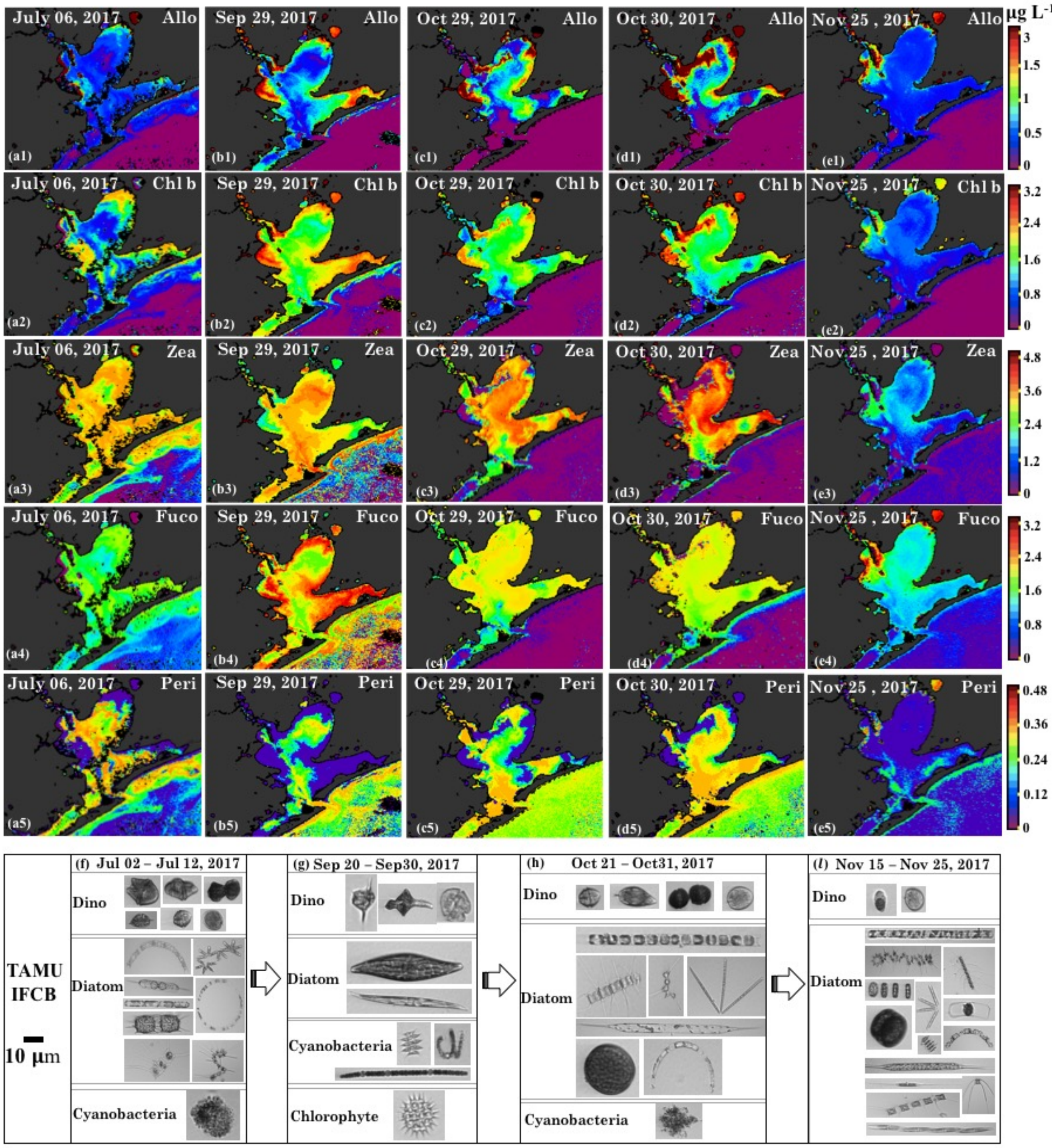

Figure 14. Sentinel-3 OLCI derived maps of diagnostic pigments for Galveston Bay. Simulated **a1-e1)** alloxanthin, **a2-e2)** Chl b, **a3-e3**) zeaxanthin, **a4-e4)** fucoxanthin, and **a5-e5)** peridinin concentrations. a, b, c, d and e represent columns (maps for July 06, September 29, October 29-30 and November 25, 2017) and 1-5 represent rows (pigments), respectively; **(f), (g), (h) and (l)** are the corresponding IFCB data for July 06, September 29, October 29-30 and November 25, 2017, respectively; note that IFCB pictures of fresh water species including chlorophyte and cyanobacteria that appeared on September 20-30, 2017 have been zoomed in for better clarity.

Specific Comments

“Line 151: replace “repetitively” with “repeatedly.”

Response: *Thank you for pointing this out. We have replaced “repetitively” by “repeatedly” in line 151.*

“Line 281: please reword for clarity and flow.”

Response: *description of pigment spectra has been revised as below:*
“where $A(\lambda) = [a_1(\lambda), a_2(\lambda), \ldots a_n(\lambda)]$ *represent mass-specific spectra of 16 pigments (Chl a, Chl b, Chl c1, Chl c2, pheophytin-a, pheophytin-b, peridinin, fucoxanthin, neoxanthin, lutein, violaxanthin, alloxanthin, diadinoxanthin, diatoxanthin, zeaxanthin, and* β*-carotenoid), which are the in-vitro pigment absorption spectra over pigment concentrations and can be extracted from supplementary R scripts of Thrane et al. (2015).”*