

Interactive comment on “Distribution and Flux of Dissolved Iron of the Rajang and Blackwater Rivers at Sarawak, Borneo” by Xiaohui Zhang et al.

Anonymous Referee #2

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The authors present dissolved iron (dFe) in the Rajang and the other three blackwater rivers and estuaries in Malaysia. Few results are available for the behavior of dFe in the tropical rivers in Southeast Asia, although those rivers account for large proportions of fluvial discharge and are significant source of terrestrial materials to the oceans. Authors present the precious and accurate data of dFe in the highly dynamic peat-draining Rajang and the other three blackwater rivers and estuaries for the comprehensive understanding of dFe biogeochemical cycle in the tropical regions. As such, their work is citable and appropriate for publication in Biogeosciences. However, there are some unclear information and improper discussions in the manuscript, and moderate scientific revisions, required.

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Detailed comments are listed as follow: 1. Based on the description in the 2.1 section, study area covers the drainage basin and estuaries of Rajang River, with major stations locating in the estuaries. So the title should include the “estuaries” inside. 2. The description of the study area and Figure 1 are not clearly enough to help readers to understand the complex riverine drainage and estuaries. For example: a) Authors should mark the location of Sarawak State in Figure 1a or 1b; b) Normally we don't use bold circle to present riverine drainage basin, it looks like the capital city. Authors should give enough information of different mainstreams and tributaries of discussed riverine basin in Figure 1 to help readers to understand the results and discussion later; c) In line106 (page 5), authors mention that “The Igan tributary is the main outlet for freshwater (of Rajang River)”. However, the survey carried out in the wet season (March 2017) only had one station in this tributary. There was only one sampling station in the main stream of Rajang River in wet season too. Authors should explain the sampling strategy between two voyages. Otherwise the discussion to compare the results between two seasons are hard to understand due to different stations' coverage. d) In Figure 3, authors don't explain how to separate the stations in the Rajang Riverine basin into three parts of “Rajang, Igan and Serendeng”? And where is “Serendeng” in Figure 1? How do authors separate riverine stations and estuary stations between two sampling voyages? According to the variations of salinity or using Sibu city as the boundary (Page 5 Line 101-102)? Relevant information is very important for the understanding of results of different average concentrations and behavior of dFe between dry and wet seasons. e) Since the behavior of dFe is strongly affected by the SPM based on the discussion, authors should give the information of sediment loads of Rajang River and the other three blackwater rivers. f) What's the water depth of the Rajang River? Since only surface samples were collected and authors explain the difference of dFe behavior between two seasons based on the resuspension and adsorption/desorption on the surface of particles. It's better to give the basic information of Rajang River. 3. Authors prove the robust of dFe measurement by the international intercalibration experiments results using SAFe D1 and SLEW-3. dFe measurements

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using isotope dilution ICP-MS method have good precision and accuracy. However, the samples collected in the Rajang River and the other three blackwater rivers have high content of DOM which is quite different with the open ocean and coastal region. What's species of dFe can be measured using solid extraction method depends on the selection of resin and the composition of organic ligands in the riverine and estuarine samples. Authors should give detailed information of resin type in section 2.3 and give clear definition of what's the speciation of measured "dFe" and what's the difference between measured "dFe" and total dissolved Fe (measured after digestion) in the section of results and/or discussion. 4. Page 8 Line 182-190: Authors discussed the distributions of SPM, DO and pH in the two seasons of the Rajang River and Estuary. However, it's hard to follow because we don't know locations of Serendeng tributary and Rajang tributary. The difference of color bar in Figure 2b and 2c is hard to recognize. 5. Section 3.2: As mentioned in the comments 2-d, I don't know how do authors separate the riverine and estuarine stations between dry and wet seasons, the data of concentration ranges and averages are hard to understand due to different sample coverage and data number. Ordinate of the iron concentration in figure 3 using two different scales (0.05?-12 μM and 0-0.05? μM), what's the scientific hypothesis of this separation? Using salinity >15 and <15 as the separation boundary? If this is true, authors should differentiate the salinity using the same boundary in Figure 2. 6. Section 4.1 page 9 line 231-232: I can't agree with the statement of "dFe elevation may be related to the stronger weathering derived from intensive precipitation". Weathering index in the same region between dry and wet season can't change significantly. The elevation of dFe in the wet season might be caused by the dissolution of weathering product in the riverine drainage basin due to the runoff variation and precipitation, and might also due to the resuspension of bottom sediments. 7. Authors using correlations of dFe with other parameters (e.g. SPM, DO etc) to discuss the behavior of dFe in the riverine and estuary region and between two seasons. Discussion is relatively superficial and need to add some solid evidence.

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