

Interactive comment on “Sources and accumulation of organic carbon in the Pearl River Estuary surface sediment as indicated by elemental, stable carbon isotopic, and carbohydrate compositions” by B. He et al.

Anonymous Referee #3

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Review summary for manuscript “Sources and accumulation of organic carbon in the Pearl River Estuary surface sediment as indicated by elemental, stable carbon isotopic, and carbohydrate compositions” by B. He et al. As the second largest river in China, the Pearl River discharges significant of terrestrial carbon to the northern South China Sea and plays important role affecting the carbon cycle and biogeochemical processes in the coastal region. In the past years, few papers have been published regarding the sources and burial of terrestrial carbon in the Pearl River estuarine and adjacent coastal sediments. In fact, none of these published studies have shown sig-

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nificant scientific interests. This study, to my knowledge, is the first study that combines elemental, stable carbon isotope and organic biomarker techniques to exam the problem in the region. In this regard, I would like to see this study to be published. After read the manuscript, however, I do have some concerns and suggestion to the authors and I think to see these questions to be clarified before its publication. The following are some specific comments: 1. When dealing with sedimentary geochemistry, some basic information need to be provided. Such as water depth, redox condition, sediment type (clay, silt or sandy), and sediment grain size, and so on. Without knowing the information, it will be difficult to compare chemical compositions among the study sampling sites, for example, between clay-rich sediment and sandy sediment, and oxic sediment and anoxic sediment. 2. When say surface sediment, what is the depth? 0-2 cm or 0-10cm? Are the sediments collected from the same depth at each station? This could make a big difference. 3. Pearl River estuary is probably a heavily contaminated estuary since there are several high populated metropolitans connected to the low reach of the river. Studies have shown that significant fraction of sedimentary organic matter in the estuary was from anthropogenic input. If that's the case, I expect that using a two end member model to calculate the terrestrial organic carbon flux and burial in the estuarine and coastal sediments is probably too simple and risky. 4. For marine end member, why using central Pacific sediment? The phytoplankton produced in the northern South China Sea could have different C/N and stable carbon isotopic values than that in the central Pacific Ocean. It is better to measure the end member values collected from the northern South China Sea. 5. I couldn't understand the Equation (3) on page 2903, and as a result, I couldn't understand how the Fig. 4 was generated. Is the mixing curve generated based on Equation (3)? Why the mixing line has to be curved in this case? 6. Could some observed concentration and composition differences of carbohydrate among the stations affected by anthropogenic input? 7. The Pearl River and Amazon River are two different river systems in many ways. Simply comparing these two river systems doesn't make too much sense. 8. On page 2904, line 10. I don't agree with the statement” So carbohydrate compositions in the

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sediment are likely to be more dependent upon their source than on diagenetic status". These are no solid evidence to show this in this study. 9. Finally, the flux calculation of terrestrial organic carbon to the sediments on page 2909 is good but is kind of weak. It is based on some uncertain assumptions and simplifications.

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