

Comments on “Source and flux of POC in a karstic area in the Changjiang River watershed: impacts of reservoirs and extreme drought” authored by Ji et al.

The authors measured $\delta^{13}\text{C}_{\text{POC}}$, $\delta^{15}\text{N}_{\text{TN}}$ and C/N ratios in both suspended and surface

Sediments along the Wujiang River and attempted to identify source and flux of POC in the Wujiang River and addressed the impacts of reservoir on POC flux into the Changjiang (or finally into the East China Sea). I think the authors had lots of data sets in two different seasons, but the whole paper presentation is not very good. I am confused about the title, introduction and interpretation about the content. Overall, I think the paper need a major revision before it can be considered to be published. My major comments are as follows:

1. The title is not suitable because the data set of POC flux and POC sources in the Changjiang River is only from upper branch. The authors mentioned POC fluxes in different rivers in the introduction, but it did not touch real POC flux in the Changjiang River mouth or the East China Sea. The title should be modified.
2. As addressed above, the introduction described the importance of riverine POC flux to different marginal seas and the main objective of the manuscript seems to emphasize the effect of Three Gorge Dam on POC flux to the East China Sea. I suggest that the authors should review possible difference of POC flux in the Changjiang before and after the construction of Three Gorge Dam. For example, the authors keeping saying POC flux to marginal seas are quite important, but they said that..... “Wujiang River is still scarce after the Three Gorges Dam began impounding sediment in 2004. Based on analyses of $\delta^{13}\text{C}_{\text{POC}}$, $\delta^{15}\text{N}_{\text{TN}}$ and C/N ratios in the suspended and surface sediments, this study identified source and flux of POC in the Wujiang River and examined the impacts of reservoir and climate.” I did not see the description above associated with whole Changjiang watershed because the Wujiang River is only a part of Changjiang branches. Plus, they attempted to study the impacts of reservoir (Three Gorge Dam?) and climate based on two season data sets. I think the little data can not wholly support their perspective. Instead, the author should point out what POC flux in the Changjiang River before the construction of Three Gorge Dam are in the introduction? In the next step, they want to examine the impacts of trapped POC in Three Gorge Dam affecting the output of Changjiang River. Anyway, the introduction and abstract need to be re-worked. A useful reference should be helpful for the authors. Hung et al. (2003). Fluxes of particulate organic carbon in the East China Sea in summer. BG, 10, 6469-6484.

3. Source of organic carbon in suspended particles and sediments are roughly separated to two main sources which may not be right. I can see authors discussed the percentage of each compound (C3 and phytoplankton) in equations 1~3 in the text, but they also explain possible sources such as C4 and C4-soil and include these compounds into equations. It is quite inconsistent for the data interpretation. I suggest the authors need do it based on other sources.

Other comments

Results.

3.1 line 25-26, it has been described in the method, delete it.

3.2 Line 21-23 content should show in the method section

Line 27, how significant? Showing p and n

Discussion

4.1 ...line 23 suggested the dominant terrestrial contribution to SPM in May and increased phytoplankton input in August. As discussed, all samples were collected in the fresh water suspended particles or sediments, it is absolutely from terrestrial source.

4.2 line 27-29 showed a relatively significant positive correlation, which suggested that a fraction of TN was inorganic nitrogen in the SPM. Why? Thus, the phytoplankton inputs might be overestimated based on C/N ratios. How can you explain this? Is it related to Redfield ratio?

P6, line9-20, are C3 and phytoplankton POC only two sources? How about other sources? Do authors have other C sources like C4 etc. ? If other C sources exist, the equations 2 and need to solved? There is a useful reference (Hung et al., ECSS, 84, 566-572) which reported that POC/Chl-a ratio in summer ranged from 50 to 70, if the authors have Chlorophyll-a data. They can estimate POC source from phytoplankton based on suspended POC data.

Line 25-34 why the phytoplankton in affected and the unaffected areas has large difference? They are both affected by fresh water largely. Is it due to residence time or other carbon sources?

P7, ...Compared with SPM, the elevated C/N ratios of surface sediments indicated more land-derived fraction contribution to the surface sediments. What other sources contributed to POC in sediments ? Line 10-13, If C4 is partially associated with POC, then the end member mixing model should be modified.

4.3 & 4.4 Flux of POC in Wujiang River, as mentioned early, the amount of POC flux is totally into Three Gorge Dam? It is quite simple to estimate POC and PIC fluxes.

The important thing should be focused on how much POC are trapped in the TGD and affect the POC export flux to the East China Sea. I think this portion should need deep discussion. For example, the author should compare the POC flux at the upper and lower watershed of TGD before and after construction of TGD. Plus, the authors keep saying possible impacts of the TGD, ...the variations of suspended sediment load could reflect the POC flux variations under the condition of dam and extreme drought....” What my understanding is that the authors should provide POC flux in the lower watershed of TGD rather than upper watershed because these upper POC finally will empty TGD, right?

Figure 2, the authors should provide water discharge data in the lower watershed of Changjiang such as Datong station and compare what is the difference of water discharge and POC flux between flood and drought seasons. If the authors have those data sets, the manuscript will provide evidence if TGD has significant impact or not. Figure 5, there are five carbon components in the figure showing different contributions of carbon sources to suspended and/or sediments. However, the authors only used two end-member to calculate possible contributions of phytoplankton and C3-plant. Why?