

# ***Interactive comment on “Geochemistry of the dissolved loads of rivers in Southeast Coastal Region, China: Anthropogenic impact on chemical weathering and carbon sequestration” by Wenjing Liu et al.***

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1. The field trip was conducted in the high-flow period. Whether is one hydrological sampling representative or can it represent a hydrological year, which must be explained.

Reply: The river water of the southeast coastal rivers is mainly recharged by rain, and the amount of precipitation in high-flow season accounts for more than 70% of the annual precipitation in the area. During the high-flow season, the abundant water

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recharging facilitates the weathering product entering river system. However, during the low-flow period, the ground water contribution to the surface water might be greater and overprint the real weathering information in river system, which would bring more inaccuracies to the weathering and CO<sub>2</sub> consumption estimation. Therefore, it is more representative to investigate the rock weathering during the high-flow season in the subtropical monsoon climate watersheds.

2. Alkalinity is titrated using HCl, while in the dataset of Table there is no alkalinity. I guess that the HCO<sub>3</sub> is from Alk, is it right? If yes, please demonstrate how to calculate the HCO<sub>3</sub>.

Reply: The content of HCO<sub>3</sub><sup>-</sup> rather than alkalinity is titrated using HCl. We have made this point more clearly in the attached revision in the supplement.

3. Authors referred many studies of rock chemical weathering, while several studies in Asia, such as Han River in the Yangtze and Mekong River in the Southeast Asian were ignored.

Reply: According to the RC, we have cited these studies in the attached revision in the supplement.

4. Authors should inform the extent of CO<sub>2</sub> consumption rate in this study in contrast to the world rivers, particularly Asian rivers and highly-impacted rivers.

Reply: According to the RC, we have compared the CO<sub>2</sub> consumption rates of SECRB to the major rivers in the world and Asian. Please find it in Lines 349-360 in the attached revision in the supplement.

5. I have noted that the references is mostly old, some new citations should be included.

Reply: We have added recent studies in both the introduction and the discussion sections in the revised version attached in the supplement.

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6. L 65 Change stronger to intense

Reply: It is revised in the attached revision in the supplement.

7. L 138 How many samples?

Reply: We have added the number of samples in the revision. Please find it in line 141 in the attached revision in the supplement.

8. L232-L233 Very high proportion of SO<sub>4</sub> and NO<sub>3</sub> is from atmosphere, if correct, does it mean the estimated CO<sub>2</sub> consumption rate is still overestimated because of contribution of HNO<sub>3</sub>?

Reply: Yes, we do think the N deposition also plays a role in rock weathering and have impacts on CO<sub>2</sub> consumption. However, the NO<sub>3</sub><sup>-</sup> source in river is more complicated, e.g. atmospheric deposition, fertilizer, industry and urban waste water, as well as nitrification and denitrification. Without more information for the above source and more tools to distinguish the different NO<sub>3</sub><sup>-</sup> source, we could not address more conclusion on the effect of HNO<sub>3</sub> on CO<sub>2</sub> consumption rate. It would be an interesting theme for further study in this area.

9. L393-394 Please could you supply the chemical equations for these weathering by HCO<sub>3</sub><sup>-</sup>, H<sub>2</sub>SO<sub>4</sub> or both HCO<sub>3</sub><sup>-</sup> and H<sub>2</sub>SO<sub>4</sub>. This will be helpful for readers to quantify the end-members.

Reply: The chemical equations for carbonate and silicate weathering by HCO<sub>3</sub><sup>-</sup> and H<sub>2</sub>SO<sub>4</sub> have been repetitively mentioned in many previous basin scale weathering studies (e.g. Li et al., 2008; Spence, and Telmer, 2005; Chetelat et al., 2008; Xu and Liu, 2010). In addition, we discussed the  $\delta^{13}\text{C}$  isotopic composition of the end-members in lines 390-406. For the condense of the whole manuscript, we did not provide the chemical equations for carbonate and silicate weathering by HCO<sub>3</sub><sup>-</sup> and H<sub>2</sub>SO<sub>4</sub>.

10. L477 No year for this citation

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11. Fig. 5. Please add p value

Reply: We have added p value in Fig. 5 in the attached revision in the supplement.

Please also note the supplement to this comment:

<https://www.biogeosciences-discuss.net/bg-2018-109/bg-2018-109-AC1-supplement.pdf>

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