

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. Line 215-217, when the authors discuss the source of Cl⁻, they say “In pristine areas, the concentration of Cl⁻ in river water is assumed to be entirely derived from the atmosphere, provided that the contribution of evaporates is negligible”. Please give a reference. In fact it was found that ground water was an important source of Cl⁻ for rivers in many regions of China such as the Yarlung Tsangpo basin on the Qinghai-Tibetan Plateau.

C1

Reply: The reference for using the lowest Cl⁻ in river water as the atmospheric input has been added in the attached revision in the supplement. As the reviewer suggested, the Qinghai-Tibetan Plateau and arid area, groundwater play as an important source for Cl⁻. However, in humid and hot area alike Southeast China, no salt-bearing rocks was found there. In addition, river water is mainly recharged by rain, but groundwater contribution is far more less than arid area. So, groundwater impact on river Cl⁻ is not considered in this study.

2. L232-L233 High proportion of SO₄ and NO₃ were found in the study area, but the discussion mainly focused on the SO₄. What was the role of NO₃ in the estimation of CO₂ consumption rate?

Reply: Yes, we do think the existing of N deposition will make the CO₂ consumption estimation higher than ignore the role of HNO₃ during weathering. However, the source of riverine NO₃⁻ is complicated, e.g. atmospheric deposition, fertilizer, industry and urban waste water, as well as the effect of nitrification and denitrification. Due to lack of information for the above source and more tools to distinguish the different NO₃⁻ source, we could not address more conclusion on the effect of HNO₃ on CO₂ consumption rate within trustful errors. It would be an interesting theme for further study in this area though.

3. Line 321-324, The authors made a comparison between the studied rivers in east coastal region and other major/large rivers in China such as Changjiang, Huanghe and Xijiang river. It will be good to have a forward discussion explaining the major reasons for the difference.

Reply: Silicate weathering are complicated and affected by lithological setting, temperature and precipitation, etc. Silicate weathering rates in southeast coastal area is higher than the Xijiang and Huanghe but lower than Changjiang basin is the complicated results of silicate dominated bedrock (compared with Xijiang), high MAT and high runoff (compared with Huanghe and Changjiang basin). We added some discussion

C2

with rivers in Asia and the world in the following section in the attached revision in the supplement.

4. Line 386-387, "Carbonate rocks are generally derived from marine system and, typically, have ^{13}C value close to zero", please add a reference

Reply: The reference has been added in the attached revision in the supplement.

5. Table 1, how do you measure the HCO_3^- ? Are they calculated from the alkalinity? Please provide more info in the method section.

Reply: The content of HCO_3^- rather than alkalinity is titrated using HCl. We have made this point more clearly in the attached revision in the supplement.

6. Fig. 5. Please provide the p value.

Reply: P value is provided in the attached revision in the supplement.

Other minor comments:

Line 72-74 the sentence is not well structured, please re-phrase.

Reply: We have re-phrase it in the revision. pls find it in the attached revision in the supplement.

Line 195 lack space between "%" and "of"

Reply: Modified 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-AC3-supplement.pdf>

Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2018-109>, 2018.