

Responses to Editor and Reviewers

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To:
Prof. Christine Stumpff
Editor
Hydrology and Earth System Sciences

Dear Prof. Christine Stumpff,

We are submitting minor revisions for the manuscript titled “Identification of anthropogenic and natural inputs of sulfate into a karstic coastal groundwater system in northeast China: evidence from major ions, $\delta^{13}\text{C}_{\text{DIC}}$ and $\delta^{34}\text{S}_{\text{SO}_4}$ ” (HESSD-12, 11331-11370, 2015) to ***Hydrology and Earth System Sciences***. Following the constructive comments from the Editor and two reviewers, the authors have completed the required revisions on the previous manuscript. We gratefully acknowledge their constructive comments.

Some explanations on the remaining points that required addressing are as follows.

Reply to the anonymous Referee #2:

Dear Reviewer,

We would like to thank you for the valuable comments for improving our manuscript:

(1) Fig. 2: Numbers are too small and better would be linked with a table

Reply: Thanks for the suggestion. We have made a minor change on Figure 2 and deleted characteristic ranges of $\delta^{13}\text{C}$ and $\delta^{34}\text{S}_{\text{SO}_4}$ values shown previously on this figure. In place of this we add letters, linked to Table 3, which shows the ranges along groundwater flow paths.

(2) Fig. 3 to 5 and 7 to 10: error bars would be helpful

Reply: Thank you for the suggestion. We attempted to add error bars to the plots where possible; however, in many cases the error values are small relative to the symbol size and/or intervals on the axes, and so it is difficult to see them on the figure (e.g. Fig 4, 5, 7 & 9). We have described the errors associated with each of the hydrochemical analyses in the section of “3.1 Sampling and

analysis”, which should suffice.

For Fig.10, we have already described the sensitivity in the results in section “5.4 Anthropogenic contribution on groundwater chemistry and environmental implications”. “We analysed the sensitivity of the mass balance by changing $\pm 10\%$ of the end-member sulfur isotope compositions of fertilizer and evaporate, respectively. We found the change on $\delta^{34}\text{S}_{\text{fer}}$ varied the contributions from fertilizer and evaporate by $\pm 0.1\%$ and $\pm 0.2\%$ respectively. The $\pm 10\%$ change in $\delta^{34}\text{S}_{\text{evp}}$ leads to changes in the contributions from fertilizer and evaporate by $\pm 0.4\%$ and $\pm 2\%$, respectively. This suggests that the results are more sensitive to $\delta^{34}\text{S}_{\text{evp}}$ values in the mass balance.” Similarly, such changes cannot be easily shown on Fig. 10 due to small sized errors relative to the symbols.

Again, the authors are grateful for the editor and the reviewers’ time and generous help.

If you have any further questions regarding our manuscript, please contact us as soon as possible.

Thank you very much for your kind consideration.

Sincerely Yours,

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