

Dear Professor Vanclooster:

We are pleased to submit our newly revised manuscript “Technical note: Effects of iron(II) on fluorescence properties of dissolved organic matter at circumneutral pH” as well as a tracked changes version of the document. We are grateful to reviewer 3 for taking the time to review our revised manuscript and for their positive feedback.

Our detailed point-by-point responses to their comments are available below. The Referee's comments are in black Arial font, our responses are in purple Times New Roman, and our revised text is in blue Times New Roman. We have also revised the formatting of the references so it matches the Copernicus format.

Thank you for considering our revised manuscript.

Sincerely,



Cara C. M. Manning on behalf of coauthors

The revisions performed by the authors according to my previous comments are acknowledged and I'm generally pleased with the revised version.

Thank you for your positive feedback.

I still think that the following points need further attention before publication:

1. The end of the introduction still needs work. The introduction should preferably end with a single concise paragraph describing the aim of the study and briefly the method. In the latest version there are still two separate paragraphs for this purpose. Additionally, the reference of the methodology section in the introduction seems unnecessary.

Based on this feedback, we combined the last two paragraphs of the introduction into a single paragraph, and revised the wording. We also removed the reference to the methodology section. Revised text:

The objective of this study was to assess the influence of high concentrations of Fe(II) on the fluorescence properties of DOM by titrating up to 306 mg/L (5.4 mM) Fe(II) into groundwater collected from a deltaic aquifer in Richmond, British Columbia, Canada. This groundwater is representative of groundwater found in diagenetically immature, organic-rich deltaic sediments, where Fe(II) concentrations can reach up to 300 mg/L (Bolton & Beckie, 2011; Jia, 2015). The biogeochemistry of groundwater at this site, and an analysis of the origin of the extraordinarily high Fe(II) concentrations, are described in Jia (2015).

In this study, we identified the degree of quenching at different Fe(II) concentrations (from 1 to 306 mg/L) based on the excitation-emission matrix (EEMs) regions and peaks. We fit the EEM spectra to a previously derived 13-component PARAFAC model (Cory and McKnight, 2005) and calculated commonly-used fluorescence indices to quantify DOM fluorescence properties as a function of Fe(II) concentration. This study provides a detailed characterization of the impact of changing Fe(II) concentrations on DOM fluorescence.

2. The phrasing you chose for the sentence in line 274 (in the revised version) seems incorrect. I suggest something like: 'Similarly to the trend obtained/observed for HIX...'. Same comment applies to line 226.

Agreed.

Line 274 changed from "Similar to trends for HIX" to "Similar to the trend observed for HIX"

Line 227 changed from "Similar to trends for relative OFI" to "Similar to the trend observed for relative OFI"

3. Paragraphs 2 and 3 of the discussion can be combined.

Agreed. We have combined paragraphs 2 and 3. Revised text:

Poulin et al. (2014) mainly examined the effect of Fe(II) addition to terrestrial-derived fresh surface water with undetectable Fe(II) levels. In contrast, the DOM in the stock solution collected from the Kidd 2 site is hypothesized to be derived from microbial sources and may respond to high Fe(II) concentrations differently than freshwater terrestrial-derived DOM. Quenching of humic-like peaks by other metal species has been observed by other researchers. Ohno et al. (2007) conducted experiments on the impact of Fe(III) and Al(III) addition to the deciduous water-soluble organic matter (WSOM) fluorescence spectra. This result showed that the fluorescence intensity was quenched by about 30% in the presence of 25 μM (1.4 mg/L) Fe for Peak A (Ohno et al., 2007). The DOM fluorescence quenching mechanism by metals is not well understood.