Hydrology and Earth System Sciences

Discussions

HESSD

Interactive
comment

Interactive comment on "Isotopic and chromatographic fingerprinting of the sources of dissolved organic carbon in a shallow coastal aquifer" *by* Karina T. Meredith et al.

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Overall: Please proof-read the MS carefully, there seem to be a few small typos/grammatical errors.

Data analysis: The dataset is well-suited for a multivariate data analysis to decipher GW sources (see RDA as example in cited Coutourier et al. 2016). I recommend the inclusion of a multivariate analysis (RDA or PCA).

Methods, p4, l15 "Dissolved". Also, I think the company name is Waterra.

p5, l10 ff: Why was GW age (years) not calculated? What is the merit of using TU?

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[Discussion paper]

All methods: Please include details for 14C analysis. Why was 14C of DOC not measured?

Results, p5, l25: Would the authors expect seawater infiltration, due on tidal inundation and/or storm floods, at S5? Or is the GW pressure so high that it immediately dilutes any seawater influence?

All results and following discussions: Please use either present or past tense continuously throughout. Results contain interpretations (e.g. indications of marine carbonate dissolution...ion exchange processes...methanogenesis...) which may better fit in the Discussion section.

p7, l1: "The average DOC concentration (...) is high" compared to what? It is not high considering the conditions (anoxic, advective flow, peat hydrolysis in the aquifer).

Section 4.1., first two paragraphs: Please refrain from switching between past and present tenses.

Discussion, p9, l5-8: Please provide additional literature which supports your claim of a global occurrence. I have added some examples to the reference list below.

Overall Discussion: It seems that 14C-DIC is not included in the discussion of the results. Why? How can it help in interpreting GW sources?

Conclusion, p12, l1ff: Please explain how the estimate of an "order of magnitude higher" is achieved.

p13, l1: Please explain how the estimate of an "export up to ten times" is achieved.

Figure 2: Perhaps there is a way to improve the quality of the figure (some features appear to be blurred). What do the blue, pink, and red arrows mean in contrast to the black ones?

References

Coutourier M, Nozais C, Chaillou G, 2016, Microtidal subterranean estuaries as a source of fresh terrestrial dissolved organic matter to the coastal ocean. Marine Chemistry 186, 46-57.

Goñi MA, Gardner IR, 2003, Seasonal dynamics in dissolved organic carbon concentrations in a coastal water-table aquifer at the forest-marsh interface. Aquatic Geochemistry 9, 209-232.

Seibert SL, Holt T, Reckhardt A, Ahrens J, Beck M, Pollmann T, Giani L, Waska H, Böttcher ME, Greskowiak J, Massmann G, 2018, Hydrochemical evolution of a freshwater lens below a barrier island (Spiekeroog, Germany): The role of carbonate mineral reactions, cation exchange and redox processes. Applied Geochemistry 92, 196-208.

Streif H, 2004, Sedimentary record of Pleistocene and Holocene marine inundations along the North Sea coast of Lower Saxony, Germany. Quarternary International, 112, P3-28.