

Seasonal characterization of CDOM for lakes in semi-arid regions of Northeast China using excitation-emission matrices fluorescence and parallel factor analysis (EEM-PARAFAC)

This paper from Zhao et al. presents the results of EEMs + PARAFAC modeling and other absorbance measurements to characterize seasonal changes in CDOM from several northeast China lakes. The work is fairly straight-forward and easy to follow as presented. My primary concern is several statements made that link correlations of the data directly to processes, as these are incorrect since the actual processes were not measured/observed. For example, on page 19, lines 413 to 415, this sentence says that a weak relationship between DOC and component 3 is 'from the decay of plants ...' when only the relationship was measured and nothing about microbial activities, etc. It is great that the authors put forth possible explanations for the observed correlations, but these statements need to clearly indicate that this is only a possible explanation. This can be accomplished simply by adding qualifiers such as 'possibly' or 'likely' to these types of statements, and there are several in the manuscript that should be adjusted such as the sentences in lines 404 and 443.

I would recommend this manuscript for publication if these statements are amended, and after the following minor (though numerous!) corrections, including several typos and grammatical errors. I have tried to indicate as many of these as possible below, though I recommend the authors please carefully recheck the text for these types of errors as well.

Specific comments:

- pg 3, line 54: change 'of producing' to 'to produce' ('... because of its ability to produce synchronous scan spectra...')
- pg 3, line 59: freshwater not freshwaters
- pg 3, line 63: 'CDOM sources in aquatic environments'
- pg 4, line 79: 'assessed' not assess
- pg 4, line 80: insert **their** before relationship ('... fluorophores and **their** relationship with salinity ...')
- pg 4, line 88: typo in amount
- pg 4, line 88: were should be was
- pg 4, line 89: DOC concentrations
- pg 5, lines 90-91: Duarte et al., 2008 and Tranvik et al., 2009 are missing from the reference list
- pg 5, line 96: seasons
- pg 5, line 99: components
- pg 6, line 113: fishery should either be 'fishing' or 'fisheries'
- pg 6, line 119: processes
- pg 6, line 125: the phrase '... when the ice layer was drilled a hole by the auger.' does not make sense, please revise (maybe 'The under-ice surface water was coming up when a hole was drilled in the ice layer by the auger?')
- pg 7, line 138: '... in **the** laboratory.'
- pg 7, line 140: '... in **the** laboratory.'
- pg 7, line 147: '... was used as **a** standard.' (could also use **the** here)
- pg 7, line 151: 'In **the** laboratory...'
- pg 8, line 170: typo in date/data
- pg 9, line 198: 'sample's' is incorrect here; should either be just sample or samples' if the possessive form is required (not necessary in my opinion)

- pg 11, line 232: '... are less **than** or equal to 0.05'
- pg 11, line 241: '... in **the** other three seasons.;
- pg 12, lines 253-255: re-phrase this sentence as it doesn't make sense
- pg 13, line 289: **processes**
- pg 14, line 299: remove **part** and **was** ('... implying most of the CDOM for the seven inland lakes originated from ...')
- pg 15, line 316: '... collected in August 2013 **were** reduced...'
- pg 15, line 320: change flood to **floods** or **flooding**
- pg 15, line 329: insert comma after February 2014
- pg 16, line 336 and 338: activities should be activity
- pg 16, line 338: A word is missing here, perhaps could? ('... there **could** still be ...')
- pg 16, line 340: change matters to matter, and then were to was
- pg 16, line 342: cumulated should be accumulated
- pg 17, line 357: change melt to **melted**
- pg 17, lines 371-375: I do not understand this sentence — is it referring to the whole study period (June 2013 to April 2014)? Also, the data in table 3 do not average to 31.66 mg/L so it's not clear to me where these concentrations are coming from. The next sentence seems out of place and is unclear (what does 'it' refer to?).
- pg 17, line 376: change averaged to average
- pg 18, line 381-384: I think these three sentences could be combined as one. ('Generally, ... a(350) is used..., a(280) is related..., and a(254) can used ...')
- pg 18, line 383: change character to **characterize**
- pg 19, line 412: changes should be change
- pg 20, line 440: insert **a** or **the** before PARAFAC (or change model to modeling)
- pg 20, line 446: add 's' to component and insert 'a' ('Components 1 and 2 exhibited **a** strong ...')
- Figure 1 caption: More details are needed here, including which panel shows which lakes and the abbreviations for the lakes.
- Figure 3 caption: Are the error bars one standard deviation? If so, this should be clearly indicated.