

## ***Interactive comment on “A systematic examination of the relationships between CDOM and DOC in inland waters in China” by Kaishan Song et al.***

**Kaishan Song et al.**

songks@iga.ac.cn

Received and published: 24 June 2017

The Authors mention in the text that using remote sensing for small ponds and lakes is problematic because of lack of appropriate remote sensing sensors. This may have been true some time ago (Palmer et al. 2015), but is not any more. Sentinel-2 imagery with 10 m spatial resolution is available globally. This kind of resolution is suitable for almost any pond, not speaking about lakes. Sentinel-2A data has been already used in mapping lake CDOM and DOC (Toming et al. 2016). Sentinel-2B was launched two months ago and is currently in testing phase. Meaning that in a few months 10 m spatial resolution imagery will be available with 5 days revisit time at the equator and

C1

about 2-3 day revisit time for most lakes in China. Besides that Landsat-8 imagery with 30 m spatial resolution is also available. There have been several papers recently showing the usefulness of Landsat-8 in mapping lake CDOM/DOC. Consequently, the image data is not a problem anymore. This strengthens the value of this research even more. I recommend to improve the remote sensing part of the manuscript showing that there is plenty of data available now free of charge with very high spatial and temporal resolution and your study will help to improve usefulness of this data at very local to global scales.

Response: the authors really thank Professor Kutser's valuable and very instructive comments. These valuable comments will be definitely helpful in revising the current manuscript, and the manuscript in preparation, which is mainly focused on establishing an algorithm with remotely sensed imagery data (e.g., Landsat OLI, Sentinel-2A, and Sentinel-3A/OLCI). For the current manuscript, the major objective is to examine the variation for the relationship between DOC and  $a_{CDOM}(\lambda_i)$ , which has the potential to be applied for DOC estimate in inland waters. As stated in the introduction section of manuscript, the regression model slopes may vary significantly for different water types that ultimately affect DOC estimated results. Thus, we mainly focus on the relationship between DOC and CDOM absorptions for different types of waters. As you may see that the two other reviewers both suggested to remove the remote sensing part since no algorithm were established specifically for each types of waters being concerned in this study. As aforementioned, your kind suggestions will definitely be incorporated in the manuscript in preparation, which is mainly focused on remote estimate of DOC concentration through the relationship between CDOM and DOC tracked in this study based on the optical classification of different types of waters. Thanks again for the very instructive comments.

SUVA is an important parameter used to describe carbon quality (e.g. in drinking water industry). Therefore, it is important to link remote sensing and SUVA more closely in the manuscript. Remote sensing of SUVA has been demonstrated at least in one recent

C2

paper cited several times by the Authors. I would recommend to add this reference in the 3.4 and strengthen the link between SUVA and remote sensing there.

Response: the authors really thank for the suggestions. Same like the responses to the exactly previous comments, the authors will retain the current manuscript major topic, and only focus on the relationship between DOC and CDOM, and the remote sensing part will be addressed in the manuscript in preparation. Thus, all your kind suggestions will be definitely incorporated in that manuscript, hope you could give more instructive comments on the ongoing one later on. Is there any information available for seasonal variability? At least in boreal zone CDOM decreases from spring to summer and then starts to increase again (e.g. Kutser 2012), but how about the CDOM-DOC or DOC-SUVA relationships? This would be a very interesting piece of information.

Response: thanks for the valuable comments, certainly, the attempts to examine the temporal variability between DOC and CDOM would be a very interesting piece of information, however, there only one visit for most of the waters being sampled. But, we have water samples collected in three river sections in weekly or bi-weekly time steps, which indicated that CDOM-DOC relationship (see Figure 5) may change with different rivers. The head water section shows higher regression slope, while river with certain amount of anthropogenic pollution will result in decreased regression slope value (Figure 5c, sample were collected in the Songhua River, which was polluted by sewage waters and other anthropogenic sources).

In general the paper is written well. There are some minor errors in names (e.g. must be Gulf of Finland not Finish Gulf in row 119) and some sentences can be modified, but the text is easily readable.

Response: the authors really thank for the valuable comments, these minor errors and some of the problematic sentences were corrected or rephrased in the revised manuscript, thanks again for the positive comments.

---

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2017-C3>

179, 2017.