

Interactive comment on “Deriving inherent optical properties and associated uncertainties for the Dutch inland waters during the Eagle Campaign” by M. S. Salama et al.

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Review of: Deriving inherent optical properties and associated uncertainties for the Dutch inland waters during the Eagle Campaign by Salama et al.

Reviewer: Emmanuel Boss, University of Maine.

This paper an algorithm is introduced and used to invert remote sensing data into inherent optical properties for two bodies of water in the Netherland together with their uncertainties.

I do not recommend this paper for publication at this stage due to the following reasons

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(detailed below).

General comments: I find this paper to be poorly written and confusing. I have a hard time to understand the underlying philosophy, which data is used for training the algorithm and which for validation and what IOP data the author have to compare with their inversion (except for SPM and chlorophyll to biogeochemical properties that represent concentrations but are not IOP per-se).

I do not understand why the authors use the IOCCG data set generated by Lee. Are these simulation applicable to the waters they investigate (these data were specifically used to look at open ocean environments where waters are deep and the atmosphere is relatively simple to deal with)? If the answer is yes please detail why it is so.

The uncertainties presented are not based on the full possible sources of error (e.g. atmospheric correction, adjacency effects, assumptions regarding relation of IOP and Rrs, assumptions regarding the semi analytical IOP model) and hence, I don't believe they represent the correct uncertainties (See Boss and Maritorena in the cited IOCCG report).

In (8) you invert for 5 parameters. How can you validate them with the data you collected? At best you can check that the inversion you use is consistent in SPM and chl with your measurements in the lake. The whole IOCCG report exercise dealt with inverting this data set with different algorithms. There is no need to duplicate it here. Here you may want to simply ask the question: Given the data we collected in the lake how well to IOP algorithm perform?

What are the uncertainties in your measurements of chl and spm? Table 1 suggests +/-0.5 for chl and +/-0.05 for spm is this correct?

Sec. 3: “The IOPs of each sampling site are computed from measured concentrations and published values of specific inherent optical properties for the Dutch lakes (Hakvoort et al., 2002)” Can you elaborate? Did you use IOPs measured in lakes? For

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what? Earlier you specified IOPs that were not based on measurements.

The 'assumption' that an $IOP = [\text{concentration}] \times \text{concentration-specific IOP}$ is not an assumption but a simple consequence of the Bouger-Beer-Lambert law. If that did not hold we would not be using spectrophotometers to do chemistry.

Figures 3 and 4 have too small of a text for readers to understand the content. Please enlarge.

Only one of your dataset has radiometry and in-water properties in the same time (ASD, SPM, chl). This is the only data set for which you can test your inversion wrt lakes. You can apply and compare your inversion to the IOCCG data set, yet, in this case, you are simply repeating the IOCCG, 2006, exercise. This may be valuable to show that your algorithm is consistent or even better than the other algorithms there. But this should be done SEPARATELY from the evaluation of its success with respect to Dutch inland waters. For the Dutch in-land water case the only data you should compare your results to are those collected IN the in-land waters.

Once you convince yourself and the readers that your algorithm works well relative to in-situ data then you can generalize to times where measurements are not available. But notice: your satellite remote sensing data are all taken when no in-situ data is available for comparison and that atmospheric correction is important in those cases (not in the ASD case). Since the atmosphere is usually 90% of the remote signal in the visible comparison between remote sensing and IN-SITU data needs to take place before one can declare the algorithm a SUCCESS. Until then your results are speculation regarding the likely success (some may call it an educated guess).

In short I do not believe that the results presented in this paper could be used to suggest a successful algorithm has been found for Dutch in-land waters that provide IOPs and their uncertainties. To convince me otherwise I will want to see the comparison with the in-situ data only and the uncertainties should be derived based on all sources of uncertainties, not just the inversion algorithm (that is the uncertainties in the assump-

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tions (e.g. the IOP shape chosen) and the input data need to be taken into account as well).

Dear Authors: I am often wrong. If you feel that I misunderstood your paper please feel free to contact me (emmanuel.boss@maine.edu) and I will more than happy to change my opinion if proven wrong.

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