Ocean Science
Discussions

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Interactive comment on "Experiments with the Secchi disk" *by* E. Aas et al.

Anonymous Referee #2

Received and published: 30 December 2013

Answers to given questions

1. Does the paper address relevant scientific questions within the scope of OS? YES

2. Does the paper present novel concepts, ideas, tools, or data? YES

3. Are substantial conclusions reached? YES

4. Are the scientific methods and assumptions valid and clearly outlined? YES

5. Are the results sufficient to support the interpretations and conclusions? YES

6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? NO

7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? YES

8. Does the title clearly reflect the contents of the paper? NO

9. Does the abstract provide a concise and complete summary? YES

10. Is the overall presentation well structured and clear? NO

11. Is the language fluent and precise? YES

12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? YES

13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? YES

14. Are the number and quality of references appropriate? ALMOST

General comment

The structure of text should be improved considerably, in order to make the manuscript more readable. In addition, it would be extremely helpful to better clarify along the way what is done and why.

Specific comments

p. 1834-1835, Motivation of the present study You provide some background information and explain briefly what you have done, but do not motivate the study or give hypotheses. Also explain in plain words already here the concepts "photopic" and "monochromatic".

p. 1844, rows 8-12 The theory is presented well and logically, and now you explain what you will be doing next. Yet, at this point it would be appropriate to justify why you have gone through such a vast chain of equations and what will you achieve through the next sections. Please do not refer to "the right hand side" or "the left hand side" of a long equation, but be more precise.

p. 1844, row 15 (and Figure 1) It seems you have some observations from the Kattegat

as well. If so, Kattegat should be mentioned here. In Figure 1, it might be useful to distinguish which data set / combination of data sets the observation points present.

p. 1844, row 16, sentence "...from the surrounding settlements." Please add reference.

p. 1844, row 20, sentence "...down to the pycnocline." Please add reference.

p. 1845, rows 1-14 I do not understand why Secchi depth ranges are presented here under "Data sets etc.", nor the relevance of such information, when the observations have been collected from different time-periods and times of year. I would remove this paragraph.

p. 1845, rows 15-27; p. 1846 and p. 1847, rows 1-8 Please provide more accurate information of the datasets: number of observations, number of stations, specify "different types of Secchi disks", the colours of the filters etc..

p. 1847, rows 9-28 (and tables 1a, 1b & 2) Also here, I find it confusing that some results from the data are presented here under "Data sets etc." – it would be easier for the reader if the two were separated. When presenting results, it would be helpful to refer to one of the datasets introduced earlier. Describe in more detail how the photopic sensitivity of the eye was determined.

p. 1848, row 11 In a similar whay as is done in the beginning of Chapter 5, it would be helpful for the reader to present also in the beginning of Chapter 4 in brief words what is done (perhaps even risking repetition).

p. 1849, rows 1-7 It seems you are presenting data from laboratory tests here? Also this data should be presented rather under Chapter 3. Otherwise the reader finds the procedure extremely hard to follow.

p. 1850, rows 5-8 (and table 3) Looking at the table, the reader assumes, that the coloured filters are used to observe the white disk, but this should nevertheless be confirmed in the table text.

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p.1850, rows 24-26 Again a new dataset is presented. If the dataset first introduced in Aas (2010) is used here to present new results, please introduce also this dataset in Chapter 3 with reference to the original paper. Or (as it seems), if you are referring only to results already presented in Aas (2010), please do not introduce the dataset again here.

p. 1854, rows 15-18 (and Figure 2) Extrapolating the non-linear function to values $Z_{D,white} < 2$, after removing all such values is not justified. Either remove the trend-line at low x-values or completely. Please also provide R^2 of trend-line.

p. 1856, rows 5-20 (and Table 4) You are presenting here a new parameter, Z_B, which has not been introduced in the list of acronyms (Table 10). The bowl has not either been mentioned in Chapter 3 where datasets and their collection is explained. When presenting A, B and B_0 of the linear relationship, the statistical significance should also be given.

p. 1857, rows 9-11 (and Figure 3) The fit of a broken trend-line should be tried as well. Visually it seems, that a line $Z_{D10cm} = Z_{D,30cm}$ would fit better at low values (for example <6m). Please also provide R^2 of trend-line.

p. 1857, rows 13-27 (and Figure 4) The fit of a broken and possibly also non-linear trend-line should be tried as well, and the one with best fit chosen. Visually it seems, that a line $Z_{D10cm,tel} = Z_{D,10cm}$ would fit better at low values. Please also provide R^2 of trend-line.

p. 1858, rows 14-17 (and Fig. 5) Please provide R^2 of fit.

p. 1861, rows 19-22 (and Fig. 6) Please provide R^2 of fit.

p. 1863, rows 21-23 and Table 8 For consistency of terminology throughout the paper, please use 'Secchi depth' instead of 'Secchi disk depth' also here.

p. 1864, rows 18-24 (and Fig. 7) Please also provide R^2 of trend-line.

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p. 1865, rows 11-13 (and Figure 8) To help the reader, explain what is Zq and p also in the figure text. Please also provide R2 of trend-lines.

p. 1865, rows 20-27, p. 1866, rows 1-5 (and table 9) What is the justification for using 1/ZD as explanatory variable (x) instead of the response variable (y)? As you state here, chl and TSM are not optical properties but matter causing attenuation (or proxy of such matter, in the case of chl), and thus logically not functions of 1/ZD (Preisendorfer, 1986, 1st law of Secchi disk). Instead of regarding these parameters separately, one might test their combined effect – yet acknowledging the other important parameters such as CDOM (as indicated in p. 1848, rows 1-10). In figure text, for consistency of terminology throughout the paper, please use 'Secchi depth' instead of 'Secchi disk depth' also here.

Interactive comment on Ocean Sci. Discuss., 10, 1833, 2013.