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Ocean Science
Discussions

Interactive comment on "In situ determination of the remote sensing reflectance: an inter-comparison" *by* G. Zibordi et al.

Anonymous Referee #1

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General Comments:

The paper describes an inter-comparison of different methods and setups to determine the remote-sensing reflectance from radiometric measurements like downward irradiance and downward and/or upward radiances. Four different systems are compared, two in water and two above water systems, that are commonly used for this kind of measurement. The methods and systems as well as the sources and extent of related uncertainties are described in much detail. The final result is that the overall differences of the systems/methods when compared to a reference system (WHISPER, which is thought to be the most accurate) are in the range of the overall uncertainties of each system. The paper is written ambitiously with respect to the description of each measuring system, the related uncertainty and the basic results, but might be

difficult to follow for reader not familiar with this kind of measurements due to the use of many different variables and to a few unnecessary recapitulations. Some changes are proposed in the following.

1.) A table or list of all variables and abbreviation used would be useful. I got often confused by a variable used with different subscripts and had to look back for to check the meaning, consulting a table would make this more easy

2.) The summary of the source of uncertainty for each system is often nearly the same for very similar systems (e.g. TACCS-S and TACCS-P, and TRIOS- E and TRIOS-B, and hence redundant.) The descriptions can be done more efficiently by avoiding recapitulations; this would also reduce the number of pages considerably.

3.) The same recapitulation can be found in the tabulated uncertainty values for each system. Very often the tables even show the same values as the instruments have the same source of uncertainty. This could also be done more efficiently. In the extreme case all values of all systems could be presented in one table. But at least the values for the same infrastructure could be combined, e.g. one table for TACCS and one table for TRIOS.

Minor changes and corrections.

page 789, line4-5: not sure what "satellite ocean color" mean (semantically), just say "ocean color"

page 793, line11: the meaning of Kl(lambda), as well as Ku.. and Kd.., are not described here

page 795, line 1: how are R(..,W) and R0 calculated, or give a reference.

page 795, line7: ta (aerosol optical thickness) is derived from what? Later in the text (page 799) you mention that it was measured by the sun photometer. Is this true here as well?

page 795, line 18: do you mean “at a distance of 7.5 m away from. . .” or such?

page 796, line 11-14: What is the influence of taking a and c into account for the calculation? How big would be the error when this would be ignored?

page 797, line20-21: correct to read either “ an Lu sensor”, or “ an upwelling radiance, Lu, sensor”, and, correct to read “ at a depth z0 of 0.5m and a chain. . ..”

page 798, line 6: do you mean the variability “of Ed is no greater than 2.5%”, instead of range?

page 798, line 9-10: Use of “respectively”! Flip Lu and Ed! At the moment you are saying averaged Lu is determined from Ed values!

page 798, line 9-17: To be consistent with the description of TACCS, see line 3 this page, use always zi instead of just z for Ed values when appropriate.

page 798, line 12: What is Kl?

page 798, line 18: Do you mean “deeper” depths?, Not sure what is correct english here.

page 799, line 8: you mean “ed(zi, lamda, t), “zi”!

page 799, line 19: How were a and c measured?

page 799, line 23: You mean “phase function of scattering”?

page 800, line 18: change to read “geometrical effects estimated from simulations, assuming:”

page 800, line 18: Do not understand what “ relative sun-sensor of 180°” means !

page 801, line 5-9: 1) These sentences need to be corrected. 2) Was there a tilt sensor on the TACCS-P?

page 801, line 20 ff: To make it more easy to read change to: “where Ed(. . .) indicates

data uncorrected for tilt, and f(..) is given by”

page 802, line 1: change to read “the apparent angle of the sun to the collector plane of the irradiance sensor”

page 802, line 2: Change to read “This correction, however, only applies to a tilt less than 8°. . .”.

page 802, lines 6-25. This is very much the same as on page 800 and should be shorten considerably.

page 803, line 20: What is D? From where did you get it (reference?)

page 803, line 20: What is Lwn(lambda)? Lw was introduced earlier, but not Lwn.

page 805, line 8-9: should this be “and consequently do not significantly impact. . ..”

page 805, line 14-15: omit “radiance” and “irradiance”!

page 806, line 16: What is alpha? Just a correction factor.

page 809, lines 11-15: Again this is the same as on page 807. Please shorten.

page 813, line21. Change to read “High-Performance Liquid Chromatography”

Table 2-7: Table 2-7 can be combined to either one or two (1. in water, 2. above water systems) tables.

Figure 2-4: the results might look better and closer to the 1:1 line if a compact symbol (small filled circle, or dots) is used instead of an open circle.

Interactive comment on Ocean Sci. Discuss., 9, 787, 2012.