

## ***Interactive comment on “Expanding understanding of optical variability in Lake Superior with a four-year dataset” by Colleen B. Mouw et al.***

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This is a useful dataset contribution, providing a valuable and comprehensive set of observations of optical properties in Lake Superior. The manuscript is well-written and the methodology is clearly described. The results provide a reasonable, high-level overview of the dataset, which will benefit future efforts to build on these findings.

The manuscript could be improved by providing a more explicit acknowledgement of data limitations and issues affecting data quality. The use of the sodium hypochlorite procedure for bleaching of pigments has been reported to result in decline of the non-pigment detrital organic absorption contribution (e.g., Mitchell et al., 2002). However, it is the preferred method for inland waters due to resistance of some cyanobacterial

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pigments to methanol extraction, which is the other conventional method used. A recent paper by Stramski et al. (2015) points out some potential issues with the T-R method that should be acknowledged. It might be appropriate to report absorption as determined by both the T-R method and the standard transmittance (T) method for comparative purposes. Sosik (1999) noted that storage of particulate absorption samples at -80degC may result in changes in absorption properties in the UV portion of the spectrum. Fluorometric chlorophyll analyses are subject to larger measurement errors than HPLC chlorophyll analyses (Van Heukelem et al., 2001). The manuscript also requires careful editing for grammatical corrections (see below).

Provided the authors include an acknowledgement of these data limitations and associated references, and address the additional comments, I recommend the manuscript for publication.

Specific comments:

Results: Using past tense for verbs referring to previous actions is preferable. For example, "Data are collected" should be "Data were collected" in line 245 and "Collection is aimed" should be "Collection was aimed" in line 246. Similar adjustments should be made to verb tense when referring to past actions throughout the remainder of the Results section.

Lines 271 and 311: Correct spelling should be "discrete", not "discreet".

References:

Mitchell, B.G., Kahru, M., Wieland, J. and Stramska, M. (2002). Determination of spectral absorption coefficients of particles, dissolved material and phytoplankton for discrete water samples, pp. 231-257. In: Mueller, J. L., Fargion, G. S. Fargion (eds.) Ocean optics protocols for satellite ocean color sensor validation, Revision 3, Vol. 2. Greenbelt, Md.: National Aeronautics and Space Administration, Goddard Space Flight Center, NASA Tech. Memo 210004.

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Sosik, H. (1999) Storage of marine particulate samples for light-absorption measurements. *Limnology and Oceanography* 44, 1139-1141.

Stramski, D., Reynolds, R.A., Kaczmarek, S., Uitz, J., Zheng, G. (2015) Correction of pathlength amplification in the filter-pad technique for measurements of particulate absorption coefficient in the visible spectral region. *Applied Optics* 54, 6763-6782.

Van Heukelem, L., Thomas, C.S., Gilbert, P.M., Fargion, G.S., McClain, C.R. (2002) Sources of variability in chlorophyll analysis by fluorometry and high-performance liquid chromatography in a SIMBIOS inter-calibration exercise. NASA/TM-2002-211606. Greenbelt, MD: NASA.

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