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***Interactive comment on* “Variation of phytoplankton absorption coefficients in the northern South China Sea during spring and autumn” by J. Wu et al.**

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Comments on the manuscript entitled: “Variation of phytoplankton absorption coefficients in the northern South China Sea during spring and autumn”.

This is the first time I have participated in an open discussion about a published article. I have raised a few points and made some comments that I hope will be valuable to the authors and readers.

This article discusses the temporal and spatial variation of phytoplankton absorption at 440 and 675 nm based on measurements collected during two cruises in the China Sea. The first cruise took place in May 2001 (spring) and the second one in November

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2002 (fall).

The presence of a river mouth in the vicinity of the study area adds some value to the dataset. First, the study confirms that small cells are dominant in deep stratified waters (outer shelf of the study area) whereas larger cells favour well mixed nutrient-rich coastal waters (although no nutrient data were available) as is frequently reported in literature. This work also showed that phytoplankton community structure changes rapidly with environmental factors, which in this case was intense precipitation with the consequence of river run-off, as demonstrated by the change in surface salinity at the mouth of the river.

I disagree with the author's statement page 1557 line 11, "while random variation occurs in different regimes". I do not think that variations in phytoplankton absorption are "random" but rather that they reflect changes in pigment composition of the phytoplankton community or reflect physiological responses and adaptation to changes in physical environments (light, nutrients, temperatures, etc.).

It is detrimental to the study that the authors limited their analysis of the dataset to the blue/red absorption ratios, as well as phytoplankton absorption coefficients at 675 nm and the shift of the absorption peak in the blue, while the entire spectrum is available for examination. Since pigment concentration were not measured, it would have been informative to examine different ratios such as 490 to 550 as several studies have shown a strong correlation between these ratios, and the relative concentration of carotenoids such as fucoxanthin and 19'-hexanoyloxyfucoxanthin. As the authors pointed out in the introduction, it would have also been interesting to analyse the chlorophyll-specific absorption coefficients, which can infer information about cell size.

The difference between the fitted parameters for Carder's phytoplankton absorption model with the original ones is not surprising since the data used by Carder et al. were collected in the Arabian Sea and the Gulf of Mexico (case 1 waters). It would have been interesting to see comparison with models developed using global datasets, such as

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Bricaud et al. (2004) and Devred et al (2006). Also fits were performed on a rather small number of data. It would also be useful to have more statistical information on the fit such as p-values for the retrieved parameters to test the significance of the fit.

Finally, as acknowledged by the authors, it is difficult to draw seasonal conclusions with only two cruises. A time series would allow a better understanding of the entire system but this preliminary study is nevertheless important in the development of local algorithms to account for the regional specificity of the optical properties. For remote-sensing applications, the challenge remains in identifying the various “optical” regions, applying the proper algorithm and dealing with operational problems such as discontinuities at boundaries.

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