Piotr Kowalczuk
Institute of Oceanology
Polish Academy of Sciences
Ul. Powstańców Warszawy 55
PL – 81 - 712 Sopot

September 9, 2013

Annick Bricaud, Associate Editor
Natascha Töpfer
Copernicus Publications
Editorial Support
Biogeosciences

Attn: Review of the manuscript by Zhang, X. Y., X. Chen, H. Deng, Y. Du, and H. Y. Jin entitled "Absorption features of chromophoric dissolved organic matter (CDOM) and tracing implication for dissolved organic carbon (DOC) in Changjiang Estuary, China" submitted to Biogeosciences and coded bg-2013-278.

Dear Dr. Bricaud,

After reading several times the manuscript by Zhang et al., submitted to Biogeosciences and coded bg-2013-278, I recommend to do not consider this manuscript for publication in this journal and **reject it**.

General opinion

Author have ambitious goal to link the DOC discharge of the largest river in Asia with $a_{CDOM}(355)$. The concept of using optical proxies for study important part of the carbon pool in the biosphere has originated in early 80'ties in XX century. The usefulness of this approach has been proven by numerous field studies around the world in the last 30 years. The general conclusion of these studies can be summarized by following: i) there is no general global relationship between CDOM absorption and DOC, ii) local and regional relationships between those two parameters can established if there is a mutual gradient of those parameters from the source to the sink, iii) the conservative mixing is a dominant variability driver of these parameters, iv) the intensity of non-conservative process is minor compared to conservative mixing, v) the scales of seasonal, annual and inter-annual variability of both parameters is known.

Based on these paradigms, I can say that authors effort in insufficient to resolve this complex task based on only 4 field surveys, that are not coherent spatially and temporally, and based on only 47 field samples.
The experimental material collected by author is not even sufficient to establish a reliable and statistically significant mixing model of studied parameters between terrestrial source and oceanic sink. The quadratic fit between aCDOM(355) and salinity is statistically insignificant $R2 = 0.075$ (explains less than 1% variability in data set). Statistical results of the linear mixing model are much better but its significance is undermined by small number of data points and a big gap in the data sets in the salinity range 0-10.

To resolve seasonal variability in the study area the field surveys must be carefully planned according to intensity of periodic occurrence of the natural climatic phenomena that control the hydrologic cycle of the river (which is primary source of CDOM and DOC) and physical forcing of the physical and biological processes in the coastal ocean, which a primary sink. To collect enough data selected transect must be sampled periodically over at least 2 full seasonal cycles. Authors have attempted recognize the coastal currents systems, but did forget about another forces that governs the mixing in the estuaries – tides. Authors did not mention at all hydrological cycle of the largest river in Asia, which is under influence of monsoon cycle in the lower part of the watershed and has typical temperate continental climate in the upper watershed. The Yangtze River watershed is also frequently impacted by episodic events like typhoons. Authors did not consider this as important factor that could distort the seasonal and annual hydrologic cycle. Therefore in is extremely important to planning the field survey when there is a period of maximum flow of the river and how the flow regime impacts the quality and quantity of DOM. The quality of DOM has a big impact on the $a_{\mathrm{CDOM}}(\lambda)$ and DOC relationship.

In summary I must say that relationship between $a_{\mathrm{CDOM}}(\lambda)$ and DOC in such complex environment cannot assessed with statistical reliability based on only 47 samples. For this reason this paper shall not be published in such highly ranked and prestigious journal.

There are also many technical and compositional errors e.g. presenting the spatial distributions of collected data ranked by station name, or number but not by real distance from the source. This presentation, that distorts the spatial dimension in data variability, is typical for student BS projects not for matured scientific paper.
Because the scientific significance of the work is so low, I will not present my full detailed review, as it would be almost as long as presented manuscript.
I do encourage authors to continue their work in the study area and use already collected data set as a pilot study. Authors shall reconsider their sampling strategy and back it with existing knowledge on river hydrology and seasonal and annual climatic variability in the watershed and influence of episodic events on subject of their study.

Best regards,

Piotr Kowalczuk