

## ***Interactive comment on “Strong linkages between surface and deep water dissolved organic matter in the East/Japan Sea” by Tae-Hoon Kim et al.***

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Received and published: 24 March 2017

Dear Editor and Reviewer

Thank you for sending the reviews of our manuscript (original ms#: bg-2017-8) entitled "Strong linkages between surface and deep water dissolved organic matter in the East/Japan Sea". Our response to each point suggested by the third reviewer is as follows:

My most significant concern is that the concluding sentence, regarding the potential decrease in DOM sequestration in the deep ocean with decreasing rates of deep-water formation, is not supported by the observations; this study did not document rates of deep-water formation nor how DOC concentrations have changed through time. The degradation index or %THAA are not precise enough metrics to be able to draw this

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conclusion.

=> Although the potential decrease in DOM sequestration in the deep ocean was not directly predictable from the atmospheric warming trend, Such a change could be associated with the instability of the interior water masses. In the revised version, we added data of sea surface temperature and air temperature from 1932 to 2009 in the East/Japan Sea in order to explain linkages between storage of bioavailable DOM and climate change. We stated that "The increasing trend in average annual sea surface temperature and average winter sea surface temperature near Vladivostok, the most northern part of the Japan Basin, was synchronized with the warming trend (2oC) of winter air temperatures (December – February) from 1932 to 2009 in the EJS (Fig. 7)".

Section 3.2, lines 23-30: It's not clear that THAA's were preferentially consumed with depth, especially as a fraction of the DON pool. Statistics should be used to evaluate whether the decrease with depth is significant.

=> In the revised version, t-tests were done in order to compare the yields of amino acids between the surface and deep waters. We stated that "DOC-normalized yields of THAA (%DOC) between the surface waters and deep waters showed a significant difference ( $p < 0.05$ ), however, DON-normalized yields of THAA (%DON) presented no significant difference ( $p = 0.41$ )".

Minor Comments: Line 3: Specify that N:P implies  $\text{NO}_3\text{:PO}_4^{3-}$ . As written it is somewhat ambiguous since the study focuses on organic nutrients.

=>In the revised version, "N:P ratio" was changed to "DIN:DIP (dissolved inorganic phosphate) ratio".

There is some redundancy regarding pigments and cyanobacteria – this is stated at least 3 times, and is probably unnecessary.

=> corrected as suggested in the revised version.

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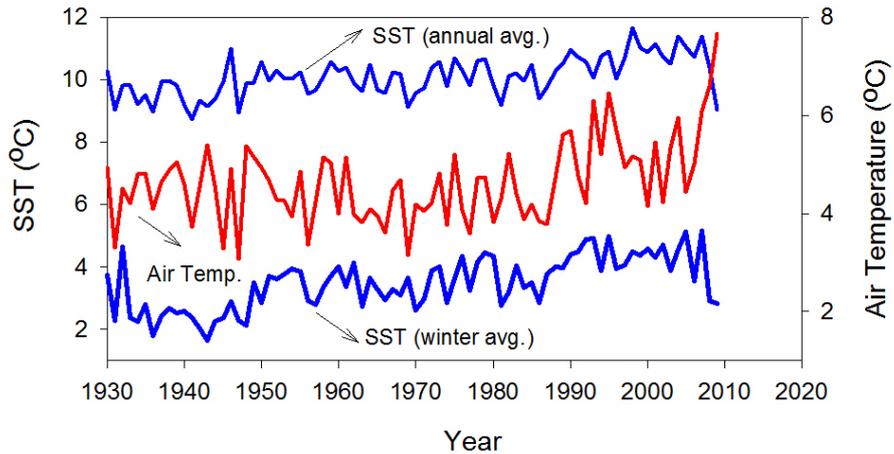


Fig. 1. Figure 7

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