We thank all positive and constructive comments from reviewers. Here all responses (point-by-point) are provided using blue color and after the mark "Answer:", with original comments provided in plain text. The revised sentences and contents (the blue portions) are incorporated in the revised manuscript.

Response to Referee #1

General comments: This paper reports the direct measurement of POC fluxes and primary production in the East China Sea and applied a vertical mixing model to correct the effect of bottom sediment resuspension, which representing a huge challenge in the constraint of POC fluxes in a continental margin due primarily to the dynamic nature of these systems. In my opinion, the data are valuable and could constitute a welcome addition to the global database even though the study is regional in scale. While I believe this paper should be ultimately published, I have a series of concerns/suggestions listed below. The biggest issue is the application of the vertical mixing model which is a selling point for this paper. However I can not comment on the validity of the model because there is not enough information presented here to make a good judgment. From table 2, the big difference between the model-derived Cs and the measured Cs suggested the unreasonable extrapolation for this model. The assumptions that go into the model should be examined rigorously to scale its validity.

Answer: In order to validate the vertical mixing model, we also used additional evidence, rare earth elements such as Eu to examine possible contribution of resuspended sediments on POC flux (see below).

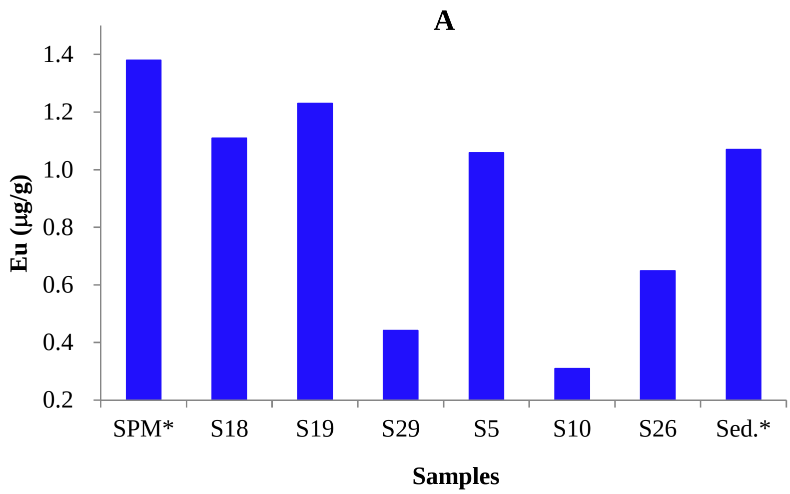
Rare earth element

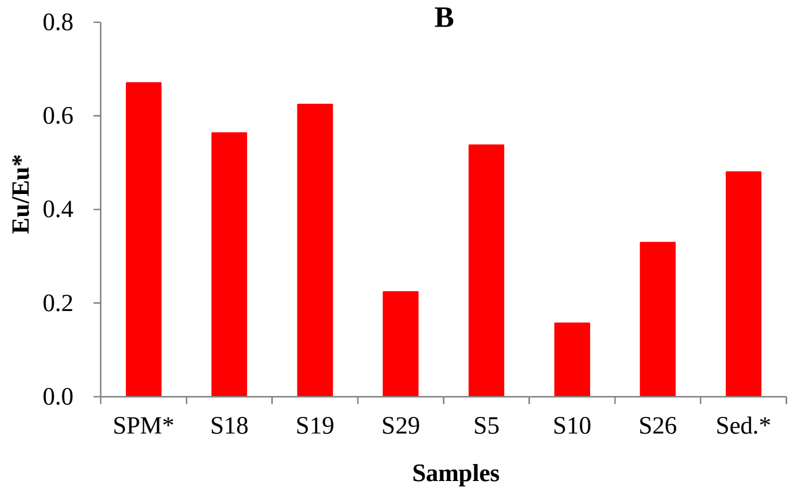
Some rare earth elements (REEs) such as light rate earth elements (LREES) have been used as proxies to evaluate sediment sources in numerous settings (Goldstein and Jacobsen, 1988; Sholkovitz et al., 1999; Li et al., 2013). Most LREES (see table below) in this study have difficulties to distinguish suspended particles from sediments based on their levels, but Eu concentrations in particles seems to be a good tracer due to remarkable differences between suspended particles and sediments. Therefore, we used the Eu anomaly (Eu/Eu*) (Eu*: was estimated by linear interpolation between Sm and Tb on the chondrite-normalized curve) to identify possible end-members (suspended particles and sediments) that contribute to sinking particles in this study. For example, the (Eu /Eu*) anomaly on the sediment and suspended particles off the Yangtze River (Changjiang) mouth (near station 19) were 0.48 and 0.67, respectively. The value of Eu/Eu* in the sinking particles at station 19 were 0.62. If a two end-member mixing model is used to estimate the contribution of suspended and sediment on sinking particles, the fractions of suspended particles and sediment will account for 74 % and 26% of sinking particles, respectively. The result suggests that R/T (0.26) is significantly lower than the estimated value (R/T =0.93) by using TSM-OC mixing model. This approach may not truly reflect resuspension value in this study because the Eu anomaly value should be from this study rather than from an estimated value 10 year ago (Yang et al., 2003). Moreover, particularly in shallow areas the dynamics of sediment settling and resuspension can be highly dependent on the seasonal and interannual changes of Changjiang discharge which may affect the Eu anomaly value. Furthermore, we should provide Eu values in both suspended particles and sediments, while the rare earth elements in this study were not available due to the fact that we were using GF/F. Overall, the fractions of REE are a potential approach to evaluate the possible contribution of suspended and resuspended particles in marginal seas where a large river empties into it.

Table 6 Concentrations of light rare earth elements in the sinking particles, sediment and suspended matter (SPM) in the East China Sea.

Station	La	Ce	Pr	Nd	Sm	Eu	Gd
	(μg g^{-1})	(μg g^{-1})	(μg g^{-1})	(μg g^{-1})	(μg g^{-1})	(μg g^{-1})	(μg g^{-1})
S18	40.87	72.44	6.77	35.18	5.37	1.11	5.61
S19	44.29	78.94	7.86	40.40	6.25	1.23	6.18
S28	4.17	4.86	0.24	0.46	ND	ND	ND
S29	17.92	31.27	2.85	14.44	1.63	0.44	1.47
S5	42.80	78.76	7.15	37.01	5.09	1.06	5.21
S10	11.04	21.99	1.84	9.84	1.20	0.31	0.98
S26	23.88	43.20	4.19	21.64	3.27	0.65	3.22
Sediment*	43.00	86.00	ND	44.00	6.00	0.89	ND
SPM*	44.00	85.00	ND	40.00	6.00	1.31	ND

*: the data of sediment and SPM were from the river mouth (near station 19) of Yangtze River in Yang et al. (2002).
ND: no data.

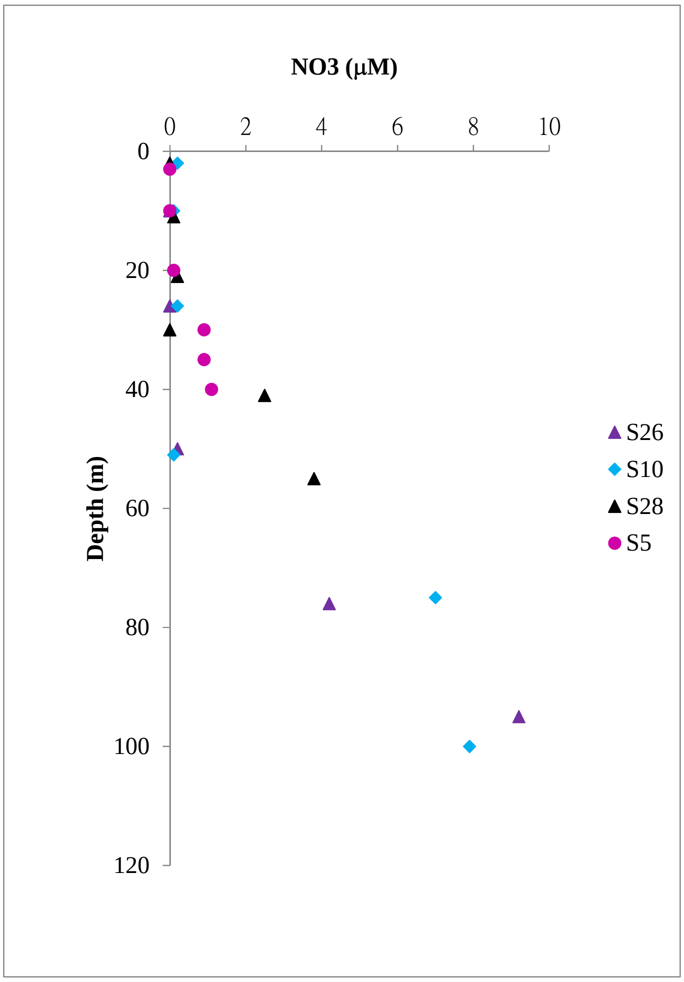




Specific comments:

1, section 3.1 (page 4276) “An interesting phenomenon is that
at stations 5, 10, 26 and 28, maximum Chl a concentrations were always observed above the depth of the euphotic zone (Table 1) and decreased with increasing depth.” This should be slightly discussed within this paragraph.

Answer: OK. The deep Chl a maximum at stations 5, 10, 26 and 28 was mainly caused by nutrient limitation in the surface layer (see figure below)



2, section 3.1 (page 4277) the
authors claimed that at station 18, POC at the lower depth were higher than at shallow depths. However this trend is not clear in Fig.3 for the absence of the data at the lower depth. Please indicate it.
Answer: Yes. Reviewer is right. POC distribution is not pronounced at station 18. We have revised it in the revised ms.

3, section 3.2 (page 4278) please specify the seasons for the
POC flux from Iseki et al., (2003). There is a big difference of the reported values for one station. Is it due to the seasonality or other reasons?
Answer: We have discussed the difference of POC fluxes between this study and the reported values from Iseki et al., (2003) in the revised manuscript.

4, section 3.3 (page 4278)
the authors claimed that one of reason for the low PP at S5 is light effect due to high TSM. However TSM of S5 is similar to other stations in the inner shelf. Why not light

effect in the other stations in the inner shelf?

Answer: We agree with the comment of reviewer that light effect is likely not a main factor affecting PP at S5. After checking the profile of nitrate at station at S5, the nutrient above the euphotic zone at S5 was very low (close to detection limit) so that the low PP at S5 is primarily due to nutrient limitation (see figure above).

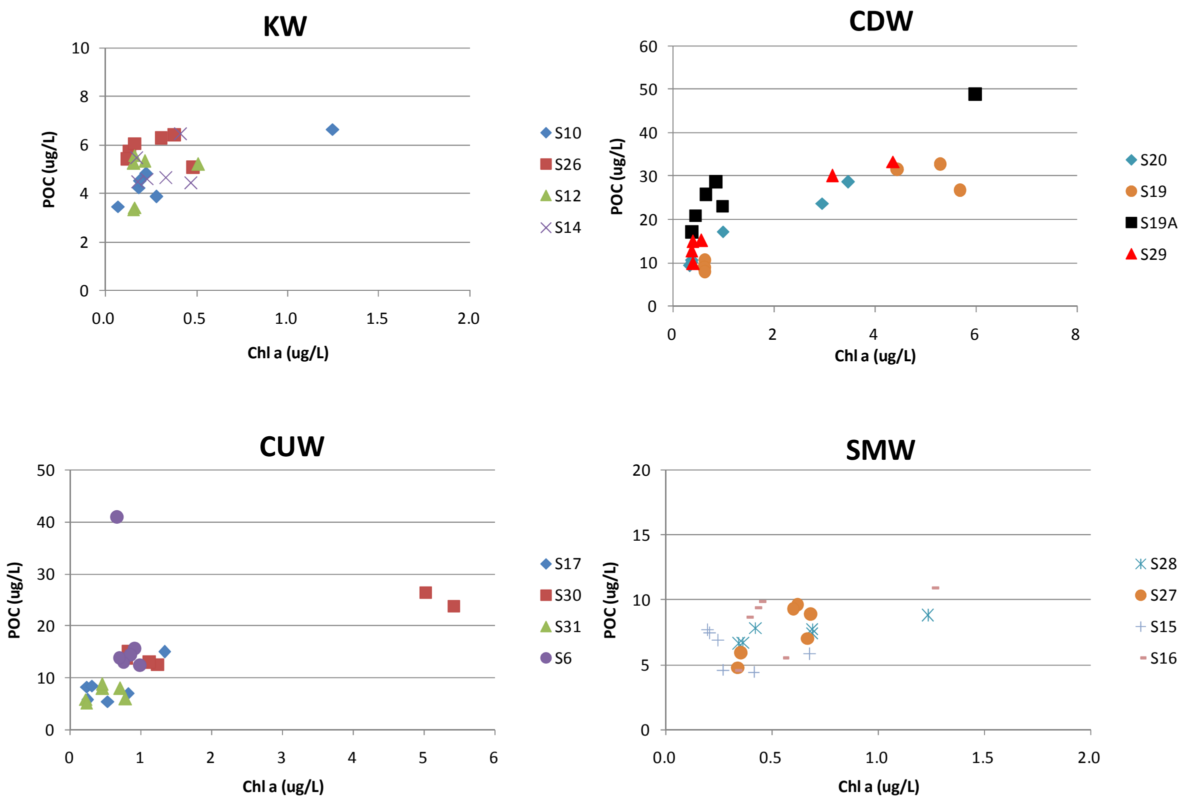
5, section 3.4 (page 4279) the sentence

"The measured POC values in the surface sediments in the ECS in this study ranged from 0.08 to 0.61% (an average value = 0.30_0.16 %)". This range is inconsistent with the values in table 2 (0.07-0.52). Please check and revise it.

Answer: The corrected OC data in the surface sediments in the ECS ranged from 0.07 to 0.52%. We have corrected them in the revised manuscript.

6, section 4.1 (page4281) the authors claimed that "It is reasonable to predict that in situ phytoplankton species composition and abundance are mainly responsible for production of POC, thus result in good correlations among these parameters in the ECS." How to draw this conclusion? It can be inferred from the relationship of POC and Chl a is that the production of POC might be affected by the phytoplankton activity. If the author could divide Fig 4a into the subset like Fig 5 and have different POC/Chl a values for different areas, it might be an indication of the effect of phytoplankton species composition on
the POC.

Answer: We did Fig 4a into the subset like figures below, but it is difficult to find good relationships between POC and Chl a in different water types (CDW, CUW, SMW and KW). Therefore, we revised our description as suggested by the reviewer.



7, section 4.1 (page 4281) How much the POC/Chl a changed with such a small change in the contribution of the main phytoplankton group to autotrophic carbon
(75-80%)? Please state it.

Answer: We agree that POC/Chl a ratio change will affect autotrophic carbon. However, it is difficult to estimate the POC/Chl a ratio affecting autotrophic carbon because we do not have the POC/Chl a ratio for each of the main phytoplankton groups in the ECS.

8, section 4.1 (page 4282) the last sentence in the last paragraph has not logical relationship with the former sentences that discussed about the possible impact of high POC flux in the inner shelf. It's ambiguous to mention table 1 in this sentence.

Answer: OK, we have deleted the ambiguous sentence.

9, section 4.3 (page 4283) the sentence "As a result, the POC exports in the outer shelf of the ECS are roughly 26 and 33 mgCm/2/ d, respectively." Did POC exports here mean the lateral transport out the outer shelf? If yes, please clarify it to avoid misleading. Also it might be interesting to roughly calculate the carbon budget in this area

Answer: The estimated POC export here means the lateral transport out of the outer shelf. Frankly speaking, it is difficult to calculate the carbon budget in this area because we only have two data points from the outer shelf.

10, section 4.4 (page 4284) the title for this section is “Possible carbon export in the outer shelf of the ECS”. However the authors also discussed the e ratio in the inner shelf.

Answer: Indeed, we have addressed the e ratio in the inner shelf, too. So, we revised the title of this section to “Possible carbon export in the ECS.”

11, table 3 the Cs comes from the average of the measured values. It would be better to delete “intercept ” to avoid misleading

Answer: OK

Technical corrections: 1) Page 4275, Line 22: “The PB-E” instead of “ThePB-E” 2) Page 4275, Line 24: add “.” after “light” 3) Page 4276, Line 4: “concentrations in” instead of “concentrationsin” 4) Page 4278, Line 20: delete “in later section” 5) Page 4281, Line 13: “abundance” instead of “abundant” 6) Page 4283, Line 20: please add the reference “Fang et al., 2007” in the bibliography 7) Page 4298, Fig. 1: “sampling locations (black dots) and hydrography” instead of “sampling locations (black dots) of hydrography” 8) Page 4300, Fig. 3: it would be helpful if the resolution of the figure would be improved; also more contrast colors would be welcome. 9) Page 4302, Fig. 5: Please delete the line below the figure for the clearness.

Answer: All typos, reference (Fang et al., 2007) and updated figures (Figures 3 and 5) have been corrected or revised.

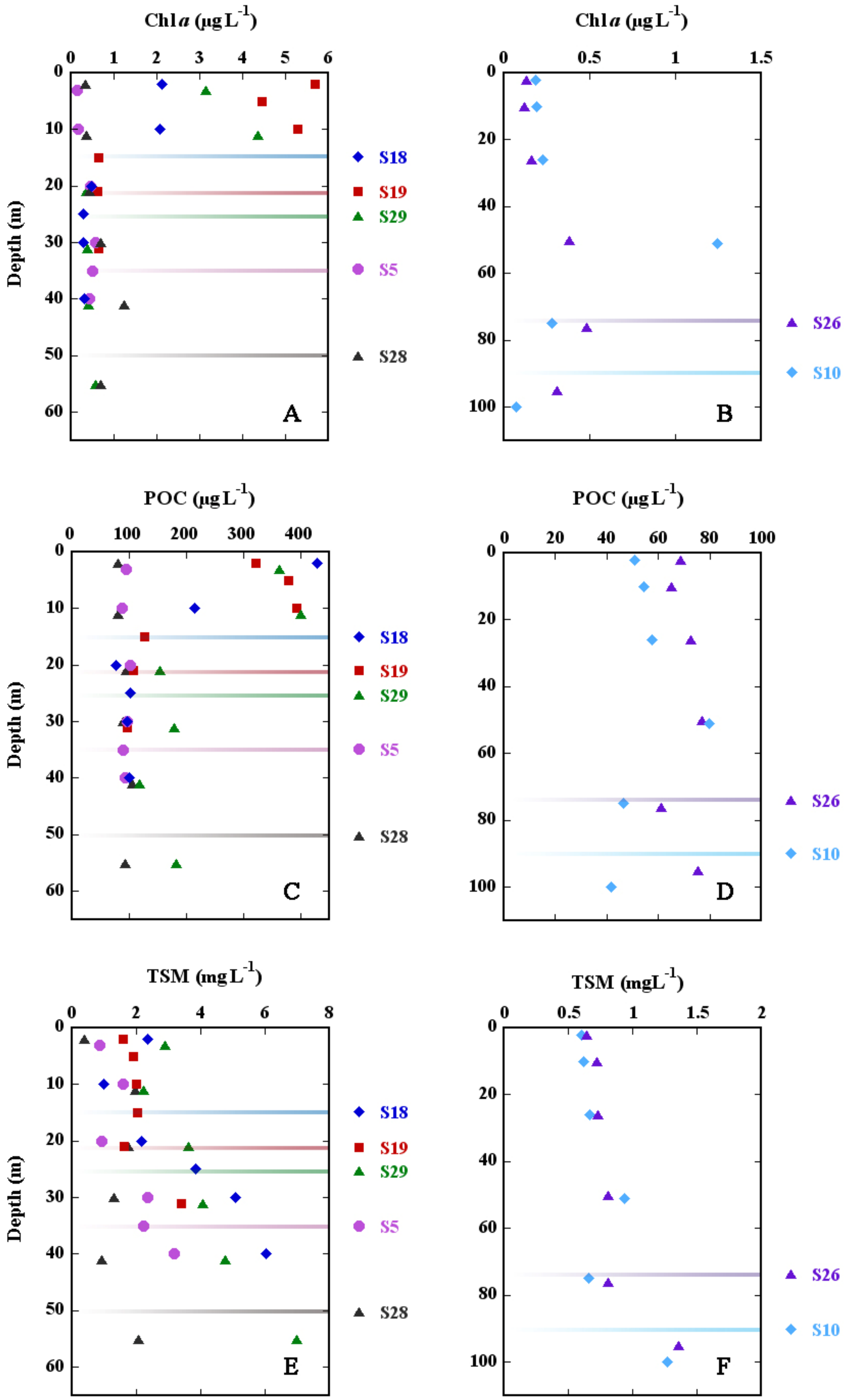


Fig. 3 Distributions of vertical Chl *a*, POC concentrations and total suspended matter

(TSM) concentrations in the inner shelf (S18, S19, S29, S5, and S28) and the outer shelf (S10 and S26) of the East China Sea. The different color lines indicate the depths of the euphotic zone at stations (S18, S19, S29, S5, S28, S26 and S10).

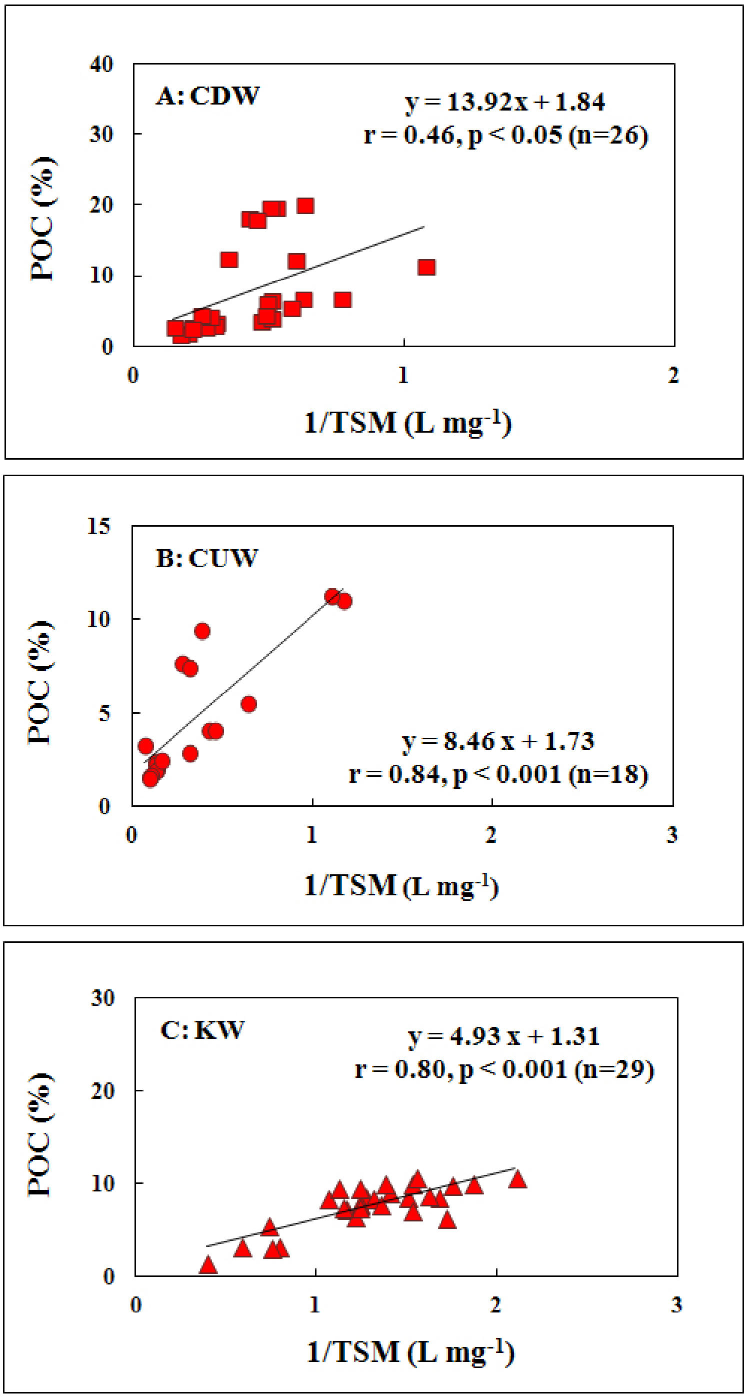


Fig. 5 (A) Relationships between POC (%) and 1/S (1/TSM) in the CDW of the ECS. (B) Relationship between POC (%) and 1/S in the CUW of the ECS.(C) Relationship between POC (%) and 1/S in the KW of the ECS.

Fang, T.H., Chen, J.L., Huh, C. A.: 2007 Sedimentary phosphorus species and sedimentation flux in the East China Sea. Cont. Shelf Res., 27, 1465-1476, 2007.