Biogeosciences Discuss., 9, C6478–C6489, 2012
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Biogeosciences Discussions

Interactive comment on "Interannual variability of surface and bottom sediment transport on the Laptev Sea shelf during summer" *by* C. Wegner et al.

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We thank both reviewers for their valuable and constructive comments.

Anonymous Referee #1

Suggestions and comments: The sampling period for the cross-shelf section depicted in Figure 4 was added to the figure caption and marked in Figure 7 with a grey-shaded area.

Stick plots of winds were introduced into Figure 7, as well as the current direction for periods with high bottom currents and high echo intensity. A discussion of wind and

current velocities at the times of maximum echo intensity was added and the "Discussions" was adjusted accordingly.

The aspect of wave action was taken into account and added. Applying the only available wave parameters from Timokhov (1994) and Pavlov et al. (1996) suggest that waves during the ice-free conditions generally start to strongly influence the bottom only up to about 4 m water depth (Wegner et al., 2005). All studied stations were in water depths > 15 m. Thus, the influence of waves for sediment transport processes is assumed to be moderate for this study.

Minor comments Abstract: The minor comments regarding the punctuation were changed.

Introduction: In the paragraph on the Laptev Sea shelf hydrography the strong seasonality of riverine input and the timing of peak flows of Lena River in June was added.

Material and Methods: The expedition dates were specified within figure caption 1. The sampling period for the cross-shelf section depicted in Figure 4 was added to the figure caption and marked in Figure 7 with a grey-shaded area (see "suggestion and comments").

Current directions were added to Figure for the peaks in echo intensity when most sediment transport is assumed to take place and mentioned within "Results".

References for both silicate methods were added (Oradovsky, 1993; "Skalar" methods (US Environmental Protection Agency, 1983)). Unfortunately no documented comparison of both silicate methodologies is available. Orthographic changes page 13059 line 23 were made.

Discussion Orthographic changes page 13066 line 23-25 were made.

Figures Generally the labelling of all figures was enlarged.

Figure 1: The symbols for those stations which have been sampled both years were

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changed in a way to make it more obvious for the reader. The line marking the x-shelf section was made darker.

Figure 7: Time-series of one-day average wind speed and direction were added. Additionally current directions (one-day averaged u- and v-current components)were included for the peaks in echo intensity when most sediment transport is assumed to take place.

Detailed Comments: 1. In Figures 2 and 3 graphs d) and e) were plotted at the same scale. The authors introduced in “Results” a comparison of the summer to winter variability of mean SPM concentration at both stations. 2. The authors are aware of the problem that transferring the maximum depth of wave influence from the Beaufort Sea does not form a particularly solid argument for estimating the maximum depth for the Laptev Sea. The only available wave data are older (Timokhov, 1994; Pavlov et al., 1996). The transition of deep-water waves to intermediate waves and the shallow water wave transition have been estimated with the existing data. The results have been inserted into the text. 3. The described “reversal currents” are compensatory currents caused by wind-induced sea-level deformation after periods of strong southerly winds. This section has been rephrased to avoid misunderstandings.

Anonymous Referee #2

Technical Aspects: Page 13055: Orthographic changes were made. The sea ice minimum in 2012 was added.

Page 13058: Orthographic changes were made.

Page 13059: Orthographic changes were made. Units were aligned.

Page 13062: The section distances from Figure 4 were added in order to make it easier for the reader to follow the description in Figure 4. The units were aligned. The data were in μmol l-1 already but the wrong unit was written down.

Page 13065: The number of the current speeds are given in Table 2.

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References: Oradovsky, S.G.: Marine water hydrochemical analysis guide. St. Petersburg, Hydgometeoizdat, 1993, (in Russian).

Pavlov, V.K., Timokhov, L.A., Baskakov, G.A., Kulakov, M.Y., Kurazhov, V.K., Pavlov, P.V., Pivovarov, S.V., and Stanovoy, V.V.: Hydrometeorological regime of the Kara, Laptev, and East Siberian seas. Technical Memorandum APL-UW TM1-96, University of Washington, 179 pp, 1996.

Timokhov, L. A.: Regional characteristics of the Laptev and East Siberian seas: Climate, topography, ice phases, thermohaline regime, circulation. Rep. Pol. Mar. Res. 144, 15-31, 1994.

US Environmental Protection Agency: Methods for Chemical Analysis of Water and wastes, Cincinnati, Ohio. EPA 600/4-79/020, p. 460, 1983.

Wegner, C., Hölemann, J.A., Dmitrenko, I., Kirillov, S., and Kassens, H.: Seasonal variations in sediment dynamics on the Laptev Sea shelf (Siberian Arctic), Glob. Plan. Chang., 48, 126-140, 2005.

Please also note the supplement to this comment:
http://www.biogeosciences-discuss.net/9/C6478/2012/bgd-9-C6478-2012-supplement.pdf

Interactive comment on Biogeosciences Discuss., 9, 13053, 2012.

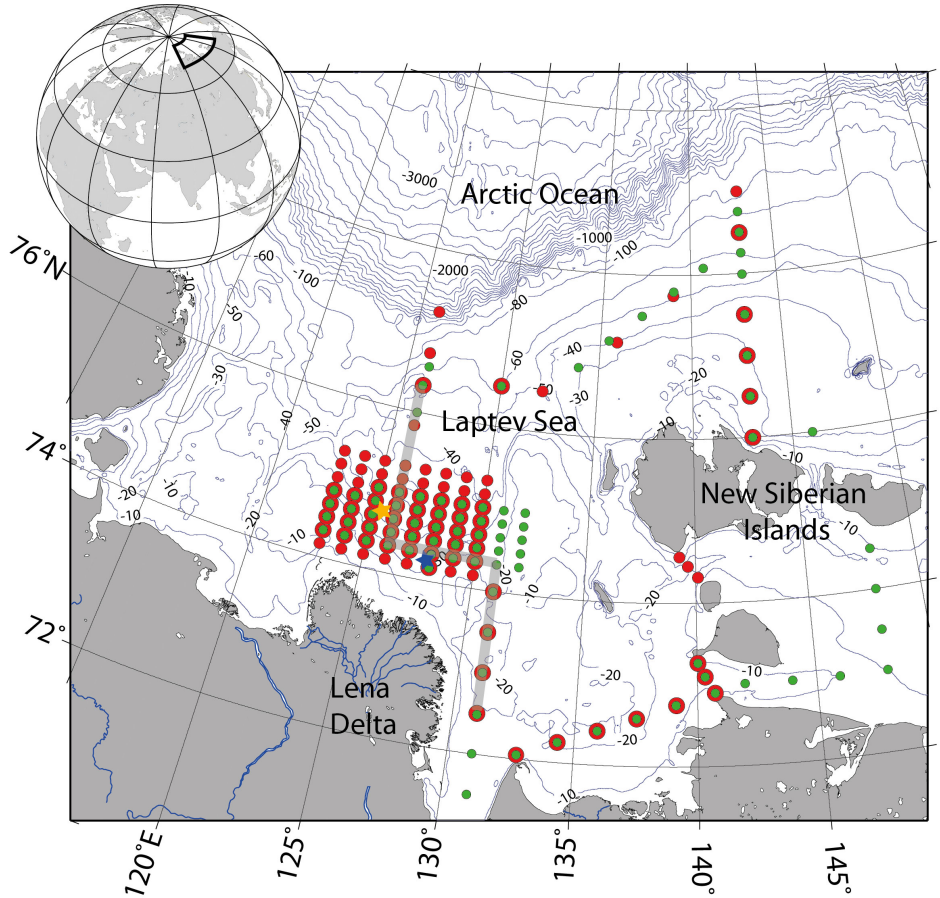

Fig. 1.

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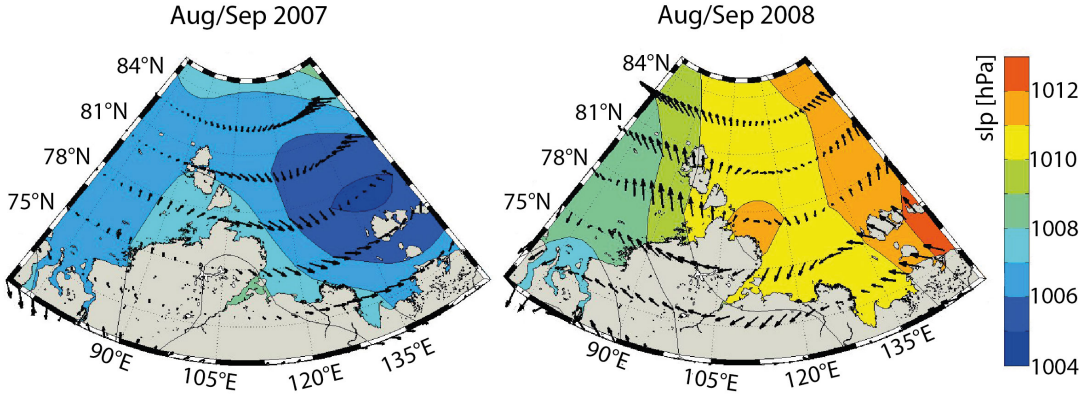

Fig. 2.

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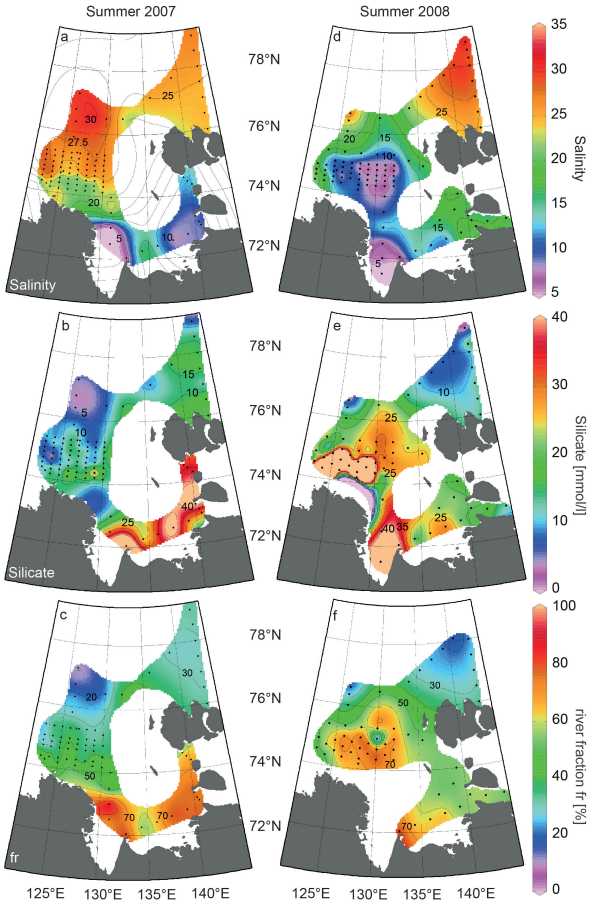

Fig. 3.

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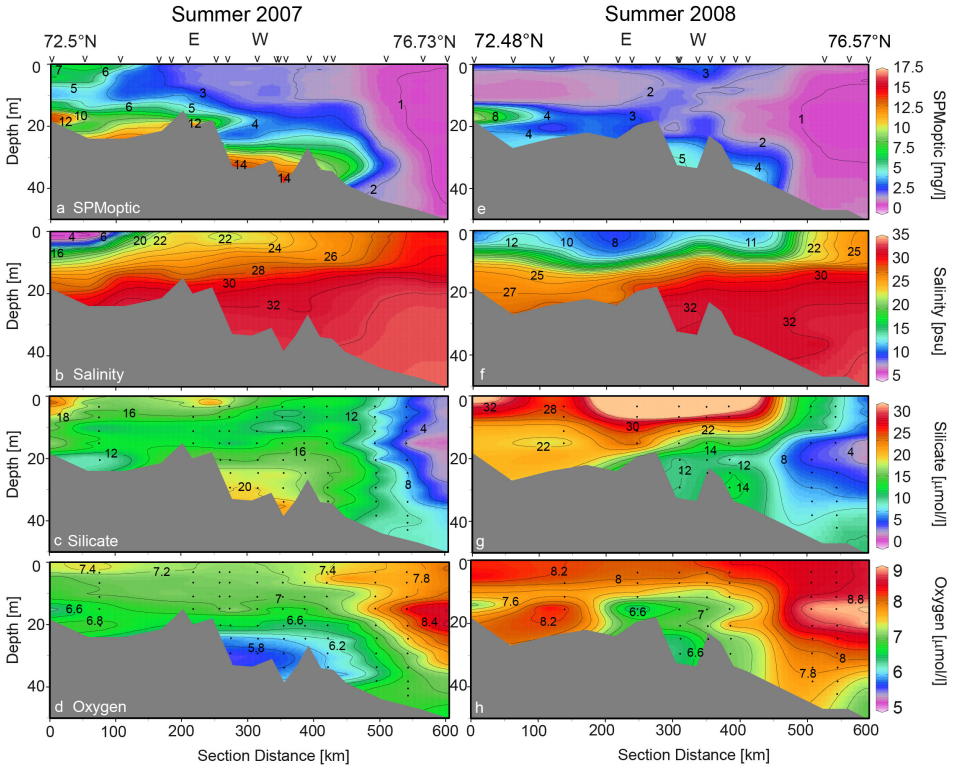

Fig. 4.

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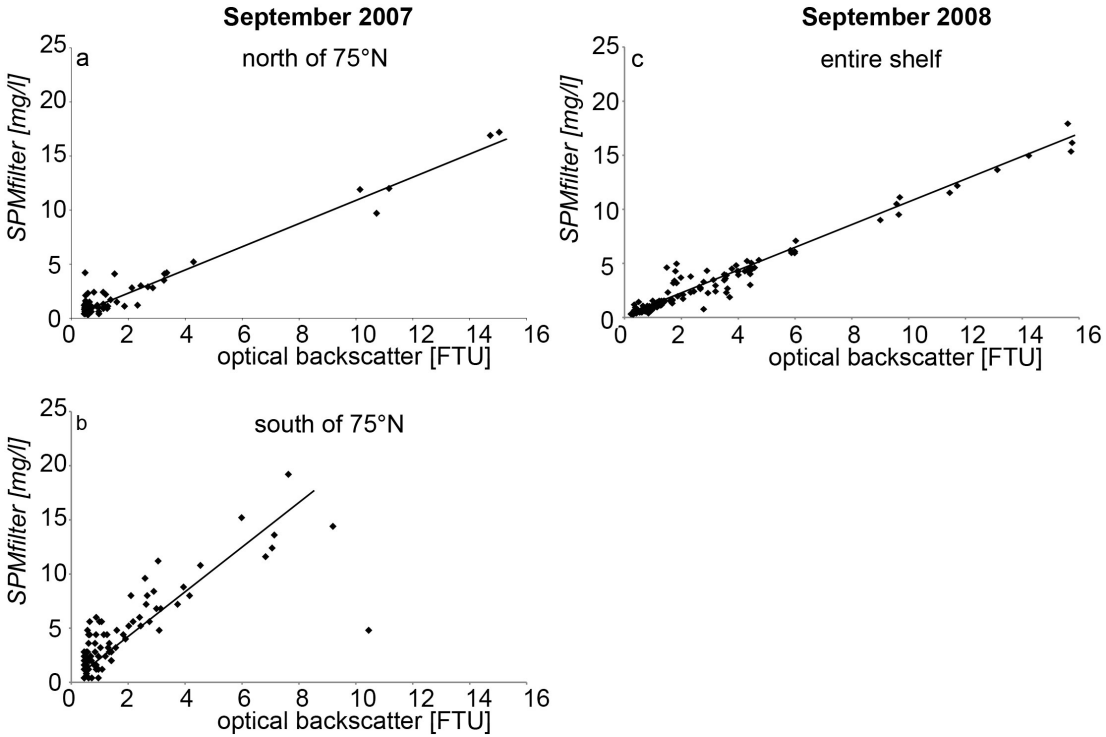

Fig. 5.

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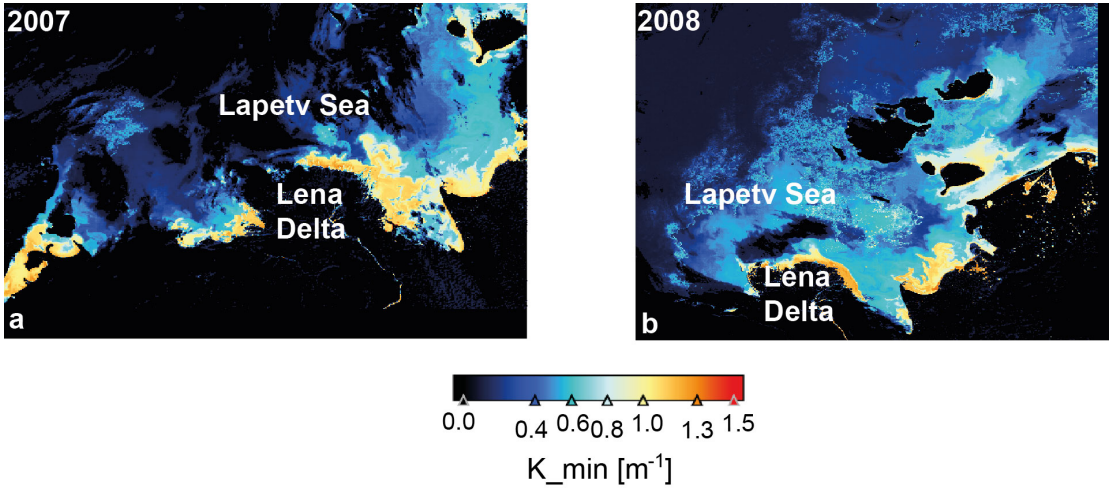

Fig. 6.

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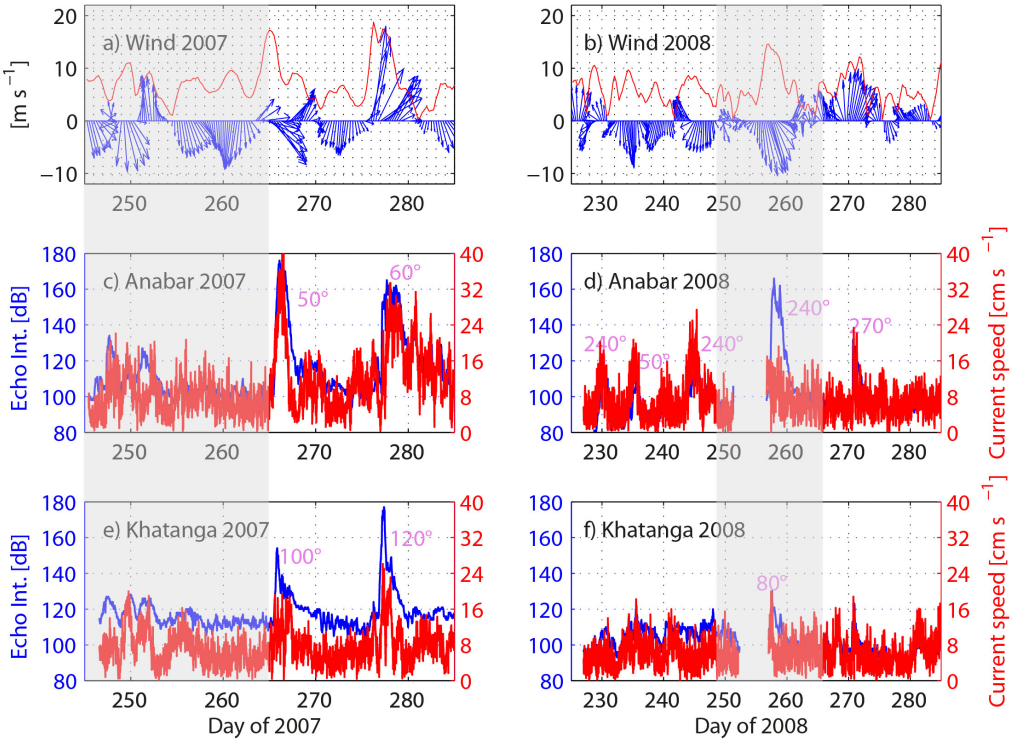

Fig. 7.

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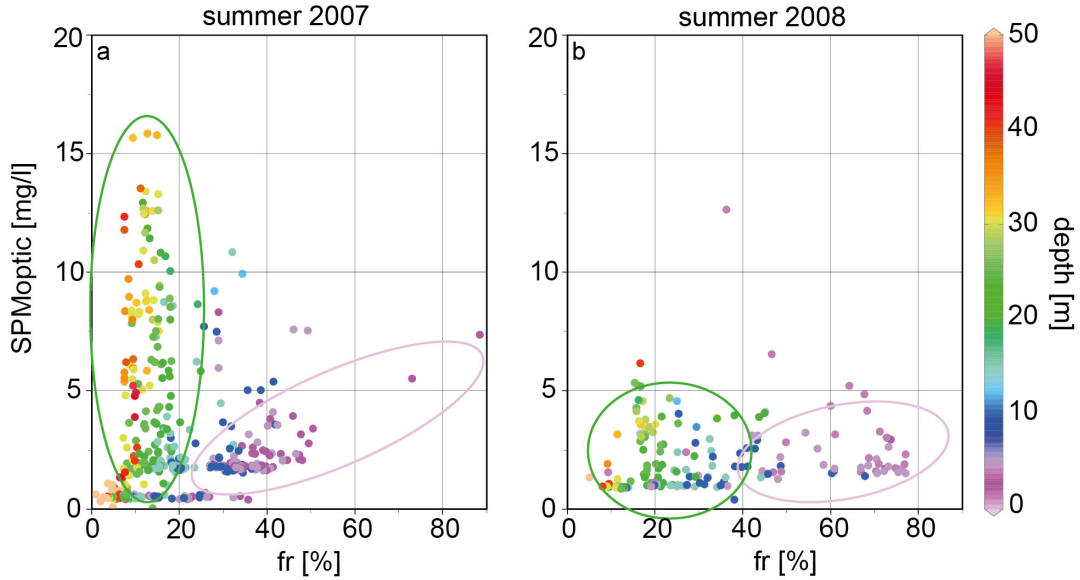

Fig. 8.

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