

**Figure Captions for Manuscript Wegner et al. “Interannual variability of surface and bottom sediment transport on the Laptev Sea shelf during summer”:**

Figure 1:

Bathymetric map of the Laptev Sea shelf and the locations of the presented stations. Red circles indicate measuring sites during TRANSDRIFT XII expedition (August 22 – September 22, 2007) and green circles during TRANSDRIFT XIV (September 5-21, 2008). The location of bottom-mooring station ANABAR and KHATANGA are marked by a blue and a yellow star respectively. The solid line marks the cross-shelf section shown in Figure 4.

Figure 2:

Average sea level pressure (slp [hPa]) and prevailing wind directions during August to September 2007 and 2008. NCEP Reanalysis data provided by the NOAA/OAR/ESRL PSD, Boulder, Colorado, USA, from their Web site at <http://www.esrl.noaa.gov/psd/>.

Figure 3:

The surface distribution of salinity (a, d; [psu]), silicate concentration (b, e; [ $\mu\text{mol/l}$ ]), and  $\delta^{18}\text{O}$  derived river water fraction  $f_r$  (c, f; [%]) indicates the different spreading of river dominated surface waters during TD XII (summer 2007) and TD XIV (summer 2008).

Figure 4:

A south-north section across the eastern Laptev Sea shelf during TD XII (summer 2007; sampling period in Julian days: 241-255) and TD XIV (summer 2008; sampling period in Julian days: 249-258) showing the distribution of  $\text{SPM}_{\text{optic}}$  concentration (a, e; [ $\text{mg/l}$ ]), salinity (b, f; [psu]), silicate concentration (c, g; [ $\mu\text{mol/l}$ ]), and dissolved oxygen (d, h; [ $\mu\text{mol/l}$ ]). As density on Arctic shelf seas is mainly determined by salinity, salinity instead of density are shown here.

Figure 5:

Linear relation between concentrations derived from filtered water samples ( $\text{SPM}_{\text{filter}}$ ) [ $\text{mg/l}$ ] and optical backscatter measurements in Formazine Turbidity Units [FTU] in September 2007 (a: north of  $75^\circ\text{N}$ :  $R^2=0,949$ ;  $p=0,01$ ;  $n=101$ ; b: south of  $75^\circ\text{N}$ :  $R^2=0,889$ ;  $p=0,01$ ;  $n=86$ ;) and in 2008 (c:  $R^2=0,96$ ;  $p=0,01$ ;  $n=154$ ).

Figure 6:

ESA MERIS acquisition of the central southern Laptev Sea on 2007-08-24 (a) and 2008-08-12 (b) showing the different attenuation patterns in summer 2007 and 2008. The parameters are processed using MERIS Case 2 Regional C2R processor (attenuation:  $\text{m}^{-1}$ ). Land and clouds are masked in black.

Figure 7:

Time series of one-day average wind speed [m/s] and direction (a, b), 6-hour running mean current speed [cm/s], and echo intensity [dB] during August to September 2007 and 2008 at bottom moorings ANABAR (c, d) and KHATANGA (e, f). Current directions are given for the peaks in echo intensity when most sediment transport is assumed to take place. The directions are one-day averaged u- and v-current components. NCEP Reanalysis data provided by the NOAA/OAR/ESRL PSD, Boulder, Colorado, USA, from their Web site at <http://www.esrl.noaa.gov/psd/>. The grey shaded area marks the measuring period of the section in Figure 4.

Figure 8:

Scatter plot of SPM<sub>optical</sub> and riverine fraction along the section in Figure 4 during TD XII (summer 2007) and TD XIV (summer 2008). Green circles mark the typical fr/SPM<sub>optical</sub> relation for the bottom nepheloid layer. Purple circles mark the characteristic relation for the riverine influenced surface nepheloid layer.