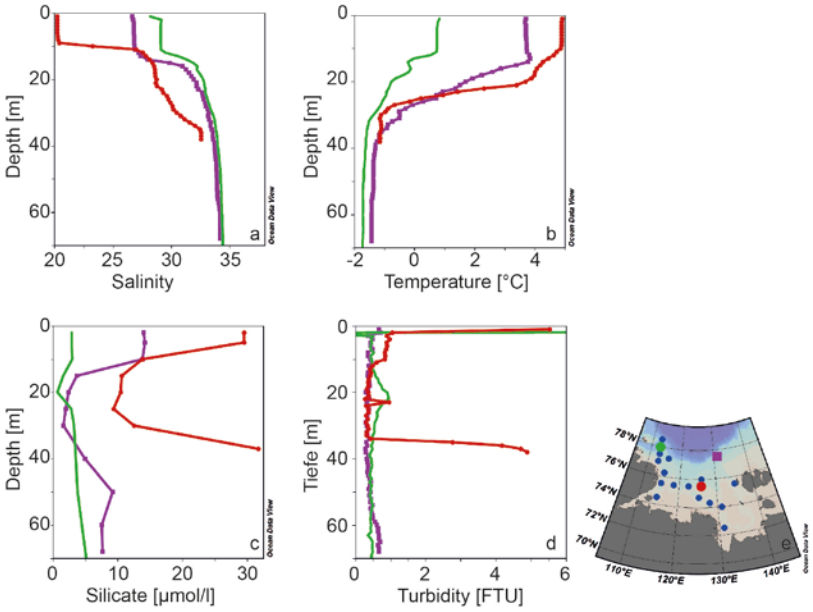
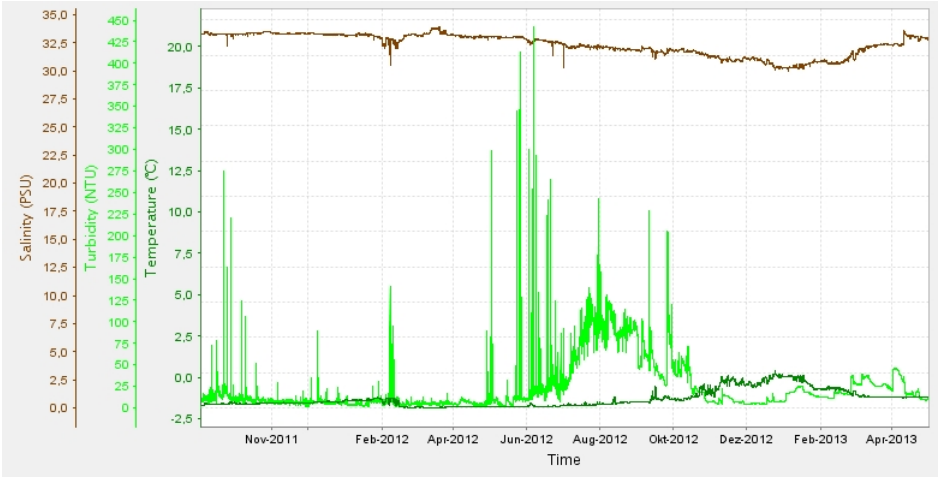
Variability of Matter Fluxes within the Transpolar System

Background

The Arctic summer sea-ice cover is continuously decreasing as a result of climate change, accelerating in the record minima in September 2007 and 2012. Larger open water areas due to reduced sea-ice cover on the vast Siberian continental shelves in summer are expected to lead to increased resuspension of bottom sediments and coastal erosion due to larger wind fetch and wave heights. Thus, a detailed understanding of the pathways of suspended particulate matter (SPM) is critical in order to draw the connection between sediment dynamics, optical properties and ecosystem dynamics under a changing climate.



Salinity (a), temperature (b), silicate (c), and turbidity (d) during TRANSDRIFT XXI expedition (August-September 2013) in the inflow area of the Transpolar Drift (green), on the central shelf (red), and in the outflow area (purple).



Long-term mooring data of seafloor observatories (KHATANGA 11, Sept. 2011 – May 2013; central Laptev Sea shelf) give insights into salinity (brown), turbidity (light green, [NTU]), and temperature (dark green, [°C]) variabilities. This record differs in its dynamics significantly from earlier years.

Goals

This study tries to extend the insights into the variability of lateral and vertical matter transport dynamics by using one-year monitoring data on salinity, temperature, currents, and suspended matter recorded at the surface inflow area of the Transpolar Drift (western Laptev Sea), on the central shelf, and in the outflow area (eastern Laptev Sea) in combination with data on the meteorological boundary conditions, sea-ice cover, and detailled fiels measurements.

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