Geophysical Research Abstracts,
Vol. 11, EGU2009-7804, 2009
EGU General Assembly 2009

Effects of Atmospheric Vorticity on Seasonal Sediment Transport Dynamics on the Laptev Sea Shelf (Siberian Arctic)

C. Wegner (1), J.A. Hoelemann (2), I. Dmitrenko (1), S. Kirillov (3), M. Kulakov (3), L. Timokhov (3), and H. Kassens (1)

(1) Leibniz Institute for Marine Sciences IFM-GEOMAR, Kiel, Germany , (2) Alfred Wegner Institute, Bremerhaven, Germany, (3) State Research Center - Arctic and Antarctic Research Center, Saint Petersburg, Russia

Models for the next 100 years project an increased input of sediments onto the Arctic shelf seas associated to increased mean annual riverine discharge of 10 to 25% for Arctic rivers, and increased coastal erosion due to increased thawing of coastal permafrost, higher sea levels, and the increased potential for severe coastal storms during the extended open water season. A detailed knowledge of the pathways of SPM and the possible response to climate change is of critical importance to understand and to forecast the impact of environmental changes on the land-shelf-ocean interaction.
The Laptev Sea Shelf is one of the largest Siberian shelf seas having several rivers discharge onto the shelf, which transport a substantial load of suspended particulate matter (SPM). Four seafloor observatories equipped with Acoustic Doppler Current Profilers (ADCPs) and Conductivity Temperature Depth meters (CTDs) were deployed on the inner, mid- and outer shelf each for the period of one year (August 1998-September 1999; September 2005-August 2008) to monitor the seasonal variability of SPM concentration. In combination with detailed process studies during summer and winter conditions these unique data sets have given new insights into sediment dynamics on the Laptev Sea shelf. In combination with a hydrographic model it can be shown that during a negative phase of the atmospheric anomaly (anticyclonic atmospheric circulation) suspended particulate matter is transported towards the Arctic Ocean mainly through the north-eastern Laptev Sea. During a positive phase of the atmospheric anomaly (cyclonic atmospheric circulation) the suspended particulate matter is kept on the Laptev Sea shelf and partially exported to the East Siberian shelf.