

## **Tracking the Transpolar Dirt Road: Sediment Transport by Siberian Sea Ice**

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Evidence mostly from opportunistic field observations has demonstrated the importance of Arctic sea ice as a geological agent, and in particular for the long-range transport of marine sediments. Due to its significant impact on ice albedo and surface ablation, the sediment load may furthermore affect the energy- and mass-balance of the ice cover. Despite this importance, studies of the mechanisms, importance and variability of entrainment and dispersal processes are lacking to date. Within the framework of a study of the sea-ice regime in the Laptev Sea in northern central Siberia, results of an integrated analysis of a major sediment entrainment event and subsequent transport are presented.

During the joint Russian-German ARCTIC 95 expedition of "Polarstern" in July to September 1995, an area of reduced surface albedo was identified in AVHRR satellite data received aboard ship. As demonstrated by in-situ measurements and airborne surveys, this patch of ice several tens of thousand square kilometers in extent contained high loads of marine sediments. In many spots "dirty" ice accounted for between 50 and 90 % of the total surface area. Based on measurements of spectral albedo and classification of AVHRR and SPOT satellite data, the extent and concentration of sediment-laden ice was mapped in detail. Through combined analysis of field measurement, buoy drift and results from a large-scale sea-ice model, origin and evolution of the ice could also be reconstructed.

Hydrographic data obtained in the study area and stable-isotope measurements on ice and water samples indicate that ice formation and sediment entrainment in this region are intricately linked to the dispersal of freshwater discharged by the Lena River. The study area may be a key location with respect to entrainment and dispersal of sediments in the Arctic Ocean, corroborated also by sedimentological data and estimates of sediment load.