

SR ISOTOPE GEOCHEMISTRY OF LAPTEV SEA SURFACE SEDIMENTS, ICE-RAFTED DETRITUS AND SUSPENDED PARTICULATE MATERIAL OF EAST SIBERIAN RIVERS - IMPLICATIONS FOR SEDIMENT DISTRIBUTION PATTERNS IN THE ARCTIC OCEAN.

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The detrital component of Arctic sediments is mainly formed from material derived from the Eurasian continent and supplied by the large Siberian rivers Ob, Yenisey and Lena. The rivers draining to the Laptev Sea, i.e. the Lena River, are of special interest. Today large amounts of sea ice feeding the Transpolar Drift are formed in the Laptev Sea shelf area. Material transported to the Laptev Sea by the Siberian rivers is partly incorporated into drifting sea ice and distributed throughout the Arctic Ocean and the North Atlantic. For that reason the identification of recent and ancient paths of sediment distribution reveal important information on the history of sea ice cover and drift patterns.

In order to determine the paths of sediment transport to the Laptev Sea and further to the Arctic Ocean we measured ⁸⁷Sr/⁸⁶Sr ratios and Sr concentrations of Laptev Sea surface sediments, ice-rafted detritus (IRD) and suspended particulate material (SPM) of the Lena, Yana and Khatanga Rivers. The SPM exported to the Laptev Sea by the Lena River is characterized by average ⁸⁷Sr/⁸⁶Sr ratios of 0.7165 ± 0.0005 and Sr concentrations of 200 ± 20 ppm measured at the northernmost stations. The average ⁸⁷Sr/⁸⁶Sr ratio (0.7141 ± 0.0002) and Sr concentration (152 ± 5 ppm) of the Yana River SPM can clearly be distinguished from those of the Lena River SPM. Pronounced differences can be observed in the Khatanga River. Sr isotopic ratios (0.7102 ± 0.0002) and Sr concentrations (181 ± 5 ppm) of the

Khatanga River SPM are strongly influenced by volcanic rocks of the Siberian Trap that are very common in the drainage area. In a ⁸⁷Sr/⁸⁶Sr ratio vs. Rb/Sr diagram samples of each river plot along straight lines. The gradients of these lines are interpreted as apparent ages corresponding to provenance. The scatter along the lines results from grain-size separation processes, that do not significantly change the provenance information.

Sr isotopic ratios and Sr concentrations of Laptev Sea surface sediments and IRD can be related to Sr data of river SPM indicating that the Sr isotope geochemistry can be applied to identify the distribution of riverine material in the Laptev Sea and the Arctic Ocean. In a ⁸⁷Sr/⁸⁶Sr ratio vs. Rb/Sr diagram sediment and IRD samples exclusively originating from one river plot along the SPM line belonging to this river. Samples related to mixing of material supplied by two or more rivers plot between the river SPM lines. Considering this, it can be stated that sediments and IRD of the southern, central and of the eastern Laptev Sea shelf are dominated by material supplied by the Lena River. The Yana River draining to the easternmost Laptev Sea seems to be of minor importance. Surface sediments and IRD of the western Laptev Sea shelf on the other hand are additionally influenced by material supplied by the Khatanga River and/or imported from the Kara Sea.