

## MODERN COASTAL ORGANIC CARBON INPUT TO THE ARCTIC OCEAN

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In recent years several studies have underlined the importance of coastal erosion for the sediment budget of the Arctic Seas and shown that the contribution of coastal erosion to the material budget has often been underestimated.

In this paper we present a quantitative assessment of the organic carbon input to the Arctic Seas through coastal erosion. The evaluation is based upon a combination of data for coastal erosion sediment input and organic carbon concentrations of the coastal sections. Emphasis is laid on the Laptev Sea and East Siberian Seas, where our own field studies have been performed from 1998 to 2002. Based upon published information, the quantification can be extended to cover all Arctic Seas. It must be cautioned that these are the best available estimates of the contribution of coastal erosion to sediment and organic carbon input and may contain considerable error.

Our results are that in total ca.  $430 \times 10^6$  t yr<sup>-1</sup> of sediment and  $6.7 \times 10^6$  t yr<sup>-1</sup> of organic carbon enter the Arctic Ocean through coastal erosion (Table 1). Approximately 60% of the total TOC flux originates in the Laptev and East Siberian Seas. The predominant sources are Ice Complex deposits, which are widespread in Northeast Siberia. The highest coastal TOC flux is observed in the East Siberian Sea, even though the Laptev Sea coastline is considerably longer. This is due to the dominance of the Ice Complex along the coastline of the East Siberian Sea. Satellite images of the East Siberian and the Beaufort Sea clearly show the major sources of sediment: the strong river plume of the Mackenzie River is visible in the Beaufort Sea, whereas in the East Siberian Sea high turbidities, which are related to coastal sediment input, are observed along the coastline.

	Sediment flux (10 <sup>6</sup> t yr <sup>-1</sup> )	TOC flux (10 <sup>6</sup> t yr <sup>-1</sup> )
White Sea <sup>1</sup>	60	0.3
Barents Sea <sup>1</sup>	59	0.5
Kara Sea <sup>1</sup>	109	1
Laptev Sea <sup>2</sup>	58.4	1.8
East Siberian Sea <sup>2</sup>	66.5	2.2
Chukchi Sea <sup>3</sup>	70	0.8
Beaufort Sea <sup>4</sup>	7.9	0.09
Total	430.8	6.69

**Table 1.** Sediment and TOC flux to the Arctic Ocean through coastal erosion (from: Rachold, V., Eicken, H., Gordeev, V.V., Grigoriev, M.N., Hubberten, H.-W., Lisitzin, A.P., Shevchenko, V.P., Schirrmeister, L. (in press). Modern terrigenous organic carbon input to the Arctic Ocean, In: Stein, R. and Macdonald, R.W. (Eds.) Organic Carbon Cycle in the Arctic Ocean: Present and Past. Springer Verlag, Berlin).