

EFFECTS OF COASTAL PROCESSES ON THE BIOGEOCHEMISTRY OF THE MARINE NEAR-SHORE ZONE: THE AMERASIAN ARCTIC

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Controversy surrounds the role of the river output and coastal erosion in land-shelf transport of terrestrial carbon in the Arctic. The East-Siberian and Laptev Seas (the most shallow and wide arctic shelf seas) are the most compelling to study the biogeochemical consequences of coastal processes in the changing Arctic. Between 1994 and 2000 the Laboratory of Geochemistry in the Polar Regions, Pacific Oceanological Institute (POI), performed eight near-shore expeditions in the eastern Siberian seas, three surveys along the Lena River stream, and the Trans-Arctic expedition-2000 along the Northern Sea Route (from Archangel'sk to Vladivostok, Fig. 1). A Set of the surface sediment and particulate matter samples has been studied in Fairbanks at the Institute of Marine Sciences and the International Arctic Research Center, University Alaska Fairbanks (UAF) and in Vladivostok at the POI. Hydro-chemical anomalies obtained over the shallow Siberian shelves demonstrate the significant role of coastal erosion and consecutive destruction of the land-derived organic matter in formation of the biogeochemical regime in the Arctic seas (Fig. 2 and Refs below). Transport of particulate organic carbon forced by the coastal erosion might be similar in value to the dissolved organic carbon transport by the rivers, whereas the total transport of terrestrial particulate eroded material is more significant than solid transports by rivers. The near-shore zone of the Siberian seas is mainly a source of atmospheric CO₂ emission, though the Arctic continental margin in whole may serve as a net CO₂ sink. Major results were presented at many international conferences and workshops.

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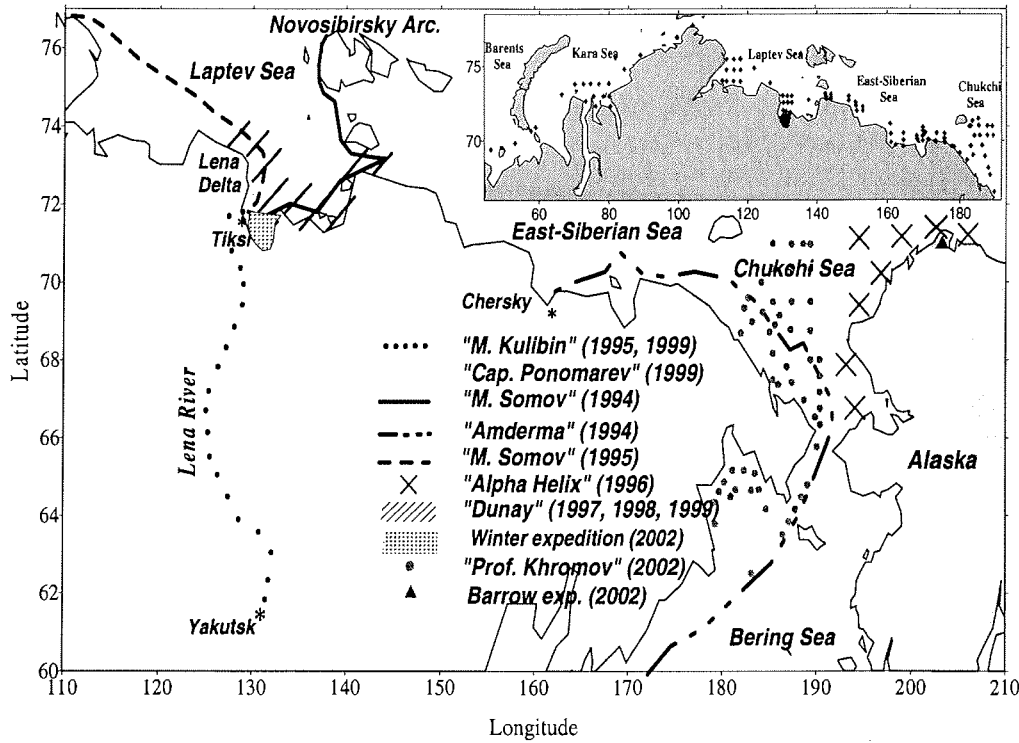
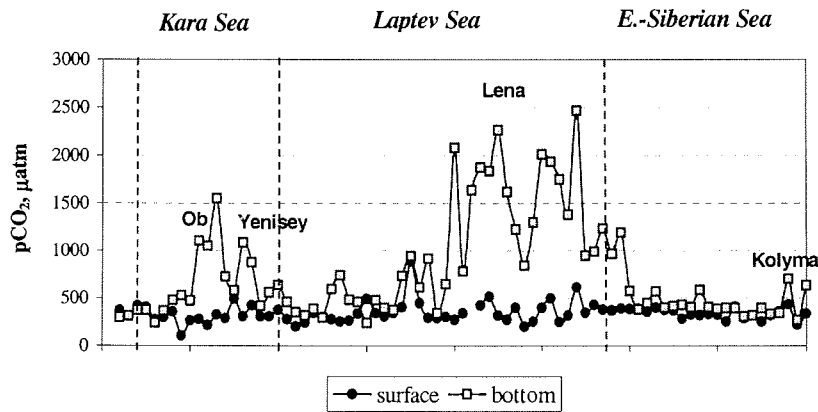


Figure1. The study area.



Distribution of CO₂ partial pressure (μatm) in the arctic seas in 2000

Figure 2. CO₂ partial pressure in the Arctic Seas (Semiletov 2001).