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The joint Russia-US-Sweden studies in the near-shore zone of the East-Siberian Arctic seas: (1999-2008)

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The Arctic Ocean is surrounded by permafrost, which is being degraded at an increasing rate under conditions of warming which are most pronounced in Siberia and Alaska . A major constraint on our ability to understand linkages between the Arctic Ocean and the global climate system is the scarcity of observational data in the Siberian Arctic marginal seas where major fresh water input and terrestrial CNP fluxes exist. The East-Siberian Sea has never been investigated by modern techniques despite the progress that has been made in new technologies useful for measuring ocean characteristics of interest. In this multi-year international project which joins scientists from 3 nations (Russia-USA-Sweden), and in cooperation with scientists from other countries (UK, Netherlands) we focus on poorly explored areas located west from the U.S.-Russia boundary, Warming causes thawing of the permafrost underlying a substantial fraction of the Arctic; this process could accelerate coastal erosion, river discharge and carbon losses from soils. Siberian freshwater discharge to the Arctic Ocean is expected to increase with increasing temperatures, potentially resulting in greater river export of old terrigenous organic carbon to the ocean. Rivers integrate variability in the components of the hydrometeorological regime, including soil condition, permafrost seasonal thaw, and thermokarst development, all the variables that determine atmospheric and ground water supply for the rivers and chemical weathering in their watershed. Thus studying carbon cycling in the East Siberian Arctic marginal seas has a high scientific priority in order to establish the carbon budget and evaluate the role of the Arctic region in global carbon cycling, especially in the coastal zone where the redistribution of carbon between terrestrial and marine environments occurs and the characteristics of carbon exchange with atmosphere are unknown. In this report we overview the main field activities and present some results obtained during the last decade (1999-2008).