



Structure of the buoyant plume formed by Ob and Yenisei river discharge in the southern part of the Kara Sea during summer and autumn

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This work focuses on the interaction between the Ob- and Yenisei-dominated parts of the large Ob-Yenisei buoyant plume formed in the southern part of the Kara Sea during ice-free periods. It was shown that certain wind forcing and river discharge conditions cause the formation of a specific structure of the Ob-Yenisei plume with significantly different properties of the Ob- and Yenisei-dominated water masses. Under these conditions, the Yenisei runoff generates a narrow coastal current propagating northward from the Yenisei Gulf along the Taymyr Peninsula, which is isolated by the Ob-dominated water mass from ambient sea water. As a result, the low-salinity Yenisei-dominated water mass occupies a relatively small area, while more saline Ob-dominated water mass spreads over a wide area between the Gulf of Ob and the Taymyr Peninsula. The formation of the “isolation” configuration of the Ob-Yenisei plume described above is presumed to be caused by the eastward Ekman transport and the resulting downwelling flow of the Ob-dominated waters under the low-saline and warm Yenisei-dominated waters along the Taymyr Peninsula. Based on satellite imagery, wind reanalysis, and river discharge data collected and derived for the period of 2005–2011, it was estimated that the “isolation” configuration is regularly formed during late summer and autumn when the Ob discharge to the Kara Sea exceeds the Yenisei discharge and the local atmospheric circulation is dominated by the northerly wind regime. Assessment of the frequency and duration of the occurrence of the “isolation” configuration showed their synoptic time scale and significant inter-annual variability.