



## **Influence of tidal mixing on river plumes in the Kara and Laptev seas**

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This work is focused on influence of tidal circulation in the Arctic Ocean on surface salinity in areas influenced by freshwater discharge. We show that tidal mixing strongly affects river plumes formed in the Kara and Laptev seas during ice-free periods. Intense tidal circulation over shallow sea results in penetration of turbulence from bottom to surface that induces mixing of freshened surface layer with subjacent saline sea water. This process, which persistently occurs over certain shelf regions, i.e. tidal mixing hot-spots, causes abrupt transformation of river plumes. Salinity anomaly, depth, and stratification of river plumes dramatically decrease as they pass over these regions. In particular, tidal mixing hot-spots occupy wide area in the central part of the Kara Sea and significantly influence vertical structure of the Ob and Yenisei plumes. Moreover, we show that tidal mixing hot-spots located to the north from the Lena Delta and the Gulf of Pyasina causes dissipation of river plumes over these areas and, therefore, play a role of mixing barriers for spreading of the Lena and Pyasina plumes. We presume that tidal mixing hot-spots located in the western part of the Laptev Sea hinder formation of stratified surface layer at this area and inhibit freshwater transport from the Kara Sea to the Laptev Sea. Thus, location and intensity of tidal mixing hot-spots strongly influences surface salinity distribution and stratification in the Siberian Arctic shelf and, therefore, play an important role in ice formation and many other physical, biological, and geochemical processes.