



New findings for the circulation around Hanna Shoal on the northeastern Chukchi Sea shelf, Arctic Ocean

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The northeastern Chukchi Sea shelf is one of the most productive areas in the polar oceans, and a foraging area for large marine mammals such as gray whales and walrus. This ecosystem is fundamentally sustained by the inflow of nutrient-rich Pacific Water (PW) through Bering Strait. PW also affects Arctic climate, as it contributes substantial amounts of freshwater and heat into the basin. We present several new findings derived from multiyear mooring observations with emphasis on the flow and hydrographic characteristics around the previously undersampled Hanna Shoal (HS) region of this shelf. The goal is to better quantify how PW is modified as it flows through the HS pathway. We describe the existence of a zonal density gradient at HS, which evolves seasonally and becomes more pronounced in winter. It appears that the local stratification along the eastern flank of HS is maintained year-round, whereas the water column along the western side becomes well-mixed in winter. This causes a local baroclinic flow that counteracts the background barotropic currents and which suggests that flow convergence and shelf-basin exchange are substantial on the northern side of HS. Our results provide new insights into the complex HS region regarding PW circulation and shelf-basin interaction with the Arctic basin.