



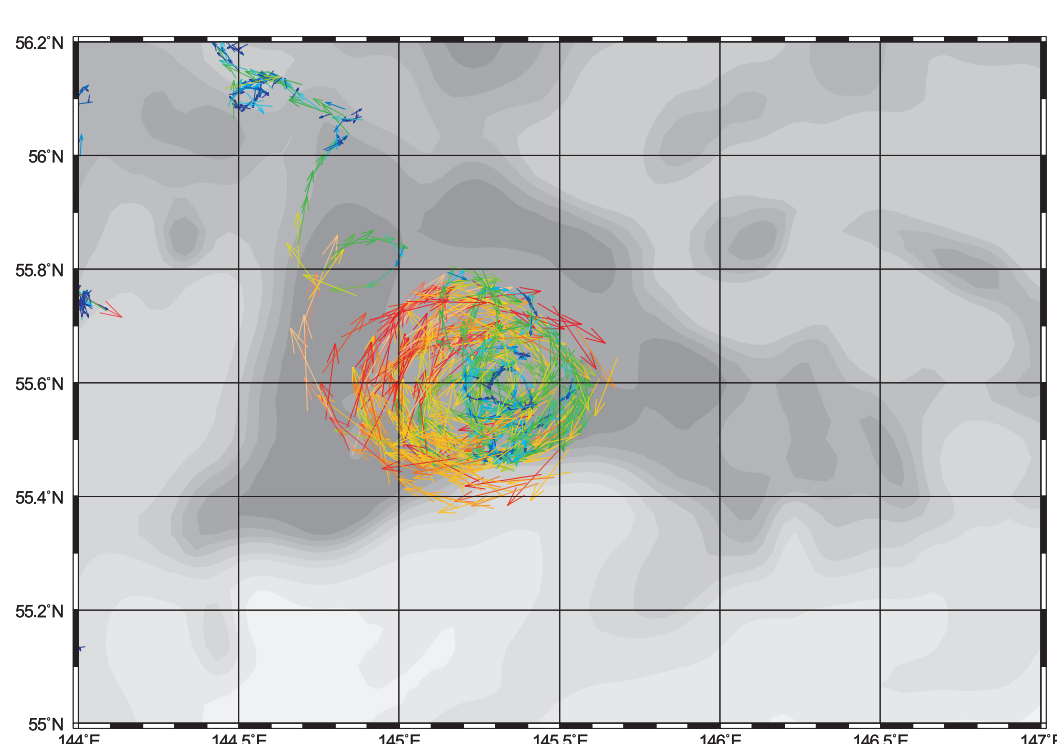
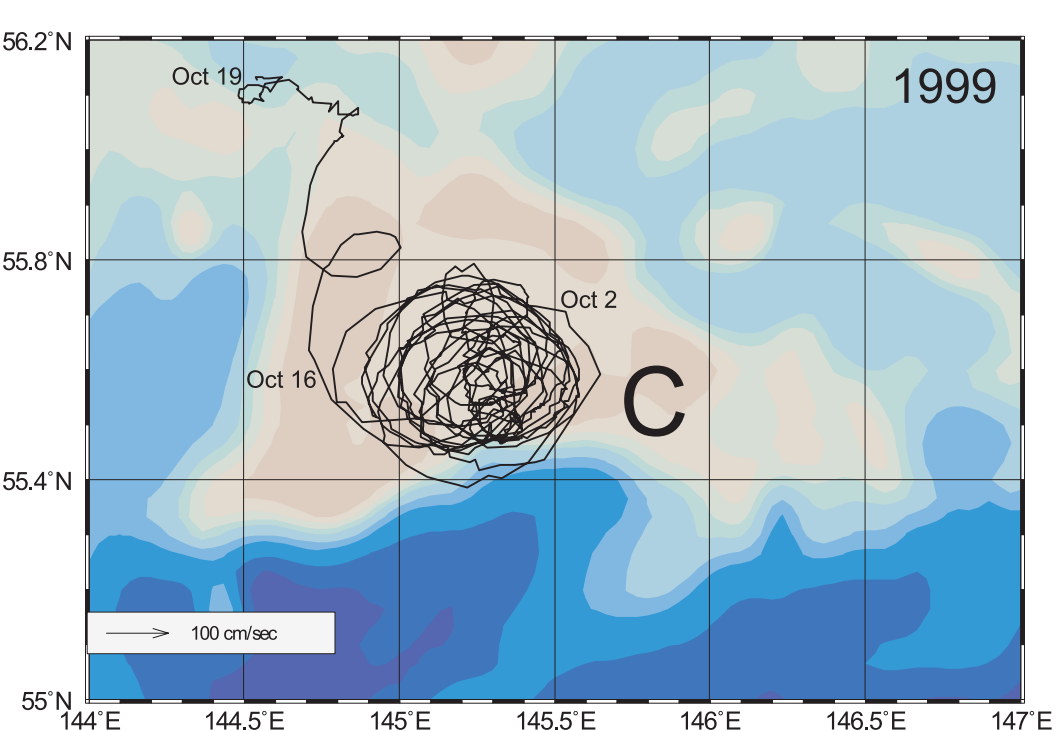
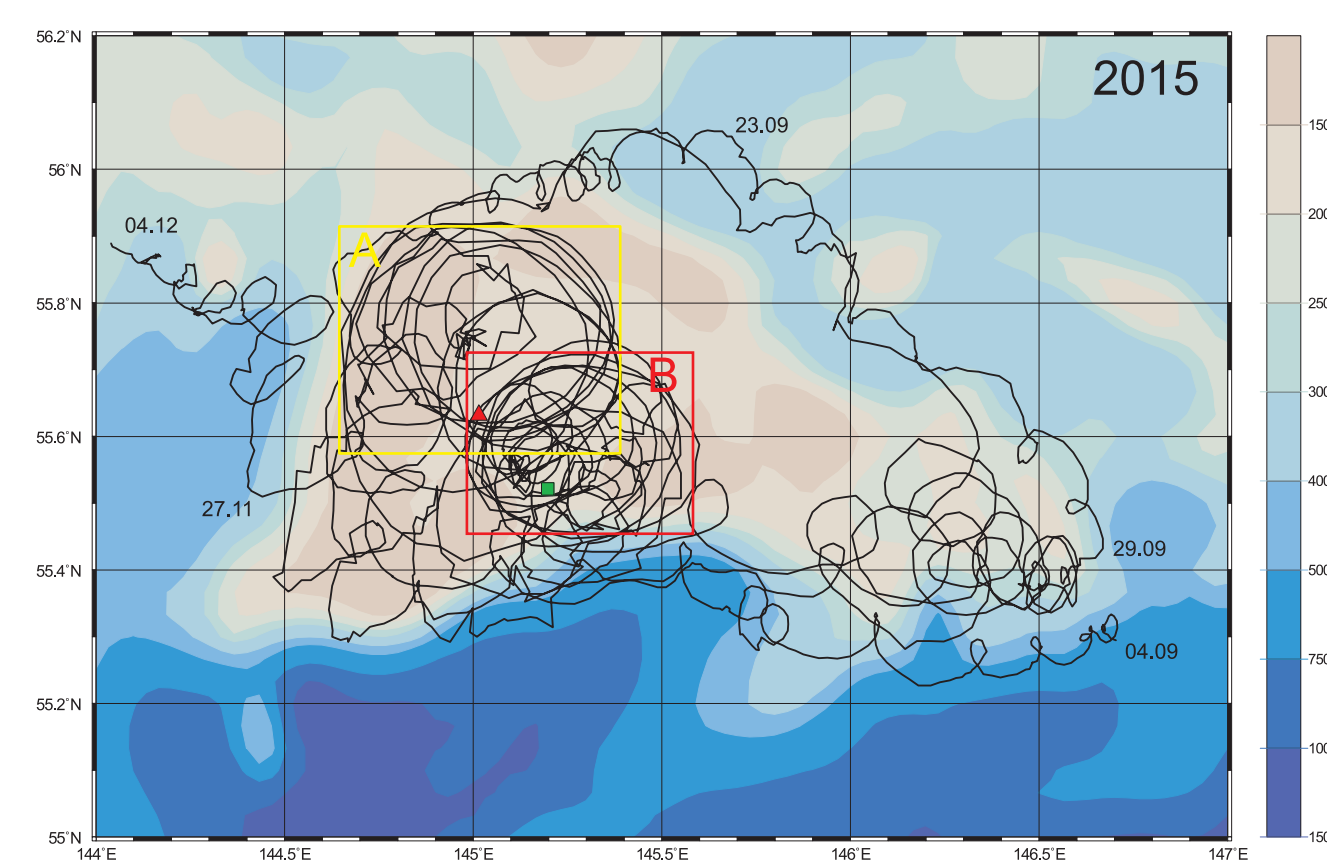
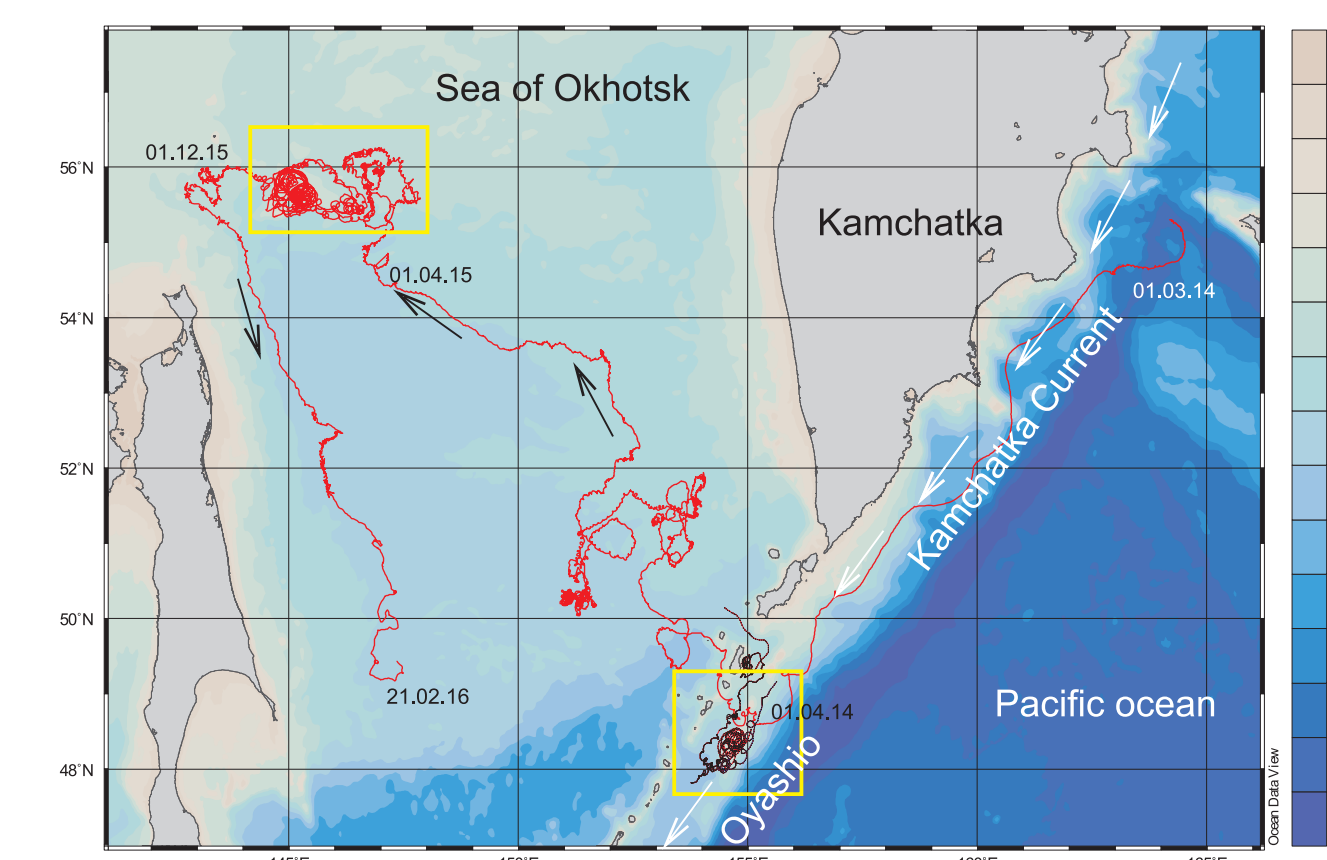
Amplified diurnal currents over the shallow banks and 18.6-year variability of salinity of the intermediate waters in the Western Subarctic Pacific

Konstantin Rogachev and Natalia Shlyk

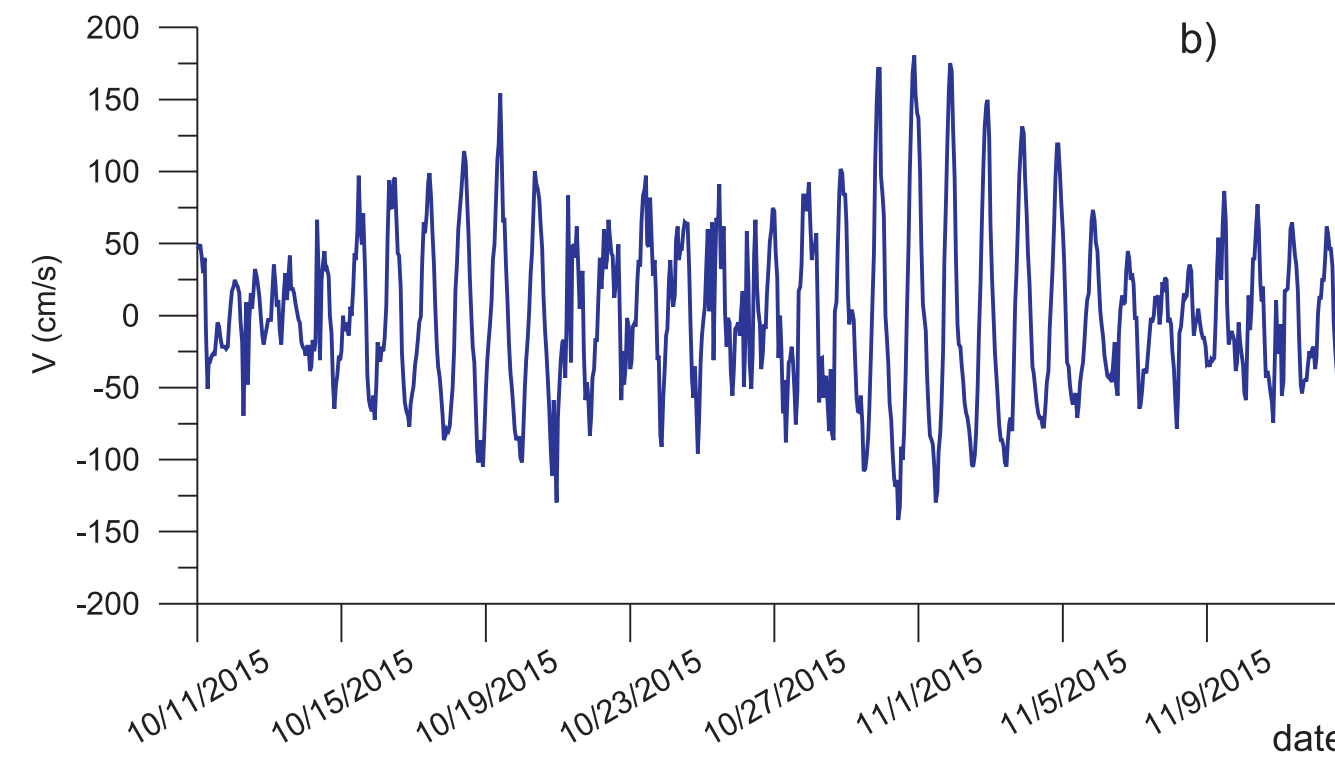
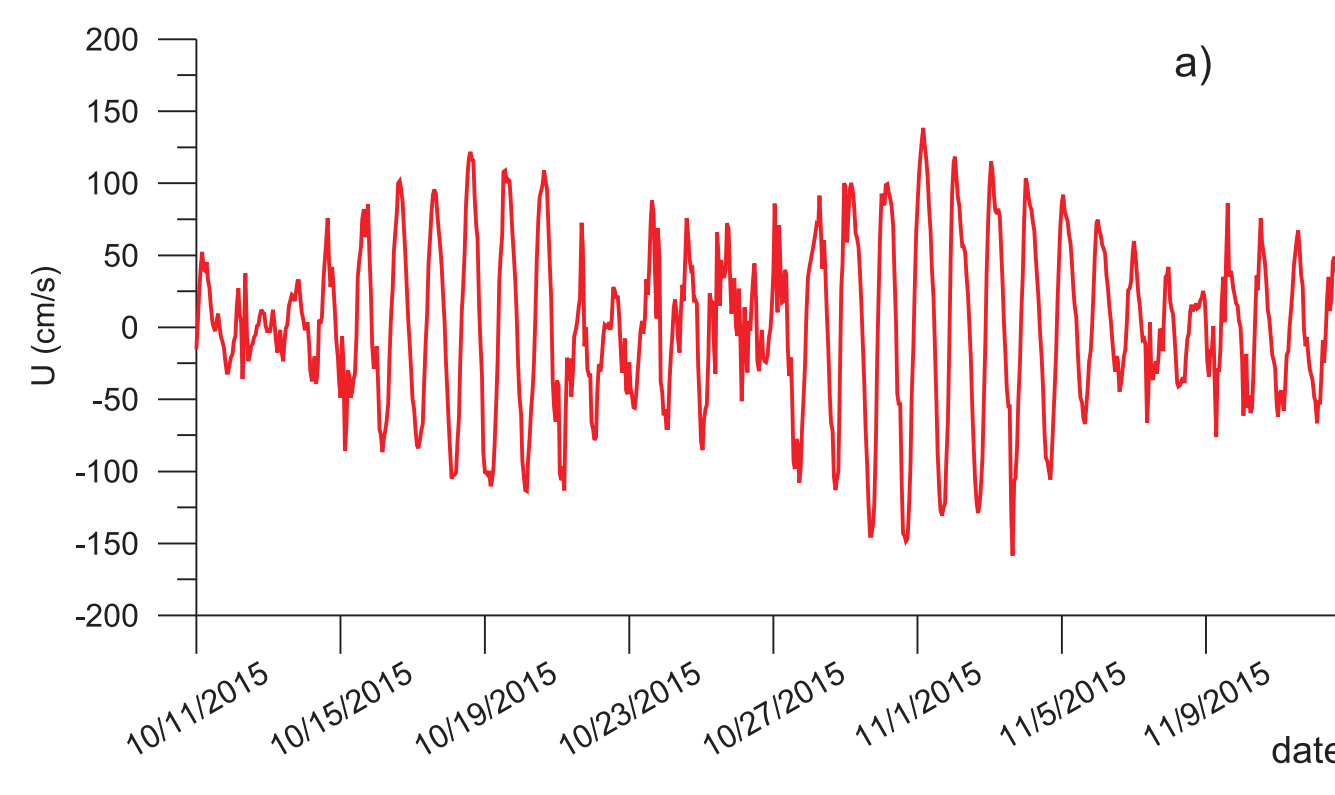
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Abstract

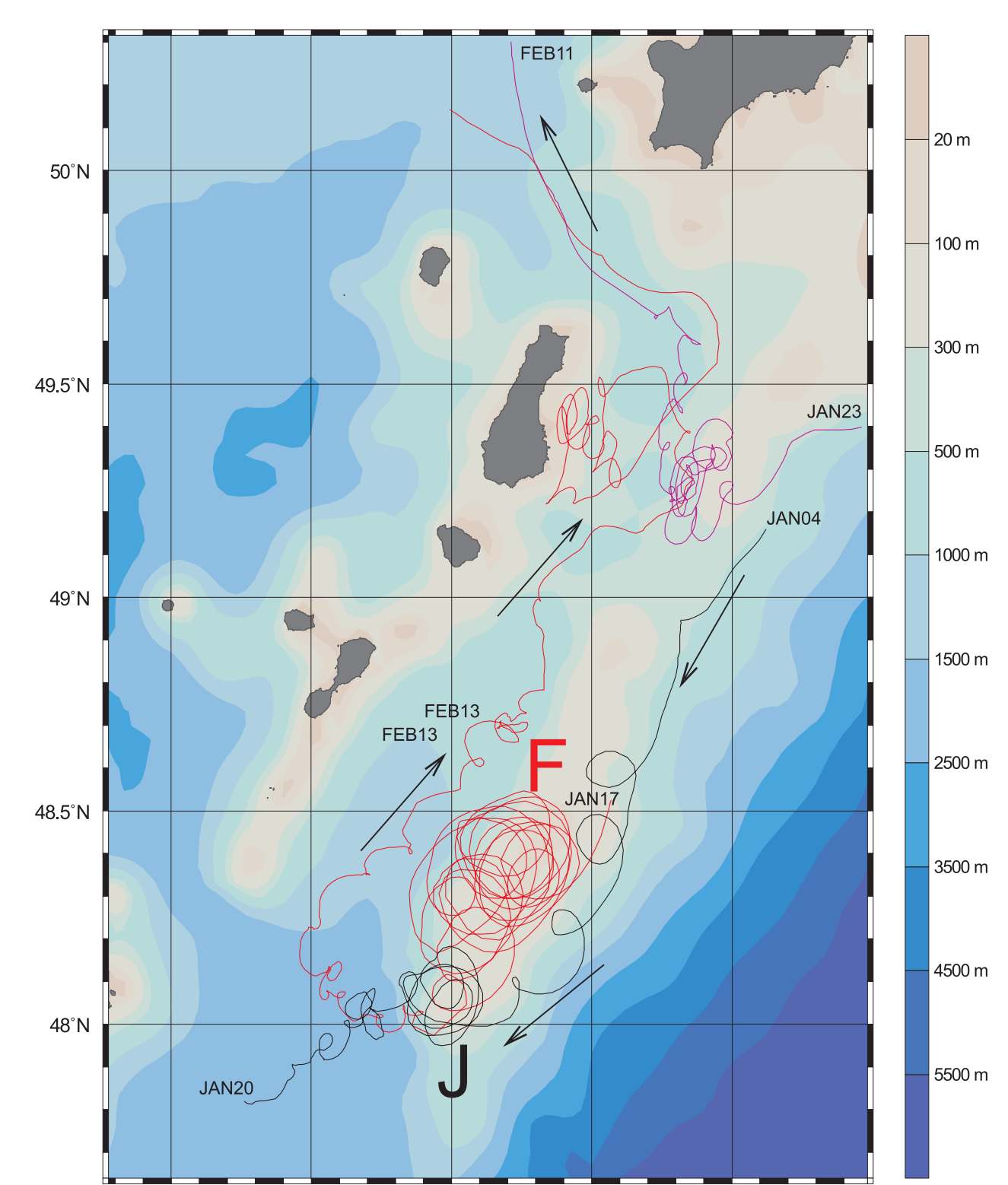
The south-flowing waters of the Kamchatka and Oyashio currents are key components of the western subarctic Pacific gyre. The dissipation of tidal energy in shallow and coastal regions of these currents and the attendant mixing are the important processes that affect the upper layer temperature and salinity. Examples of the impact of tidal currents on water temperature and salinity are the persistent tide-driven mixing around the Kashevarov and Kruzenshtern banks. The Kruzenshtern Bank is a shallow submarine bank stretching along the eastern continental slope of the Kuril Islands with the minimum depth of 86 m. Surface drifters observations are used to determine the characteristics of tidal currents, and the circulation over these banks. New software that allows more versatility in the harmonic analysis is used for drifter's data. The two banks have similar features. The variations in current velocities are dominated by the diurnal signals. The K1 and O1 tidal ellipses over the banks are the largest and clockwise. The enhanced tidal currents suggest that the formation of cold and saline water in summer is due to mixing of water column over the banks with intermediate waters. Variations of tidal ellipses over the bank may explain the formation of polynya at the western end of the Kashevarov Bank. We found that the 18.6-year lunar nodal cycle is a significant characteristic of salinity variation at the temperature minimum in the eddies eastward of the Boussole Strait over the period 1990-2018.



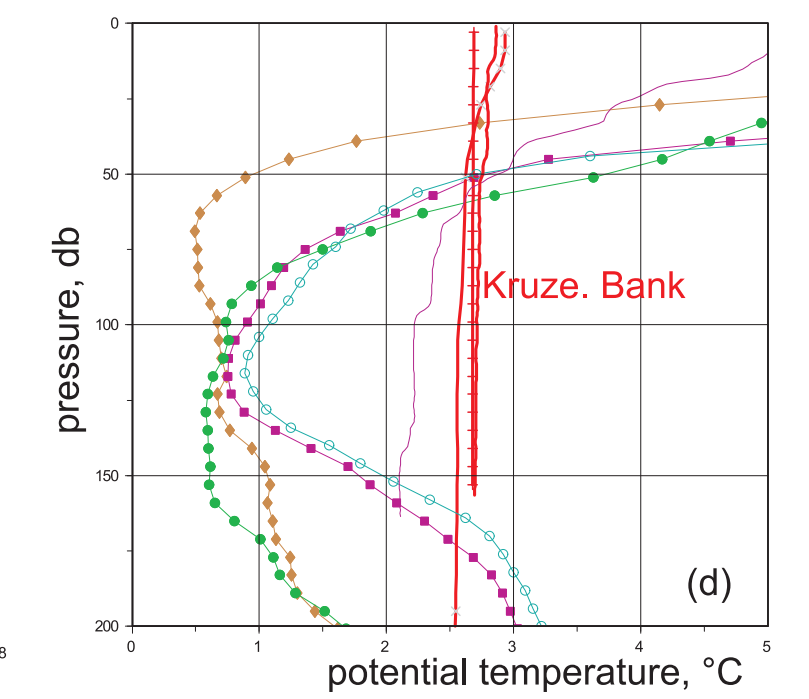
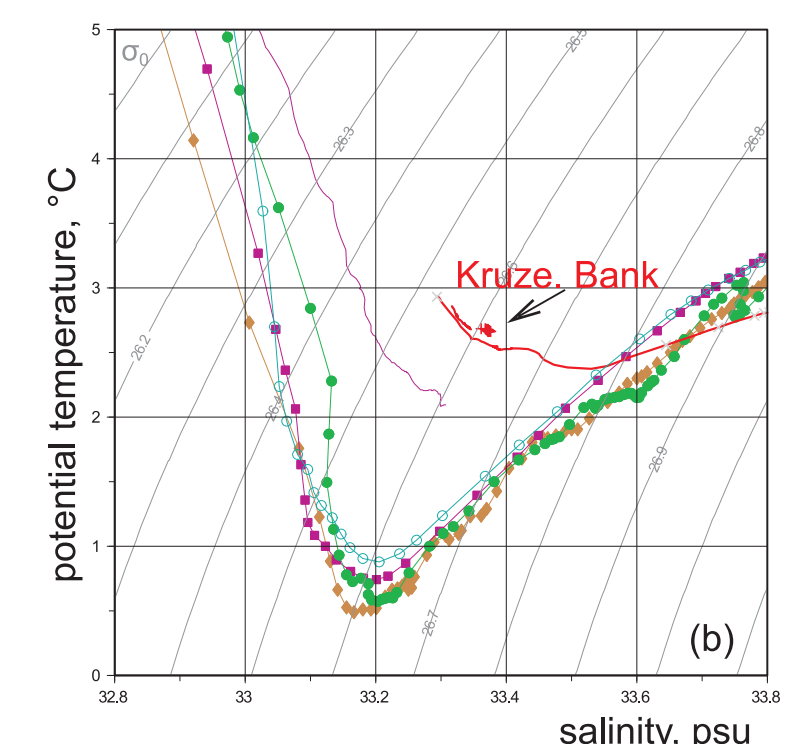
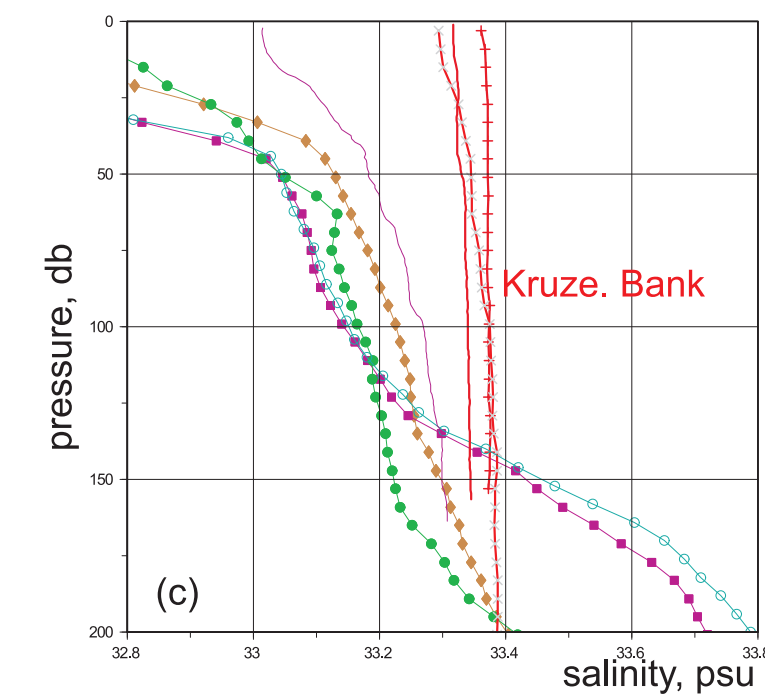
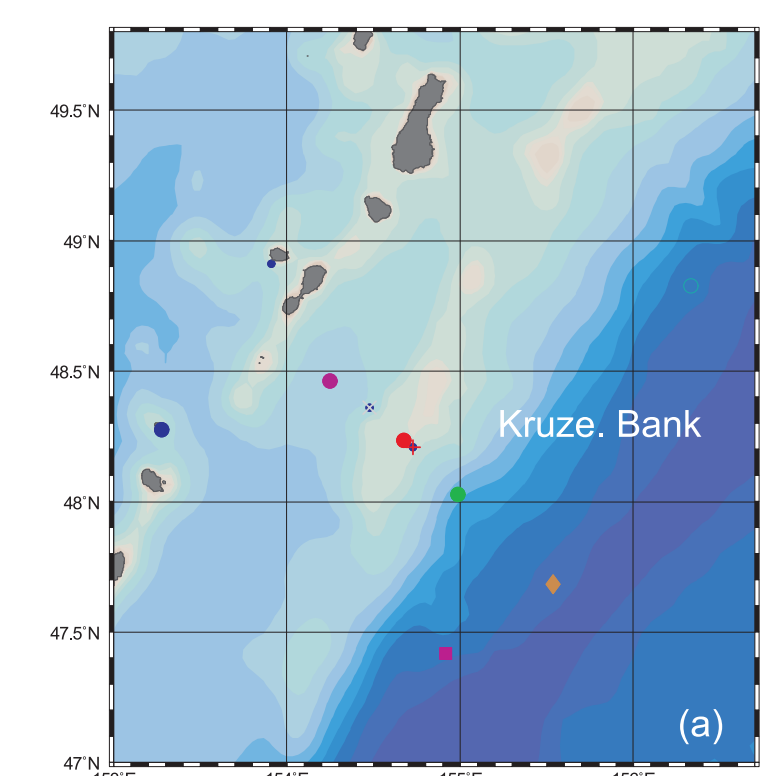
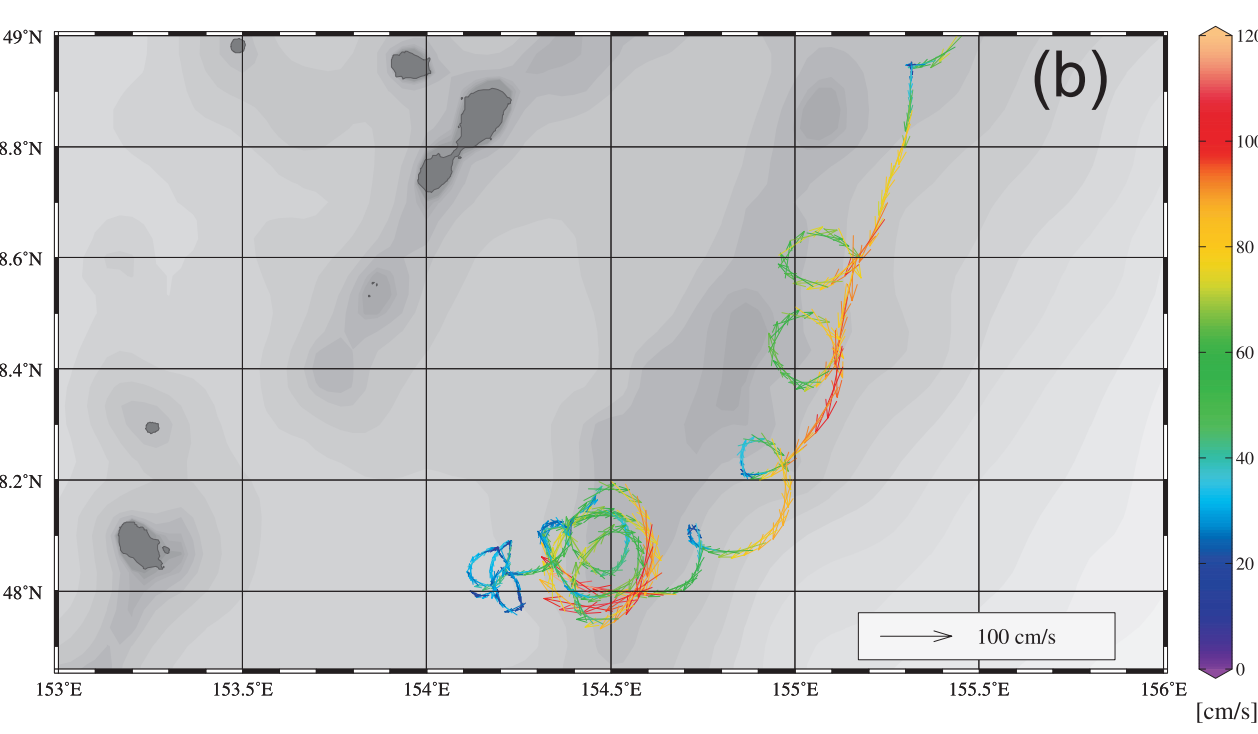
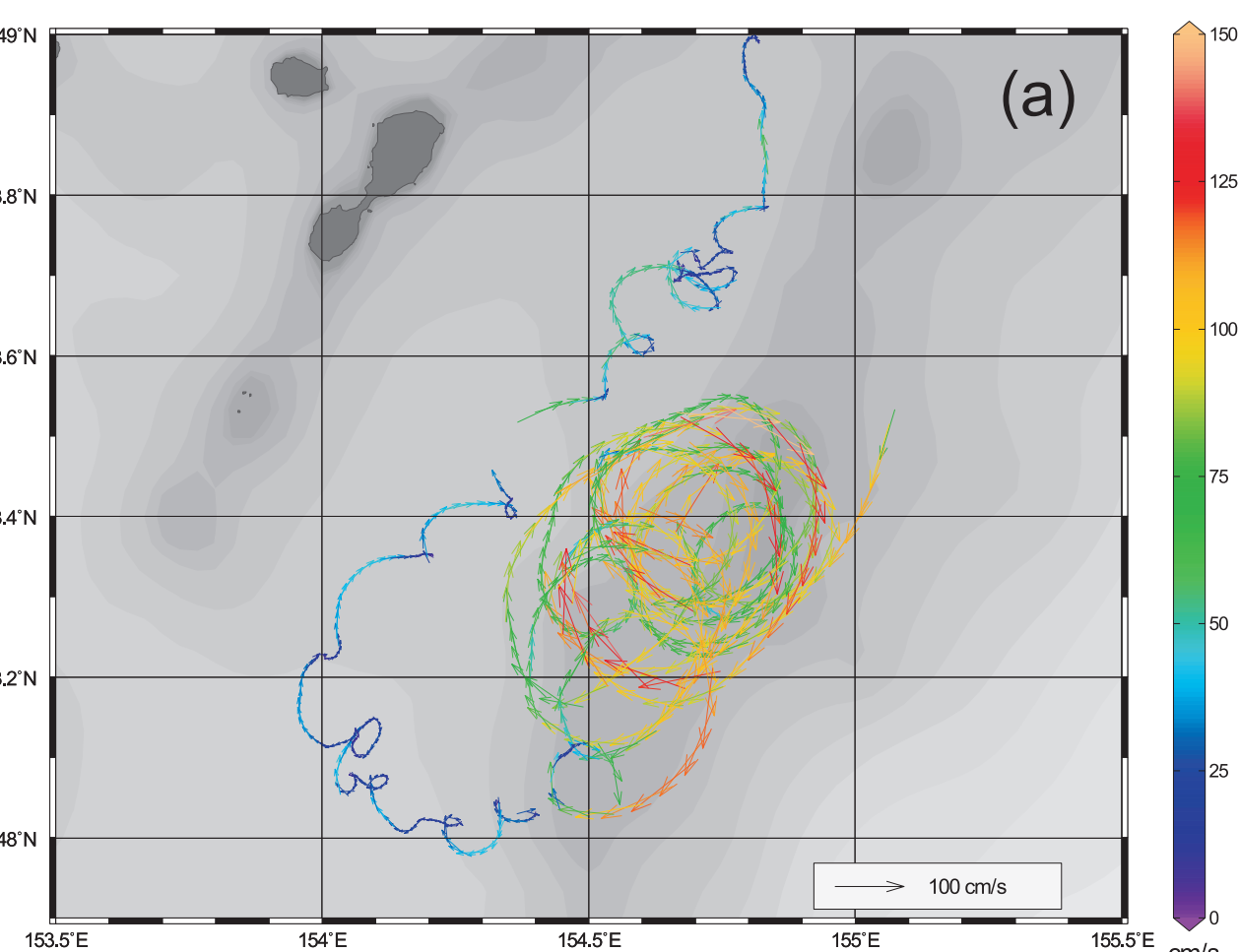
Study area, positions of the Kashevarov and Kruzenshtern banks (squares) and trajectories of the surface drifters in 2014-2017.



Velocity components obtained from the drifters for buoy over Kashevarov bank.



Trajectory of the surface drifters over the Kruzenshtern Bank



TS-diagram and vertical profiles of temperature (d) and salinity (c) over Kruzenshtern Bank in August 1990 and 2010.