Simulation of seasonal and intraseasonal variability of mesoscale circulation in the Tatar Strait of the Japan Sea

V.I. Ponomarev*, P.A. Fayman, V.A. Dubina, S.V. Prants, M.V. Budyansky and M.Y. Uleysky

Pacific Oceanological Institute, Far Eastern Branch of the Russian Academy of Sciences, Vladivostok 690041, Russia

Seasonal and synoptic variability of mesoscale circulation in the Tatar Strait is studied by using output from ocean circulation model developed at the Institute for Applied Mechanics Kyushu University, as well as Lagrange analyses. The model domain is a large scale area included North Japan Sea, Okhotsk Sea and adjacent region of the Pacific Ocean with horizontal resolution 1/18°. Model runs with realistic meteorological conditions from ECMWF ERA-40 reanalysis and restoring of surface temperature and salinity. Two characteristic circulation regimes of currents and eddies in the Strait were revealed. On seasonal time scale the regime changes from summer to winter mainly due to change of North Asian Monsoon. Northward current along the Tatar Trough axes and two southward currents with mesoscale eddy streets of inversed vorticity over eastern and western slopes of the Tatar Trough are formed in the cold season while cyclonic circulation and cyclonic mesoscale eddies in the strait are most typical for the warm season. In winter and early spring the southward current along the western shelf of Sakhalin Island becomes much stronger than the Liman Current along the continental bottom slope. On meteorological synoptic time scale in any season similar change of the circulation regime in the strait can be also resulted from the change of the south-eastern wind to the north-western one when the meteorological situation with anticyclone over the Okhotsk Sea is changing to the situation with strong cyclone. The model results are verified by using oceanographic observation data and high resolution satellite images.

Keywords: simulation, mesoscale, circulation, Tatar Strait

*Presenter: E-mail: pvi711@yandex.ru