

## ***The results of the Laboratory of Nonlinear Dynamical Systems (2016)***

Lagrangian analysis of formation, structure, evolution and splitting of Kuril eddies We studied in detail a mesoscale anticyclonic eddy that has been sampled in the R/V Professor Gagarinskiy cruise in June – July 2012 in the area east of the Kuril Islands in the northwestern subarctic Pacific. Lagrangian approach was applied to study formation, structure and evolution of this feature called the eddy A and of its parent eddy B using a simulation with synthetic tracers advected by the AVISO velocity field. We used different Lagrangian techniques to identify those eddies and their boundaries, to know their structure and to document their deformation, metamorphoses and splitting. It has been found that the eddy A was born as a result of splitting of the eddy B with the core water borrowed from the eddy B which, in turn, was influenced by the Okhotsk Sea water flowing into the ocean through the Kuril straits. The periphery of the eddy A was formed mainly by the

Eastern Kamchatka Current water in the process of its winding onto the eddy We have found a Lagrangian structure of those eddies and the ways how they have gained and released water. Simulated and measured locations of the center of the eddy A and its boundary have been estimated to coincide with the accuracy of 7-10 and 15-20 km, respectively. Our simulations were validated in part by tracks of available surface drifters and Argo floats. We presented CTD hydrographic observations of the Kuril eddy A from the surface to deep waters and compared observed and simulated results in order to establish origin and properties of water masses constituting that eddy.

According to voting at the Institute Scientific Council, the following result was recognized as **the most important one in the Institute in 2016**

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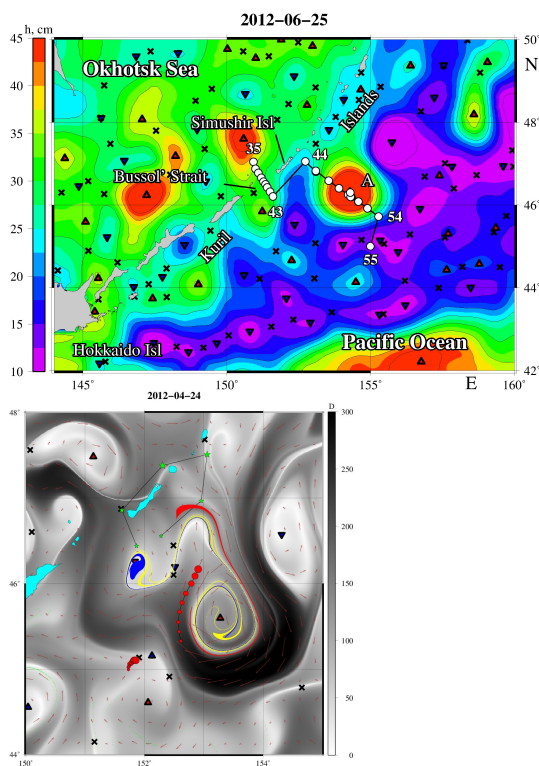


Figure. The anticyclonic Kuril (Bussol) eddy A in the SSH field in the end of June 2012. The marshrute of the R/V Professor Gagarinskiy is shown. The drift Lagrangian map on 24 April 2012 with tracks of two drifters (red circles) shows formation of the eddy A and its interaction with the surrounding features. Triangles and crosses are elliptic and hyperbolic points in the AVISO velocity field.

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