

Observation of anticyclonic eddies in the western subarctic North Pacific

*Ueno Hiromichi¹, Ryo Dobashi², Yuki Okada², Takahiro Tanaka³, Jun Nishioka⁴, Toru Hirawake¹, Atsushi Ooki¹, Sachihiko Itoh⁵, Yoshikazu Sasai⁶, Hideharu Sasaki⁶, Ichiro Yasuda⁵

1. Faculty of Fisheries Sciences, Hokkaido University, 2. Graduate School of Fisheries Sciences, Hokkaido University, 3. Tohoku National Fisheries Research Institute, Japan Fisheries Research and Education Agency, 4. Institute of Low Temperature Science, Hokkaido University, 5. Atmosphere and Ocean Research Institute, The University of Tokyo, 6. Japan Agency for Marine-Earth Science and Technology

Mesoscale eddies in the subarctic North Pacific have a significant impact on the heat, freshwater, macro- and micro-nutrient and biota exchanges between shelf and offshore regions and thus play an important role in the marine ecosystem of the offshore region. In the offshore western subarctic North Pacific, we conducted a cross-section observation of two mesoscale eddies (Eddies A and B) on board T/S Oshoro-maru in June–July 2016. Satellite data analysis revealed that Eddy A formed along the Alaskan Peninsula, and Eddy B formed in the observation area. Unexpectedly, it was found that iron and chlorophyll concentrations were low both inside and outside of the eddies. Satellite chlorophyll concentration was high inside of Eddy A along the Aleutian Islands and for a while after it detached from the Aleutian Islands, suggesting that iron originated from coastal region was lost during 2-year journey in the offshore region to the Oshoro-maru observation area. Oshoro-maru observation also revealed that the vertical diffusivity was low both inside and outside of Eddies A and B. This weak vertical mixing could be another reason for low iron and thus low chlorophyll concentration inside Eddies A and B. Analysis of the output data of high-resolution model suggested that the weak vertical mixing could be attributed to the seasonality of the vertical velocity inside mesoscale eddies and the weakness of Eddies A and B.

Keywords: mesoscale eddy, western subarctic North Pacific