

Structure of the Transition Domain observed with drifting buoys

*Hatsumi Nishikawa¹, Humio Mitsudera¹, Takeshi Okunishi², Shin-ichi Ito³, Taku Wagawa⁴, DAISUKE HASEGAWA², Toru Miyama⁵, Hitoshi Kaneko²

1. Institute of Low Temperature Science, Hokkaido University, 2. Tohoku National Fisheries Research Institute, Japan Fisheries Research and Education Agency, 3. Atmosphere and Ocean Research Institute, The University of Tokyo, 4. Japan Sea National Fisheries Research Institute, Japan Fisheries Research and Education Agency, 5. Japan Agency for Marine-Earth Science and Technology, Application Laboratory

The North Pacific transition domain is the area where seawater exchange between subtropical and subarctic is carried out and it is very important area for oceanographic, meteorological, and biological. This study aims to clarify the flow structure and the process of the seawater exchange in the transition domain based on the results of drifting buoys observation and particle trajectory analysis using the lagrangian trajectory code TRACMASS (Döös 1995, Blanke and Raynaud 1997).

The trajectory of the drifting buoys visualized the flow structure around the Isoguchi jet (Isoguchi et al., 2006, Wagawa et al., 2014) and the transition domain. The frequency distribution of modelled particle trajectory shows the flow along the bottom topography in the west side of the transition domain and the flow via the gap of the bottom topography in the east side of the transition domain. These flow suggest seawater transport paths from the subtropical to the subarctic.

High frequency region is also distributed around 42°N -155°E. The high frequency region corresponds to the swirling flow of the drifting buoys. The cause of the swirling flow may be barotropic flow with the small bottom topography located at 42.5°N -157°E and baroclinic flow with baroclinic instability near the surface. The swirling flow may contribute to the seawater exchange between subtropical and subarctic in the transition domain.

Keywords: transition domain, Isoguchi jet, drifting buoy observation, bottom topography