

## Influence of tide on the growth and migration of walleye pollock (*Gadus chalcogrammus*) in the Oyashio region

\*Shin-ichi Ito<sup>1</sup>, Zi-jian Wang<sup>1</sup>, Hatsumi Nishikawa<sup>3</sup>, Humio Mitsudera<sup>3</sup>, Mitsuhiro Ishino<sup>2</sup>

1. Atmosphere and Ocean Research Institute, The University of Tokyo, 2. Fisheries Research and Education Agency Japan, 3. Hokkaido University

A bioenergetics model of walleye pollock (*Gadus chalcogrammus*) coupled with a lower trophic level nutrient-phytoplankton-zooplankton model was developed to investigate environmental effects on the pollock growth in the Oyashio region. The bioenergetics model was coupled to a migration model of pollock based on the environments calculated by an ocean general circulation model (CCSR (Center for Climate System Research) Ocean Component Model: COCO) coupled to a simple nutrient cycle model. In the growth-migration model, two physical environment conditions (with and without tidal forcing) were applied to investigate the tidal effects on the growth and migration of pollock. With tidal effect, warm water supply through the Tsugaru Strait to the southwestern coast of Hokkaido increased and a strong temperature front was formed along the southwestern coast of Hokkaido. Coastal current associated with the temperature front advected the pollock larvae to the Cape Erimo and pollock successfully settled to the bottom layer. Comparing the result without tidal forcing, tide potentially provide optimal temperature condition for growth and higher possibility to settle near coast. On the contrary, tide potentially provide lower nutrient supply with increasing nutrient poor water through the Tsugaru Strait. Therefore, the pollock growth itself did not change between with and without tidal forcing.

Keywords: marine ecosystem model, fish growth-migration model, walleye pollock