Sensitivity analyses of growth and migration of Japanese anchovy (*Engraulis japonicus*) in the East China Sea using a fish growth-migration model.

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Japanese anchovy (Engraulis japonicus) is an important species not only as an exploited species but also as prey for variety of predators including marine mammals, tunas, mackerels, flounders, etc. However, the biomass of Japanese anchovy have shown large fluctuation and is one of the main actors of the fish species alternation responding to basin scale climate variabilities. From the stock management views, three sub-populations are defined in Japan: Pacific stock, Tsushima stock (also called the East China Sea stock), and Seto-inland Sea stock. There is evidence (different weights-at-age and longevity) of three sub-populations of anchovy within the Japan system. While he three sub-populations of anchovy share their spawning grounds, the migration route and nursery grounds are divided. In addition, while Seto-inland Sea sub-populations do not show a large migration, Pacific and Tsushima sub-populations make long distance ontogenetic migrations, On the contrary, there is no evidence of a similar migration of juvenile anchovies in the California Current system. Therefore, we are focusing on the movement (advection and migration) routes of eggs, larvae, and juveniles from the spawning grounds to the adult grounds. We developed a fish-migration and growth model using environmental conditions derived from simulations of a coupled ocean circulation and ecosystem model. For the ocean circulation model, a high resolution (1/10 deg.) FRA-ROMS (Fisheries Research Agency - Regional Ocean Modeling System) was used. For the marine ecosystem model, eNEMURO, an extended version of NEMURO (North Pacific Ecosystem Model for Understanding Regional Oceanography) was used. The larvae transported to southern part of Kyushu Island in Japan (current main fisheries ground for anchovy larvae) were reasonably reproduced in the model. The sensitivity analyses of swimming efficiency will be conducted respect to the migration route of anchovy.

Keywords: marine ecosystem model, fish growth-migration model, Japanese anchovy

