Long-term comparison between the Japanese sardine stock level and simulated zooplankton density around the Kuroshio axis

*Haruka Nishikawa¹, Hiroyuki Tsujino², Shiro Nishikawa¹, Hideyuki Nakano², Toru Sugiyama¹, Yoichi Ishikawa¹


Food availability in the larval stage is thought to be one of the important control factors for the Japanese sardine (*Sardinops melanostictus*) stock fluctuation. However, it is hard to compare the stock level with food availability, because there are few long-term data set of zooplankton. In this study, we simulated the past zooplankton density in the Northwestern Pacific from 1930s by using an NPZD model to solve the problem. Following a previous study that suggested an importance of the Kuroshio axis region as a larval feeding grounds, we compared the modeled zooplankton density in that region with the logarithm of recruitment per spawner (LNRPS) from 1978 to 2017 and catch from 1938 to 2017. This is the first study that shows the timeseries of modeled zooplankton density in the Japanese sardine feeding grounds. We found that there is a significant positive correlation between the zooplankton density and the LNRPS. Also the zooplankton density variation is consistent with the catch variation. These results suggested that the zooplankton density variation in the Kuroshio axis region affected the stock fluctuation of the Japanese sardine over the past few decades.

Keywords: Japanese sardine, NPZD model, Kuroshio