

Long-term variability of larvae feeding grounds of Japanese sardine and its environment

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Since 1980s, many previous studies have suggested that Japanese sardine (*Sardinops melanostictus*) is influenced by climate change. Recently, two studies focused on where and what is significant for controlling the stock. One study suggested that the environment of winter Kuroshio front area controlled the stock variation because that area was main distribution area of sardine larvae in 1980s. Another study revealed the dependency of larval growth on temperature, so-called "Optimal temperature hypothesis". According to this hypothesis, the stock variation depends on the ambient temperature of larvae. Japanese sardine has a notable habit that their spawning grounds move drastically in decadal scale. It implies that distribution area of larvae also changed. Considering this spawning habitat, the current distribution area of larvae has already not been in the winter Kuroshio front area. On the other hand, if the optimal temperature hypothesis can totally explain the stock variation, long-term stock variation depends on ambient temperature of larvae wherever they are distributed.

Whether the significant area for the stock variation has changed and whether ambient temperature controls the stock variation in decadal scale are important points to understand how the climate change affects the sardine stock. However, there is few knowledge about long-term variability of larvae feeding grounds.

In this study, we estimated the larval distribution area and environment from 1980s to 2000s by using the most advances reanalysis dataset. Through the comparison between past environment and the stock variation, we examined above two hypotheses.

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