

## **Impacts of ENSO on skipjack tuna (*Katsuwonus pelamis*) in the Western Central Pacific Ocean**

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### **Introduction**

Skipjack tuna (*Katsuwonus pelamis*) contributes about 70% of the total tuna catch in the Pacific Ocean. This species are commonly found in surface layer of tropical and subtropical waters all over the world, but the largest catches are taken from the warmpool in the western equatorial Pacific. Lehodey *et al.* (1997) revealed the relationship between the distribution of skipjack and warm pool. The movements of skipjack are linked to large zonal displacements of the warm pool that affect during ENSO events. In this study, Korean purse-seine fisheries data were applied to investigate the zonal displacement of skipjack in WCPO depending on ENSO. To verify the condition of skipjack biology related on ENSO, the mean-length and GSI were compared with environmental factors.

### **Materials and Methods**

Monthly total catch (in tones) and Catch Per Unit Effort (CPUE; catch/fishing day) were calculated in the area 5°N-5°S, 120°E-180°W from obtained data from 1985 to 2003 by 1°\*1° scale. To determine the fishing ground longitudinal gravity centre of CPUE were calculated with the formular used by Lehodey et al. (1997). Biological information of skipjack tuna, such as weight, FL, and GSI, are collecting in every month at the tuna canning factory in Chanwon, Korea. Three environmental factors, such as Southern Oscillation Index (SOI) and SST in NINO3.4 (5°N~5S°, 170°W-120°E), and SST in main fishing ground (5°N~5°S, 140-170°E), were compared with fisheries and biological data of tuna.

## Results

There are consistent trends in those ENSO factors and computed longitudinal gravity centres of CPUE, especially during ENSO series. Statistically significant correlations in the gravity centres of CPUE were found in all of three environmental factors. In particular the trend of longitudinal relocation had showed high correlations with two of ENSO factors. Strong interannual variations are observed in catch rate, and catch is significantly correlated with SST in main fishing ground. From cross-correlation with time lag, the evolution of the SOI preceded the CPUE gravity centre and catch rate by four months and 7 months, respectively. Instead of seasonal change, biological characteristic displayed in interannual variability. From the correlation coefficient, two of ENSO factors related to fluctuations of length and maturation. According to the result of cross-correlation, SOI may previously affected skipjack length and maturation by 5 months and 8-9 months ahead.

## References

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