Climate change and food: Changes and expansion of fishing ground of squid in Korea

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Abstract

Squid has known to play an important role as predator and prey in marine food-webs. Since squid are one of the preferred fish species of Koreans, the catch of squid has been an important target for fisheries in Korea. In Korea, squid has been caught mainly in the East Sea, and the predominant species of the catch is *Todarodes pacificus*. From the early 1990s, the squid catches increased sharply compared to the 1980s. Looking at the fluctuation of fisheries in the 2000s, the catch of squid in the West / Yellow Sea has increased. This fact has become a new opportunity to recognize the importance of the West / Yellow Sea as a freshwater squid fishery. In this study, we investigated the long-term effects of climate change on the variation of fishing ground of *Todarodes pacificus* in Korean coastal sea. This was studied by examining / determining the relationship between the main meteorological / oceanographic factors and fluctuation of catch of the squid during the past 30 years (1981 ~ 2010). Time series analysis, correlation analysis, and regression analysis were used to determine the change in abundance of squid population compared with climatic variables (237). We found that squid distribution in the Korean coastal sea increased over the 30-year time series and there were significant annual variations in every ten years ($p < 0.01$). Among the investigated factors, air temperature, air pressure, and sea surface temperature were positively correlated with the catch of squid ($p < 0.05$), but dissolved oxygen ($p < 0.05$) negatively correlated with the catch ($p < 0.001$).. These results suggest a causal association between climate variability, notably warming temperatures and squid populations.. Climate change appears to have been largely favorable for squid.

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Image

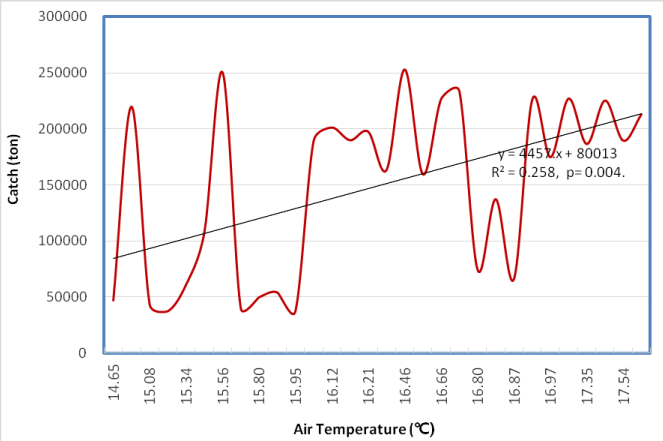

Fig. 1. The relationship between annual catch of squid in offshore fisheries and air temperature.

Recent Publications

1. Song, JY, Lee JS, Kim JJ, Lee HJ, Park MH, Han IS. 2017. Transport process and directly entrainment possibility into the Yellow Sea of *Todarodes Pacificus* winter cohort Korean J Fish Aquat Sci 50. 183-194. .
2. Lie HJ, Cho CH and Lee S. 2009. Tongue-shaped frontal structure and warm water intrusion in the southern Yellow Sea in winter. J Geophys Res 114, C01003. http://dx.doi.org/ 10.1029/2007JC004683.
3. Fukudome KI, Yoon JH, Ostrovskii A, Takikawa T and Han IS. 2010 Seasonal volume transport variation in the Tsushima Warm Current through the Tsushima Straits from 10 years of ADCP observations. J Oceanography 66, 539-551. http:// dx.doi.org/10.1007/s10872-010-0045-5.
4. Kim JJ, Lee HH, Kim SA and Park C. 2011. Distribution of larvae of the common squid Todarodes pacificus in the northern East China Sea. Korean J Fish Aquat Sci 44, 267-275. http://dx.doi.org/10.5657/KFAS.2011.0267.
5. Kim JJ, Stockhauses W, Kim S, Cho YK, Seo GH and Lee JS. 2015. Understanding interannual variability in the distribution of, and transport processes affecting, the early life stages of *Todarodes pacificus* using behavioral-hydrodynamic modeling approaches. Prog Oceanogr 138, 571-583. http://dx.doi. org/10.1016/j.pocean.2015.04.003.

Biography (150 word limit)

J. S Kim Is working for Keimyung University of Republic of Korea (South Korea) from 1982. He is in teaching and research capacity. He is now in sabbatical leave and joining Oregon State University, U. S. A. He is a specialist in the field of Industrial and Management Engineering. His undergraduate background is Business Administration, and he majored in Industrial Engineering at his master and doctoral courses. He has many publications in the peer-reviewed scientific journals, and edited several books including "Technology and Management".

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