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Structure of the Western East Sea Ecosystem

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Introduction

In this study, we studied the structure of the western East Sea ecosystem and ecotrophic relationships among species inhabited at the East Sea using Ecopath (Christensen and Pauly, 1992) program. And in order to examine how the Climatic Regime Shift (CRS) affected to the western East Sea ecosystem, we analyzed the structure of the western East Sea ecosystem dividing before and after 1976/1977 CRS.

Data and Methods

Ecopath models were constructed for two periods : (1) the before CRS covering the period 1970 year to 1975 year and (2) the after CRS covering the period 1978 year to 1984 year. Organisms of the western East Sea ecosystem were divided 16 functional groups according to habitat and ecological characteristics. Functional groups were apex predator, small pelagics, semi-demersal fish, cephalopods and so on. Basic input data are catch data, biomass, production/biomass ratio (P/B ratio), consumption/biomass ratio (Q/B ratio) and diet composition. Biomass was calculated from B=C/F relationship using catch data from 1970 year to 1984 year (MOMAF, 1971-1985) and instantaneous fishing mortalities. Where, C is catch and F is instantaneous fishing mortality. Catch data were average catch for each period, instantaneous fishing mortalities were weighted mean of values of species in the groups. Regarding P/B ratio as instantaneous total mortality (Z) in the equilibrium situation (Allen, 1971), P/B ratios were estimated from a weighted mean of values of species in the groups. Q/B ratios and diet composition were referred to the previous literature.

Results and Discussion

In the western East Sea ecosystem, primary producers were algae and phytoplankton, primary consumers were epifauna, infauna, gastropods and zooplankton. Secondary consumers were whales, small sharks, small pelagics, large pelagics, semi-demersal fish, cephalopods and benthic feeders. Finally, terminal consumers were apex predator and sea bird. Based on the mass-balanced model to compare the periods of before and after 1976/77 CRS, total biomass and total catch of all functional groups in the western East Sea after 1976/77 CRS increased by 84% and 94%, respectively. Especially, biomass of cephalopods, demersal fish, semi-demersal fish and small pelagics group were increased by 329%, 164%, 119% and 115%, respectively. Mean trophic level of the functional groups in the western East Sea increased from 2.44 to 2.85.

Reference

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