

Fluctuation of the South Pacific Albacore Stocks (*Thynnus alalunga*) Relative to the Sea Surface Temperature

Chien-Hsiung Wang¹

(Manuscript received 1 May 1998, in final form 19 November 1998)

ABSTRACT

Both biomass and production of the south Pacific albacore stocks were estimated by the improved surplus production model. Estimations were based on the catch and effort data of the south Pacific albacore tuna longline fisheries.

Indices of the area and perimeter of the isotherms of the albacore preferred sea surface temperature and the higher sea surface temperature (over 28°C) were measured. They were then used as indices of the sea surface temperature of the south Pacific albacore tuna longline fishing grounds.

The relations between the albacore stocks and the index of the sea surface temperature were examined. The results are as follows:

(1) Fluctuations of the south Pacific albacore stocks can not be explained by the distributions of the preferred sea surface temperature alone.

(2) Fluctuations of the south Pacific albacore stocks depend mainly on the distributions of over 28°C sea surface temperature.

(3) The heavier El Niño events in 1982/83 and the particular development of the gill netters in 1989 to 1991 clearly influenced the south Pacific albacore stocks.

(4) After adjusting for the effects of the heavier El Niño events and the rapid development of the gill netters, albacore stocks show a significant correlation with the index of over 28°C sea surface temperature.

(Key words: Sea surface temperature, South Pacific albacore stocks)

1. INTRODUCTION

Following this same theory of the surplus production model, Wang (1996) suggested the IPM-method (Improved surplus Production Model) for assessing fish stocks. It was applied in assessing south Pacific albacore stocks (Wang 1997; 1999). The parameters, including annual biomass, production, and fishing mortality rate of the south Pacific albacore stocks, were estimated. The estimated maximum sustainable yield of the south Pacific albacore stocks was

¹Institute of Oceanography, National Taiwan University, Taipei, Taiwan, ROC