

# Variability on Skipjack Tuna (*Katsuwonus pelamis*) Fisheries in the FMA 715, Indonesia

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## ABSTRACT

This study aimed to determine the variability in peak season of tuna fishing to regional climate change with the aim to optimize the utilization of *Katsuwonus pelamis*. Sampling and measurement times were performed at the end of the East season, which was from September to December 2019. The results of this study show that regional climate change affected inter-monthly variation of the peak seasons of *Katsuwonus pelamis* fishing in the fisheries management (FMA) 715 area. The regional climate change triggered from the Pacific Ocean caused the unsuitable water conditions in the FMA 715 for *Katsuwonus pelamis* fishing.

**Key words:** Climate change, Papua, Sea surface temperature, Tuna

## Introduction

Global warming that hits the world today causes global climate change that is irregular and has an impact on the environment as a whole. This global change touches the joints of life in the territorial area and will negatively impact to the potential, quality and quantity of marine and fisheries resources such as finfish and shellfish (Isoni *et al.*, 2019; Islamy and Hasan, 2020). The impact of global warming on the atmosphere, for instance, is the temperature increase until 0.5 °C throughout the 20<sup>th</sup> century (Church and White, 2011).

Marine and fisheries resources have a characteristic that is trans-boundary (Song *et al.*, 2016) and have a great potential to be affected by global climate change (Monnereau and Oxenford, 2017). Changes in the aquatic environment can affect the life cycle of aquatic biota (Hasan and Widodo, 2020; Hasan and Islam, 2020; Gani *et al.*, 2021; Hasan *et al.*,

2021). Changes in global environment emerge because there are climate changes characterized by warming in the atmosphere. Tuna is one of Indonesia's main export commodities (Hidayati *et al.*, 2015). This study investigated the water sensitivity of FMA 715 towards regional climate change that affected the monthly variability of *Katsuwonus pelamis* catches, with the aim to increase the optimization of the *Katsuwonus pelamis* fishing.

## Materials and Methods

The position of the each observation station in FMA 715, West Papua. Fishing ground location was located between 00°11'26"S - 02°53'08"S and 129°07'08"E - 130°44'34"E (Fig. 1).

Observations and data collection on oceanographic variable factors (SST and salinity) in the FMA 715 area were carried out using satellite data and in situ data from September to December 2019.

The study was conducted using qualitatively descriptive methods by investigating the direct correlation between *Katsuwonus pelamis* catches during 2014-2019 and regional climate change that occurred during those periods. Simultaneous measurement methods of Sea Surface Temperature (SST) in the FMA 715 waters area were performed using satellite imagery and Triton buoy data.

**Results and Discussion**

The temperature of the FMA 715 waters is directly affected the Pacific Ocean (Fig. 2). Water temperature based on vertical sea temperature data from Triton buoy was obtained at various depths 1.5 m. For temperature from Triton data which is the sea surface temperature (SST), the results show average of SST variations ranged from 28.4 °C-30.6 °C. The biggest catch of *Katsuwonus pelamis* was in the SST range of 29-30°C (Nugraha *et al.*, 2020).

The conditions of Indonesia’s oceanography are influenced by global climate change, for example, the condition of rainfall on land and at sea, sea surface temperature (SST) and sea level height. Global warming will increase sea level and water tempera-

ture (Brown *et al.*, 2019). The impact of the ozone layer is expected to affect the performance of chlorophyll to produce.

Oceanographic conditions of the FMA 715 waters returned to normal and began to form upwelling. The horizontal surface temperature in North Papua comes from the temperature flow of the water mass originating from the Northwest Pacific. This event is known as the lower current in North Guinea/North Guinea Coastal under Current (NGCUC). The displacement of the water mass from the Pacific (in-flow) into the eastern islands such as Papua occurs along the Northwest monsoon wind and outflow to the Indian Ocean occurs along the Southeast monsoon wind (Hartoko, 2007).

The existence of NGCUC water flow from a depth of 100 m in northern Papua then rises to the surface of the water of south Halmahera and becomes upwelling. The effect of upwelling in this area that brings nutrients from deeper water to the water surface can cause nutrification and plankton blooming (Hartoko, 2009). The formation of warm water mass in the internal waters of FMA 715 is an ideal condition for the environment of *Katsuwonus pelamis*. Normal phase in March to september 2014,

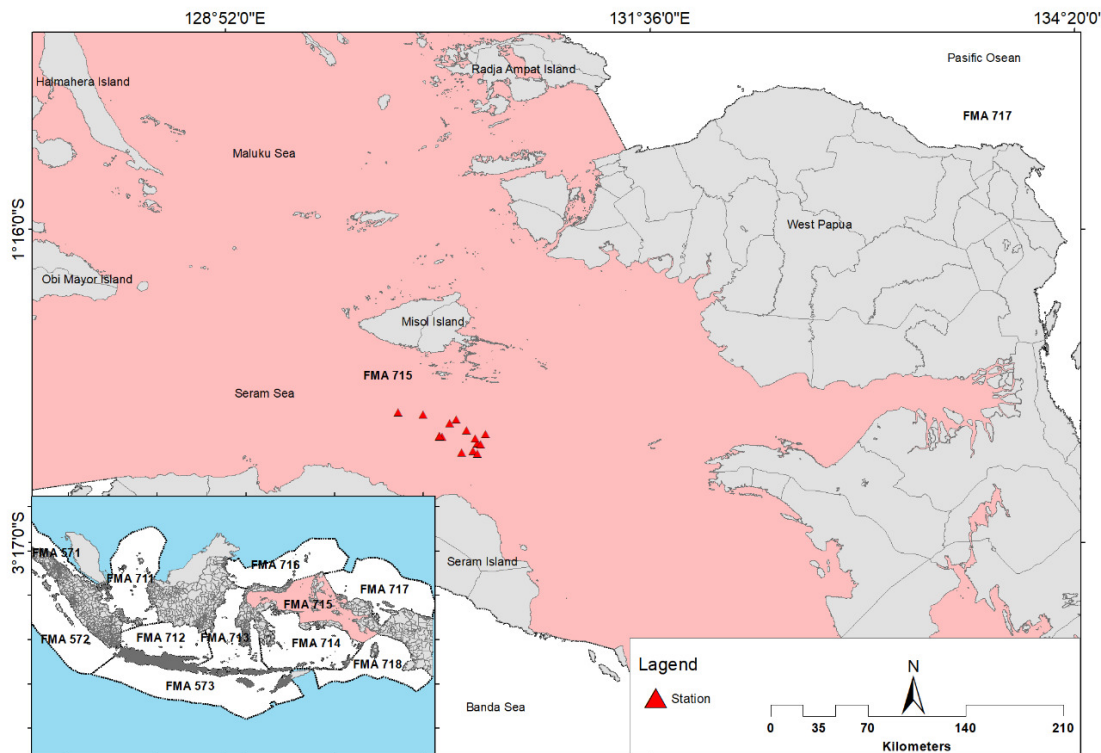


Fig. 1. Map of sampling site (Ministry of Marine and Fisheries, 2014)

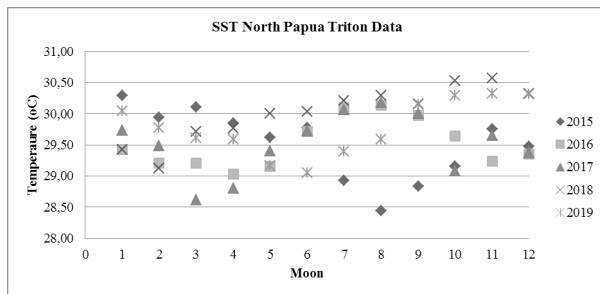


Fig. 2. Sea Surface Temperature (SST) in the FMA 715 waters

march to august 2018.

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