# Long-term series variation in fishery biology of *Dosidicus gigas* off Peru: Response to climate variability from 2008 to 2020

Ya Ting Dan[1] , Bi Lin Liu[1,2,3] , Xin Jun Chen[1,2,3] , Wei Guo Qian[4]

1College of Marine Sciences, Shanghai Ocean University, Shanghai, China
2National Engineering Research Center for Oceanic Fisheries, Shanghai, China
3The Key Laboratory of Sustainable Exploitation of Oceanic Fisheries Resources, Ministry of Education, Shanghai, China
4College of Marine Sciences, Zhejiang Ocean University, Zhoushan, China

## Background:

As a cephalopod with a short life cycle, the *Dosidicus gigas* (Jumbo flying squid) is extremely sensitive to changes in climate and marine environment in terms of individual growth and resource changes.

## Objective:

The impacts of climate variability and marine environment change on the biological characteristics of *D. gigas* under long time series provide a scientific basis for a detailed understanding of the response of the biological characteristics of *D. gigas* to climate variability.

## Sample collection

From 2008 to 2020, a total of 7514 D. gigas samples were collected in the Chinese jigging fishery outside the exclusive economic zone waters of Peru .

## Environmental data collection

According to sample collection time:2008, 2010, 2011, and 2020 were La Niña years, while 2009 and 2015 were El Niño years, and 2013, 2014, and 2019 were normal years.

## Data analysis

ANOVA was used to analyze the ML and frequency composition of different years, genders, and sexual maturity.

Logistic curves were used to estimate the size at the first stage of maturity of male and female individuals in different years

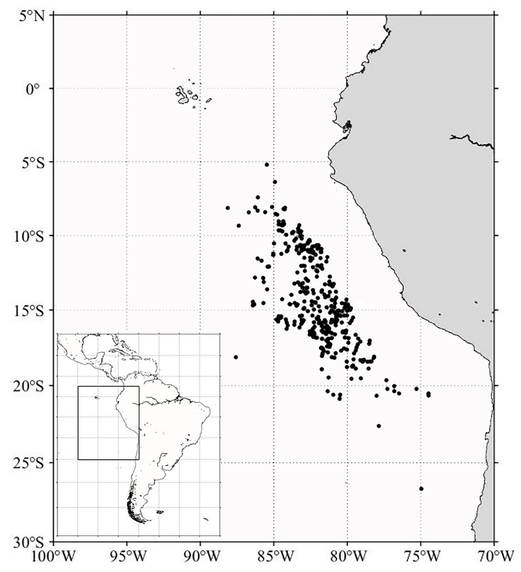


Figure1 Sampling locations of D. gigas off Peru

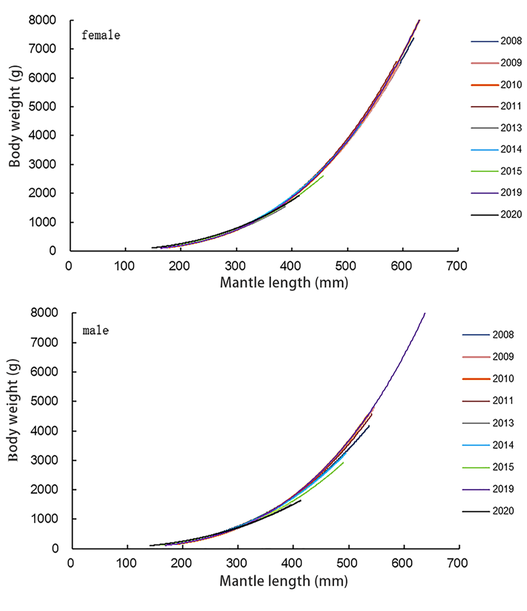


Figure 3 Relationship between mantle length and body weight of female and male *D. gigas* in different years

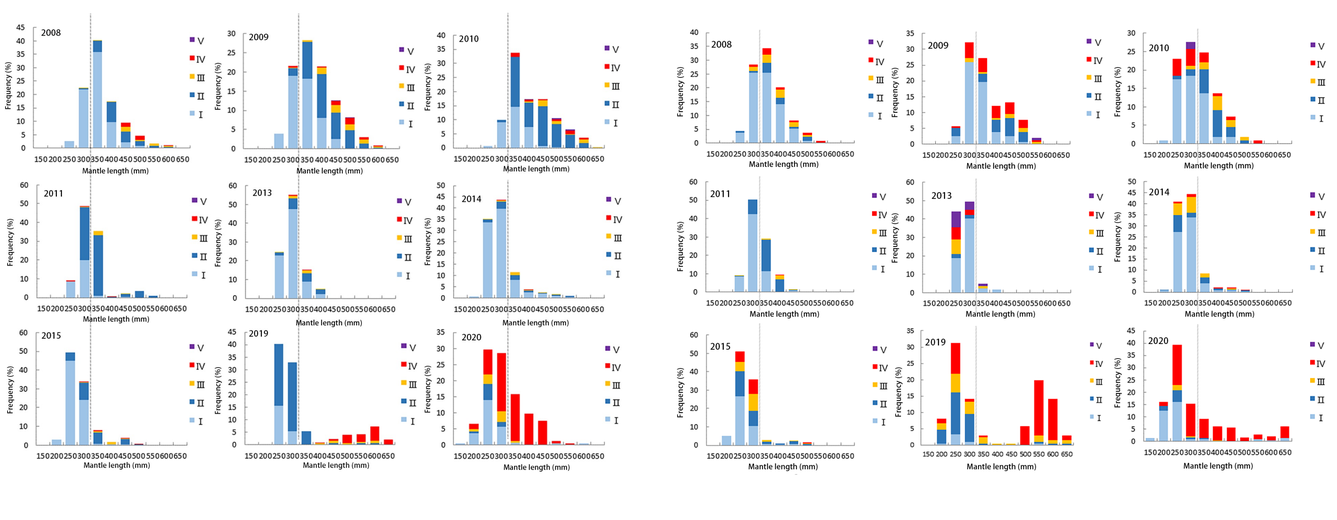


Figure 4 Relationship between sexual maturity and mantle length of males and females *D. gigas* in different years

## Results

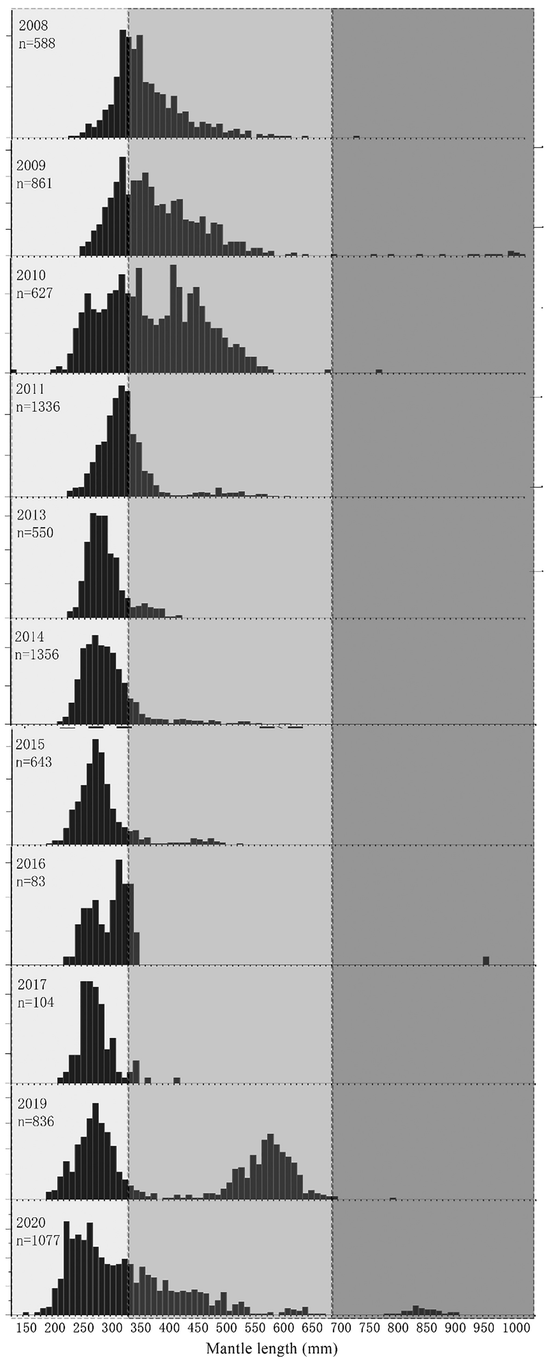


Figure2 Variety of mantle length of *D. gigas* in the offshore waters of Peru from 2008 to 2020. The shadow part represents groups of different sizes of *D. gigas*. Light gray represents a small group; medium gray represents a medium group; dark gray represents a large group. The abscissa is the mantle length and the ordinate is the sample frequency

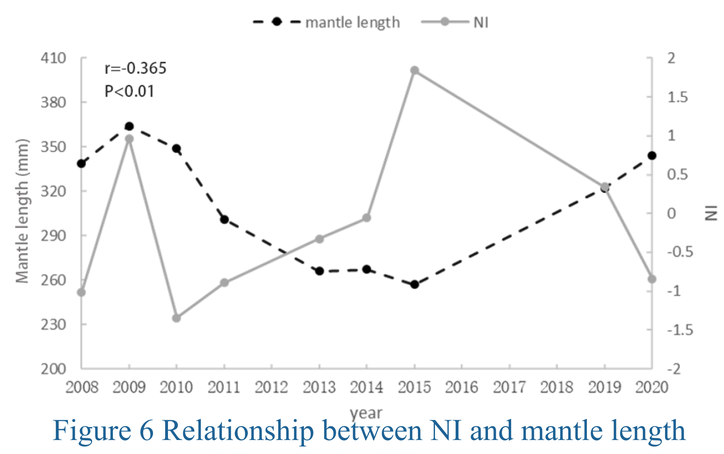


Figure 5 Mantle length at 50% maturity of male *D. gigas* in different years

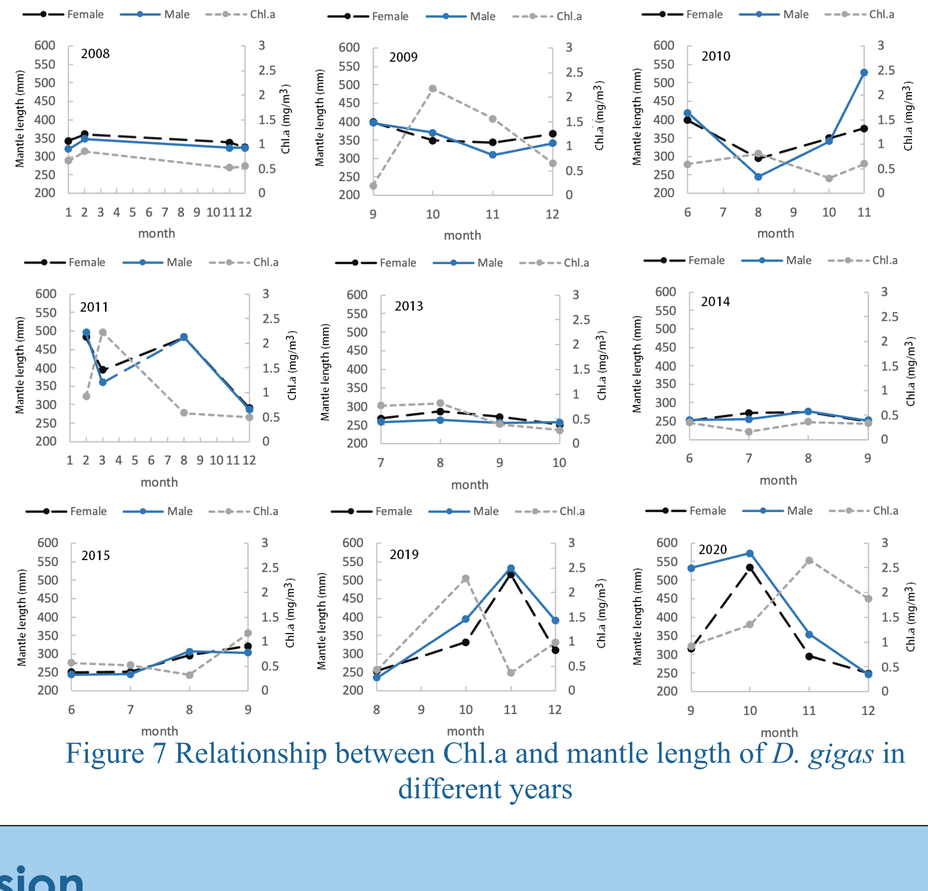


Figure 7 Relationship between Chl.a and mantle length of *D. gigas* in different years




Figure 6 Relationship between NI and mantle length of *D. gigas* in different years

## Conclusion

The study found that from 2008 to 2020, the mantle length of **small-size** groups of *D. gigas* **decreased**, and the mantle length of **medium-size** groups **increased**;

The mantle length of both male and female individuals at first sexual maturity decreased; La Niña event was conducive to the growth of *D. gigas*, which produced more **larger-size** individuals; El Niño events suppressed the growth of *D. gigas*, resulting in **smaller-size** individuals.

## Contact Information

1). Reporter: Yating Dan // PhD Candidate
2). Institution: China's Squid Fishing Technology Group
3). Direction: Fishery Biology & Ecology of Cephalopods
4). E-Mail: dinaty@163.com
5). Address: College of Marine Science, Shanghai Ocean University, Shanghai, China, 201306

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