Form 3

Annual Report

LaMer, Ehime University

Date (24 , 2 , 2018)

To Director of LaMer

Principle Investigator:

Affiliation Ocean University of China, OUC

Position master candidate

Name in print Mengqi Zhu

Include the report on the result of the project/meeting in a separate sheet.

1. Project / Meeting title

The seasonal and inter-annual variations of the influences of the water masses structures along the Tsushima Strait Section on the temperature and salinity distributions along the Japan Sea Section

2. Members of project / meeting

Name	Affiliation	Position	Contribution part
PI			
Mengqi Zhu	Ocean University of China, OUC	master candidate	Data processing; Paper writing
Members			
Jie Shi	Ocean University of China, OUC	Associate Professor	Beneficial discussion
Huiwang Gao	Ocean University of China, OUC	Professor	Beneficial discussion
Xinyu Guo	Ehime University	Professor	Beneficial discussion

Title

The seasonal and inter-annual variations of the influences of the water masses structures along the Tsushima Strait Section on the temperature and salinity distributions along the Japan Sea Section

Members' names and affiliations

Name	Institution and Department	Employment position	E-mail
Jie Shi	Ocean University of China, OUC	Associate Professor	shijie@ouc.edu.cn
Huiwang Gao	Ocean University of China, OUC	Professor	hwgao@ouc.edu.cn
Xinyu Guo	Faculty member of LaMer	Professor	guoxinyu@sci.ehime-u.ac.jp

Aim

This project aims to carry out cooperative research with Prof. Guo Xinyu of Ehime University on the seasonal and inter-annual variations of the influences of the water masses structures along the Tsushima Strait Section on the temperature and salinity distributions along the Japan Sea Section.

Procedure

The principal investigator (PI) has first made an oral presentation "The seasonal and inter-annual variations of the influences of the water masses structures along the Tsushima Strait Section on the temperature and salinity distributions along the Japan Sea Section." and showed the recent studies including:

1. The temperature and salinity's seasonal variations on section of the Japan Sea and section of the Tsushima Strait.

2.The seasonal variations of the influences of the water masses structures from the section of the Tsushima Strait Section to the Japan Sea Section.

3. The seasonal and inter-annual variations of mixing ratios of the different Tsushima Strait water masses to the Japan Sea Section.

4. The analysis on the mixing ratios' variations between the two sections.

Results

Based on the observed water temperatures and salinities along the Tsushima Strait Section and the Japan Sea Section from WOD13 (Fig. 1), the seasonal and inter-annual variations of the influences of the water masses structures along the Tsushima Strait Section on the temperature and salinity distributions along the Japan Sea Section were analyzed. The water masses structures along the Tsushima Strait Section showed obvious seasonal variations (Fig. 2). In winter, the whole water column was occupied by the high-salinity water. In summer, the surface water at Tsushima Strait Section was characterized by high temperature and low salinity; the deeper water was of high salinity and the subsurface water was the mixture of the surface water and the deeper water. Compared the seasonal variations of temperatures and salinities along the two sections, it was suggested that the distributions of temperature and salinity at the Japan Sea Section were influenced by the structures of water masses at the Tsushima Strait Section. At the Japan Sea Section, the distributions of temperature and salinity in autumn were most complicated. The surface water was of low salinity, which was influenced by the Tsushima Strait Surface and Subsurface water. The Japan Sea Subsurface water was of high salinity, which was determined by the Tsushima Strait Deeper Water. The deeper water was of low temperature and high density, which was named as the Japan Sea Local

Water. The water masses composition along the Tsushima Strait Section caused the inter-annual variations of the temperature and salinity distribution along the Japan Sea Section (Fig. 3). The larger Changjiang runoff made the core salinity of summer Tsushima Strait Surface and Subsurface water lower, and therefore the mixing ratios was higher. The mixing ratios of the Tsushima Strait high salinity water to the Japan Sea Section was determined by the current structure and the temperature and salinity distribution in the subsurface layer.

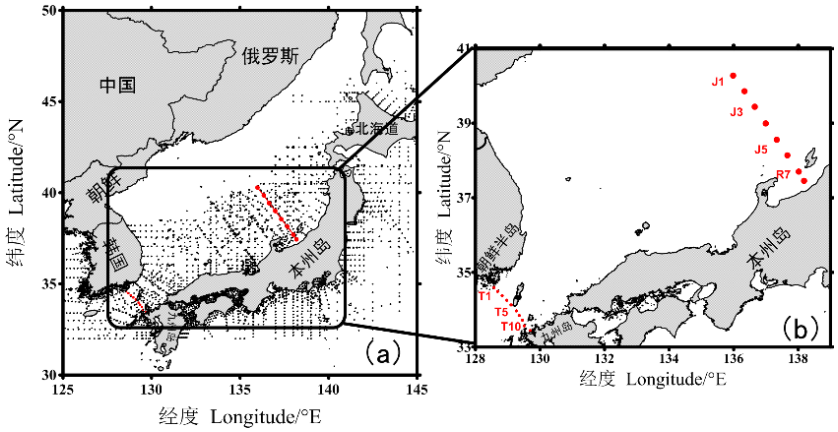

Fig. 1. The study area(a) and the stations at the two observational sections(b).

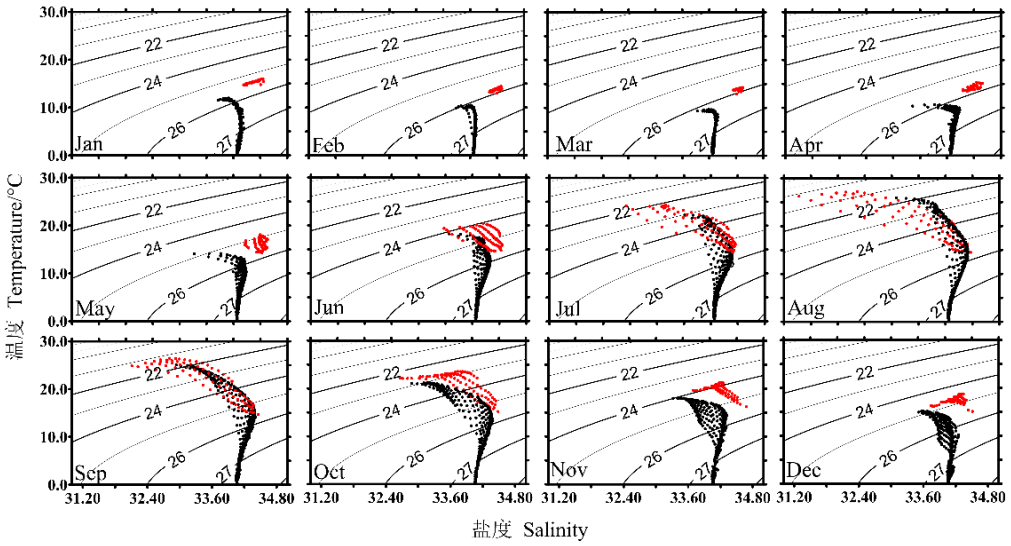

Fig. 2. Climatological T-S diagrams at Tsushima Strait Section and Japan Sea Section from January to December. Red and black dots represent T-S dots at Tsushima Strait Section and Japan

Sea Section, and the black lines are the isopycnals.

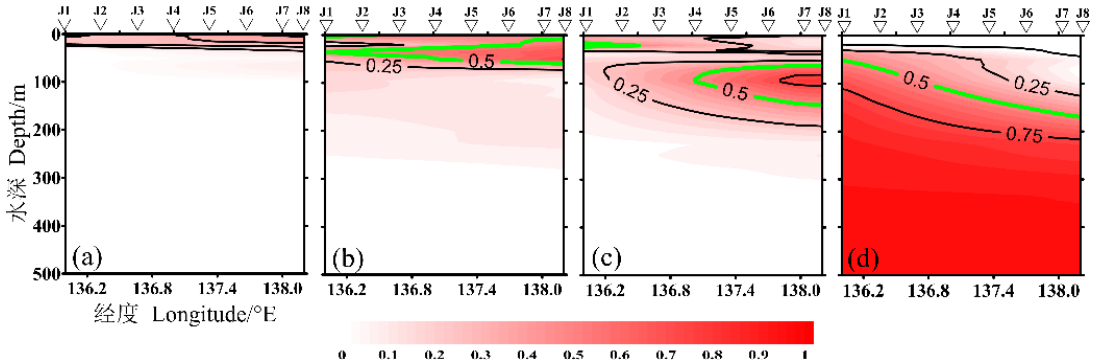

Fig. 3. The distribution of water mixing ratios along the Japan Sea Section (a: Summer Tsushima Strait Surface Water; b: Summer Tsushima Strait Subsurface Water; c: Tsushima Strait High Salinity Water; d: Japan Sea Local Water)

References:

1. Guo X Y, Miyazawa Y, Yamagata T. The Kuroshio Onshore Intrusion along the Shelf Break of the East China Sea: The Origin of the Tsushima Warm Current[J]. Journal of Physical Oceanography, 2006, 36(12): 2205-2231.
2. Mao H L, Ren Y W, Wan G M. Quantitative analysis of water masses in shallow water with T-S relationship[J]. Oceanologia ET Limnologia Sinica, 1964, 6(1): 145-160.

Publication/conference presentation

Conference:

Poster: The seasonal and inter-annual variations of the influences of the water masses structures along the Tsushima Strait Section on the temperature and salinity distributions along the Japan Sea Section.

Oral presentation:

Title: The seasonal and inter-annual variations of the influences of the water masses

structures along the Tsushima Strait Section on the temperature and salinity distributions along the Japan Sea Section.

Lecturer: Mengqi Zhu.

Time: November 14, 2017.

Location: Ehime University.

Perspectives in future

We will investigate the seasonal and inter-annual variations of the influences of the ecological effects from the nutrients concentration from the Tsushima Strait Section to the Japan Sea Section. We are planning to publish our joint research on an international journals.