

# Cruise Summary

## 1. Cruise Information

(1) **Cruise ID:** KH-19-6 Leg1 - Leg3

(2) **Vessel:** R/V HAKUHO MARU

(3) **Cruise Title**

Interdisciplinary research on oceanography and earth science in Weddle Sea and southern Pacific -Around the world cruise for anniversary of 30 years of R.V. Hakuho Maru-

(4) **Chief Scientist**

Koji Hamasaki (Leg1), Atsushi Tsuda (Leg2,3) (AORI)

(5) **Representative of the Science Party**

SH19-23\_01 Koji HAMASAKI (AORI)

SH19-23\_02 Atsushi Tsuda (AORI)

SH19-23\_03 Atsushi Tsuda (AORI)

(6) **Research Titles**

SH19-23\_01 Interdisciplinary research on oceanography and earth science in Weddle Sea and southern Pacific -Around the world cruise for anniversary of 30 years of R.V. Hakuho Maru-

SH19-23\_02 Interdisciplinary research on oceanography and earth science in Weddle Sea and southern Pacific -Around the world cruise for anniversary of 30 years of R.V. Hakuho Maru-

SH19-23\_03 Interdisciplinary research on oceanography and earth science in Weddle Sea and southern Pacific -Around the world cruise for anniversary of 30 years of R.V. Hakuho Maru-

(7) **Cruise Period**

2019/10/16 - 2019/12/15

(8) **Ports of departure/call/arrival**

Yokosuka - Punta Arenas Mardones Wharf

(9) **Research Area**

Subtropical Pacific, Eastern South Pacific

## 2. Overview of the Observation

The R.V. Hakuho-Maru was built in 1989 in Shimonoseki. Then, 2019 is 30-years anniversary for her. Prof. Ikehara of Kochi Univ. proposed an anniversary cruise by all disciplines of oceanography, and I (A. Tsuda) and Prof. Ohshima of Hokkaido Univ. agreed with his idea and have been discussing our cruise plan in detail. Finally, we made an around-the-World cruise focusing on the eastern part of the South Pacific and the Southern Ocean. The leg 2 and 3 mainly focusing on biogeochemical cycles, including carbon, nitrogen, trace metals, phytoplankton/zooplankton ecology and biological diversities in the eastern South Pacific. The biogeochemical cycling and ecosystem of the eastern South Pacific Ocean also change with the physical oceanographic regime. Moreover, the eastern South Pacific is one of the least influenced by aeolian dust (iron) and anthropogenic disturbance. Therefore, it must be important to compare western North Pacific where is located at the most populated region of the world, the ecosystems are also influenced by various anthropogenic perturbations such as pollutants, plastic debris, overfishing, marine heat wave, etc. The eastern South Pacific is, however, seriously understudied region relative to the other regions of Pacific Ocean and the Atlantic Ocean, and our knowledge on the biological and biogeochemical processes are limited. Understanding the mechanisms of biogeochemical cycle and ecosystem responses to natural and anthropogenic perturbations is an emergent issue since increasing human activity is degrading the quality and quantity of marine ecosystem services, on which our society is dependent. In order to tackle with the emergent issue, it is essential to take an interdisciplinary approach, under which physical oceanographers, biogeochemists, biological oceanographers, and atmospheric chemists work together to unveil physical-chemical-biological interactions in the eastern South Pacific.

In the leg 1, we did not have station, only focused on the surface monitoring of TS, chlorophyll, sensor-measured nitrate, together with environmental DNA sampling from surface waters. In leg 2 and 3, we have 10 stations from 20°S to 50°S along 90°W basically for observations and samplings together with geophysical survey of Chile ridge (39°S). The samplings covered water from full depth, zooplankton from upper 2000 m and micronekton from upper 500 m, sinking particles by drifting sediment trap, bottom sediment by multiple-core sampler, visual plankton recorder, plastic debris and light attenuation, which covers required parameters for modern biogeochemical oceanography. Please refer the cruise report for each theme. PI of leg 1 was Koji Hamasaki of atmosphere and ocean research institute of the University of Tokyo, and that of leg 2 and 3 was Atsushi Tsuda of the same institute. If you are interested in our results or data, please contact us.