# MR07-05 Cruise Summary

## 1. Cruise information

1. Cruise designation (research vessel)
   MR07-05 (R/V MIRAI)

2. Cruise title
   Biogeochemical study in the western North Pacific and Study of role of zooplankton on material cycles at time-series station K2 in the northwestern North Pacific

   Principal Investigator (PI): Makio Honda
   JAMSTEC Mutsu Institute for Oceanography (MIO)

3. Science proposals of cruise

| S/N | Affiliation | PI Proposal | Titles |
|---|---|---|---|
| MR07-22 | JAMSTEC IORGC | Kinpei Ichiyanagi | Rain Sampling for Stable Isotopes |
| MR07-23 | JAMSTEC IORGC | Toshio Suga | Variation of temperature and salinity in the Subarctic North Pacific: ARGO project |
| MR07-24 | Tokyo Univ. | Mitsuo Uematsu | Air-sea interaction of chemical substances in the North Pacific (IGBP/SOLAS project) |
| MR07-25 | JAMSTEC IORGC | Kunio Yoneyama | Continuous surface meteorological measurements as a basic dataset. |
| MR07-27 | Ryukyu Univ. | Takeshi Matsumoto | Standardization of marine geophysical data and its application to the ocean floor geodynamics studies |
| MR07-28 | Tokyo Univ. | Shigenobu Takeda | Study of dissolution of biogenic opal |
| MR07-29 | NIES | Nobuo Sugimoto | Study of distribution and optical characteristics of ice/water clouds and marine aerosols |
| MR07-30 | Nagoya Univ. | Toshiro Saino | Control system of primary productivity in the Northern North Pacific |
| MR07-31 | NIES | Masao Uchida | Utilization of DOC by bacteria and its contribution on carbon cycle in the ocean |
| MR07-32 | Hokkaido Univ. | Seiichi Saito | Study of primary productivity observed by remotely sensing data of ocean color. |

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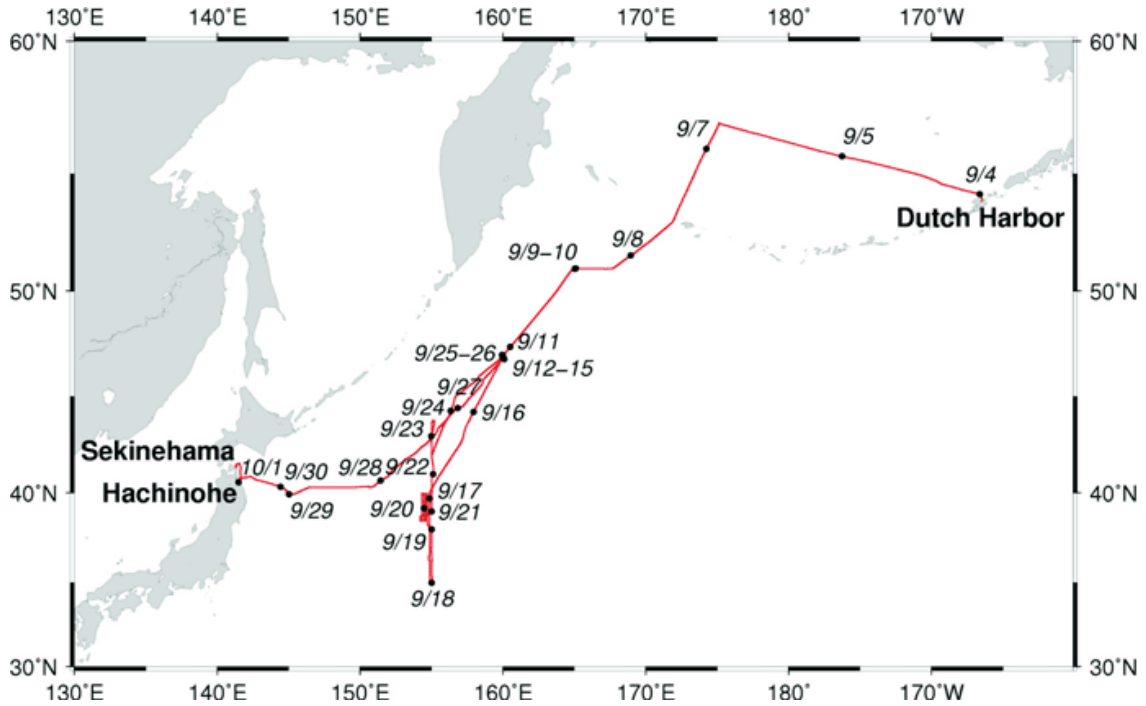
| MR07-55 | JAMSTEC IFREE | Natsue Abe | Underway Geophysical Survey in the Northwestern Pacific for Study of Petit-spot Intra-plate Volcanism |

4. Cruise period (port call)
   4 September 2007 (Dutch Harbor) – 2 October 2007 (Sekinehama)

5. Cruise region (geographical boundary)
   The western North Pacific (57° N . 35° N, 154° E . 175° E)

6. Cruise track and stations




## 2. Cruise Participants

| | Name | Affiliation | Appointment | Tel |
|---|---|---|---|---|
| 1 | Makio HONDA (Principal Investigator) | Mutsu Institute for Oceanography (MIO) Japan Agency for Marine-Earth Science and Technology (JAMSTEC) | Sub Leader | 0175-45-1071 |
| 2 | Minoru KITAMURA (Deputy PI) | Extremobiosphere Research Center (XBR) JAMSTEC | Researcher | 046-867-9527 |
| 3 | Kazuhiko MATSUMOTO | MIO and Institute of Observational Research for Global Change (IORGC) JAMSTEC | Researcher | 0175-45-1071 |
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|---|---|---|---|---|
| 4 | Hajime KAWAKAMI | MIO<br>JAMSTEC | Researcher | Same as above |
| 5 | Tetsuichi FIJIKI | Same as above | Researcher | Same as above |
| 6 | Sanae CHIBA | Frontier Research Center for Global Change (FRCGC)<br>JAMSTEC | Senior Researcher | 045-778-5604 |
| 7 | Yoko IWAMOTO | University of Tokyo | Graduate student | 03-5351-6897 |
| 8 | Sen-ichiro IGATA | Same as above | Same as above | 03-5841-5291 |
| 9 | Suguru OKAMOTO | Hokkaido University | Same as above | 0138-40-8843 |
| 10 | Amane FUJIWARA | Same as above | Same as above | Same as above |
| 11 | Masao UTSUMI | Tsukuba University | Lecturer | 029-850-2042 |
| 12 | Gang Chen | Same as above | Visiting Scientist | Same as above |
| 13 | Satoshi ITO | Same as above | Graduate student | Same as above |
| 14 | Ken-ichiro SATO<br>(Principal Marine Tech.) | Marine Works Japan Inc.<br>(MWJ) | Marine Technician | 045-787-0041 |
| 15 | Toru IDAI | Same as above | Same as above | Same as above |
| 16 | Masanori ENOKI | Same as above | Same as above | Same as above |
| 17 | Shinsuke TOYODA | Same as above | Same as above | Same as above |
| 18 | Ai YASUDA | Same as above | Same as above | Same as above |
| 19 | Tatsuya TANAKA | Same as above | Same as above | Same as above |
| 20 | Tetsuya INABA | Same as above | Same as above | Same as above |
| 21 | Tomoyuki TAKAMORI | Same as above | Same as above | Same as above |
| 22 | Takayoshi SEIKE | Same as above | Same as above | Same as above |
| 23 | Yasuhiro ARII | Same as above | Same as above | Same as above |
| 24 | Hiroki USHIROMURA | Same as above | Same as above | Same as above |
| 25 | Ayaka HATSUYAMA | Same as above | Same as above | Same as above |
| 26 | Miyo IKEDA | Same as above | Same as above | Same as above |
| 27 | Yukiko HAYAKAWA | Same as above | Same as above | Same as above |
| 28 | Kanako ISOGAI | Same as above | Same as above | Same as above |
| 29 | Ayumi TAKEUCHI | Same as above | Same as above | Same as above |
| 30 | Keisuke WATAKI | Same as above | Same as above | Same as above |
| 31 | Yuichi SONOYAMA | Same as above | Same as above | Same as above |
| 32 | Fuyuki SHIBATA | Same as above | Same as above | Same as above |
| 33 | Hideki YAMAMOTO | Same as above | Same as above | Same as above |

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|---|---|---|---|---|
| 34 | Fujio KOBAYASHI | Same as above | Same as above | Same as above |
| 35 | Hiroyuki HAYASHI | Same as above | Same as above | Same as above |
| 36 | Minoru KAMATA | Same as above | Same as above | Same as above |
| 37 | Wataru TOKUNAGA<br>(Principal Marine Tech.) | Global Ocean Development Inc.<br>(GODI) | Same as above | 045-849-6630 |
| 38 | Ryo KIMURA | Same as above | Same as above | Same as above |

## 3. Overview of MR07-05

1. Objective

To collect oceanographic data in autumn in the northwestern North Pacific for the sake of understanding cycles of chemical substances focusing on $CO_2$ and role of zooplankton in its materials' cycle

2. Overview of MR07-05

Main mission of this cruise is to collect oceanographic data in autumn in the northwestern North Pacific for the sake of understanding cycles of chemical substances focusing on $CO_2$ and role of zooplankton in its materials' cycle in this area.

As same as previous cruise in this area, we were plagued by bad weather and sea condition. Though we planned to conduct observation at many stations including a station in the Bering Sea and station KNOT, we cannot but suspend many observations at many stations. However we could conduct comprehensive observation at station K2, which is our time-series station.

At first, mooring system was deployed successfully after one-year hiatus. This mooring system consists of automatic water sampler (RAS), optical sensor package (BLOOMS) and sediment trap. Until autumn 2008, time-series samples will be collected in order to study the biological pump in this area, especially focusing on materials' cycles in the "twilight zone".

Secondly, we visited station K2 twice during this cruise and measured chemical substances such as dissolved oxygen, nutrients and carbon chemistry. Compared with previous data, concentrations of nutrients and dissolved inorganic carbon were close to annual minimum and it was suspected that winter mixing would start soon. Concentration of chlorophyll a and primary productivity were not low, which was indicative of that particulate organic carbon flux was not low. Analysis of pigments by HPLC revealed that haptophytes such as coccolithophorids was predominant during this cruise. Biological observation with plankton net (IONESS and NORPAC) was also conducted. One of scientific interests is carbon transport by zooplankton ontogenetic migration. Preliminary result showed that some fraction of copepod such as *Neocalanus cristatus* and *Neocalanus plumchrus* still exist in the upper layer and annual carbon export by migration was not over. In addition, onboard incubation was conducted and grazing pressure by micro zooplankton was measured. As a result, 60% of phytoplankton was grazed by micro zooplankton. Microscopic analysis will supply more information about the roll of zooplankton in material's cycle in the northwestern North Pacific.