MR09-03 Cruise summary

1. Name of Vessel
   R/V Mirai
   L x B x D 128.58m x 19.0m x 13.2m
   Gross Tonnage 8,672 tons
   Call Sign JNSR

2. Cruise Code
   MR09-03

3. Title of the Cruise
   Multi-disciplinary observation cruise for the Arctic Ocean

4. Undertaking Institute
   Japan Agency for Marine-Earth Science and Technology (JAMSTEC)
   2-15 Natsushima-cho, Yokosuka 237-0061, Japan

5. Chief Scientists
   Leg1: Shigeto Nishino (Research Institute for Global Change)
   Leg2: Takashi Kikuchi (Research Institute for Global Change)
   Leg3: Shigeto Nishino (Research Institute for Global Change)

6. Representatives of the Science Parties and Titles of the Proposals
   Toshi Nagata (The University of Tokyo)
   "Studies on the distribution and dynamics of microbial communities in the Arctic Ocean" (Leg2)
   Sei-Ichi Saitoh (Hokkaido University)
   "Elucidation of the role of sea-ice cover change on the primary productivity in the northern Chukchi Sea" (Leg2)
   Ken'ichi Ohkushi (Kobe University)
   "Paleoceanographic study of climate interaction between global warming and deep water circulation in the Arctic Ocean" (Leg2)
   Masao Uchida (National Institute for Environmental Studies)
   "Origin and transport of dissolve and particulate organic carbon from shelf to basin in the Actic Ocean" (Leg2)
   Ippei Nagao (Nagoya University)
   "Flux measurements of marine biogenic gas (dimethylsulfide) by eddy

correlation method" (Leg1)

Nobuo Sugimoto (National Institute for Environmental Studies)
"Lidar observations of optical characteristics and vertical distribution of aerosols and clouds" (Leg1-Leg3)

Kunio Yoneyama (Research Institute for Global Change)
"Archive of surface meteorological data" (Leg1-Leg3)

Yoko Yokouchi (National Institute for Environmental Studies)
"A study on the distribution of biogenic volatile organic compounds (BVOCs) over the Arctic Ocean" (Leg1-Leg3)

Masao Nakanishi (Chiba University)
"Tectonic evolution of the Pacific Plate" (Leg1-Leg3)

Takeshi Matsumoto (University of the Ryukyus)
"Standardizing the marine geophysics data and its application to the ocean floor geodynamics studies" (Leg1-Leg3)

Osamu Tsukamoto (Okayama University)
"On-board continuous air-sea eddy flux measurement" (Leg1-Leg3)

Naoyuki Kurita (Research Institute for Global Change)
"Water sampling for making isotope distribution map over the Ocean" (Leg1-Leg3)

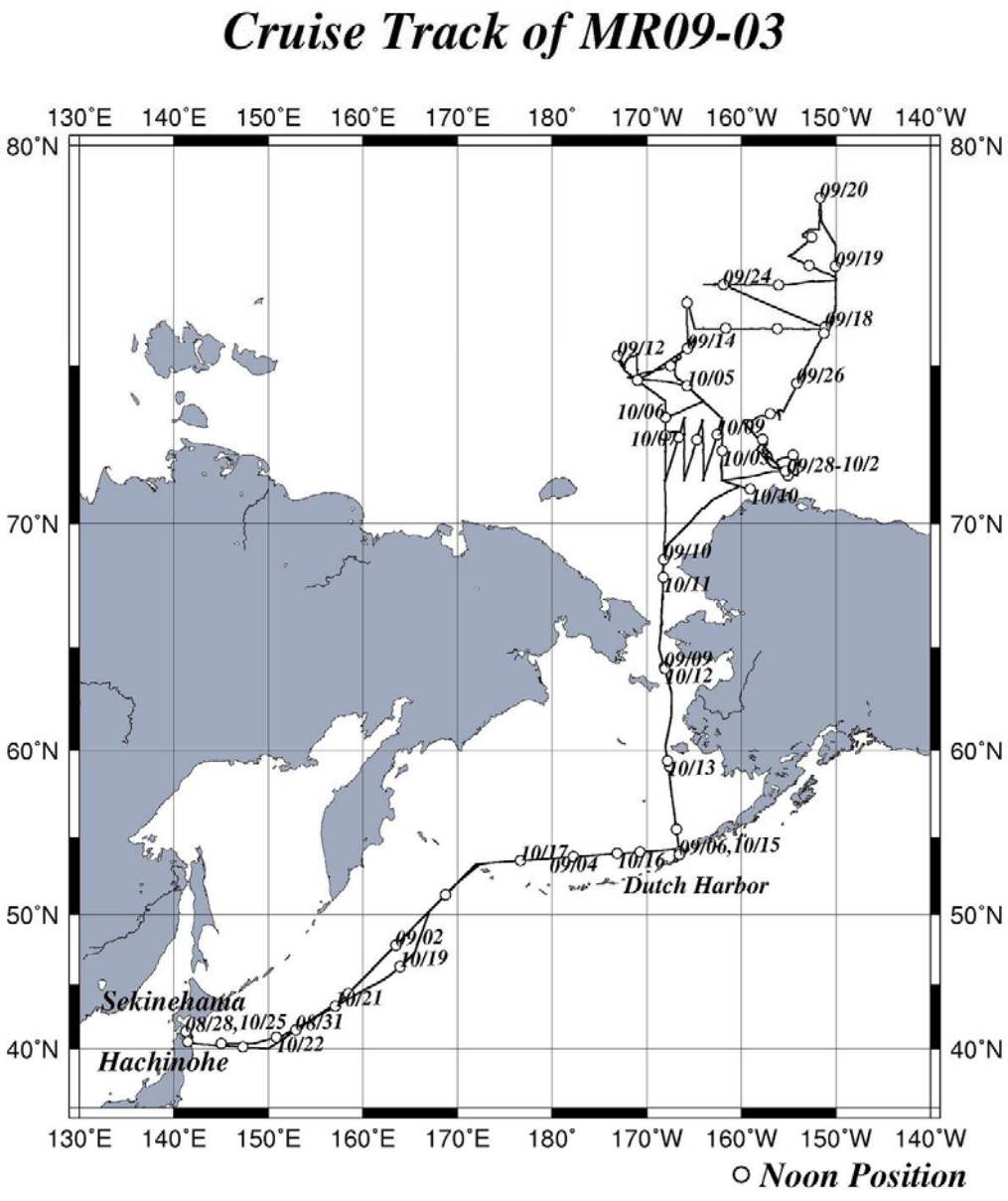
7. Cruise Periods and Ports of Call

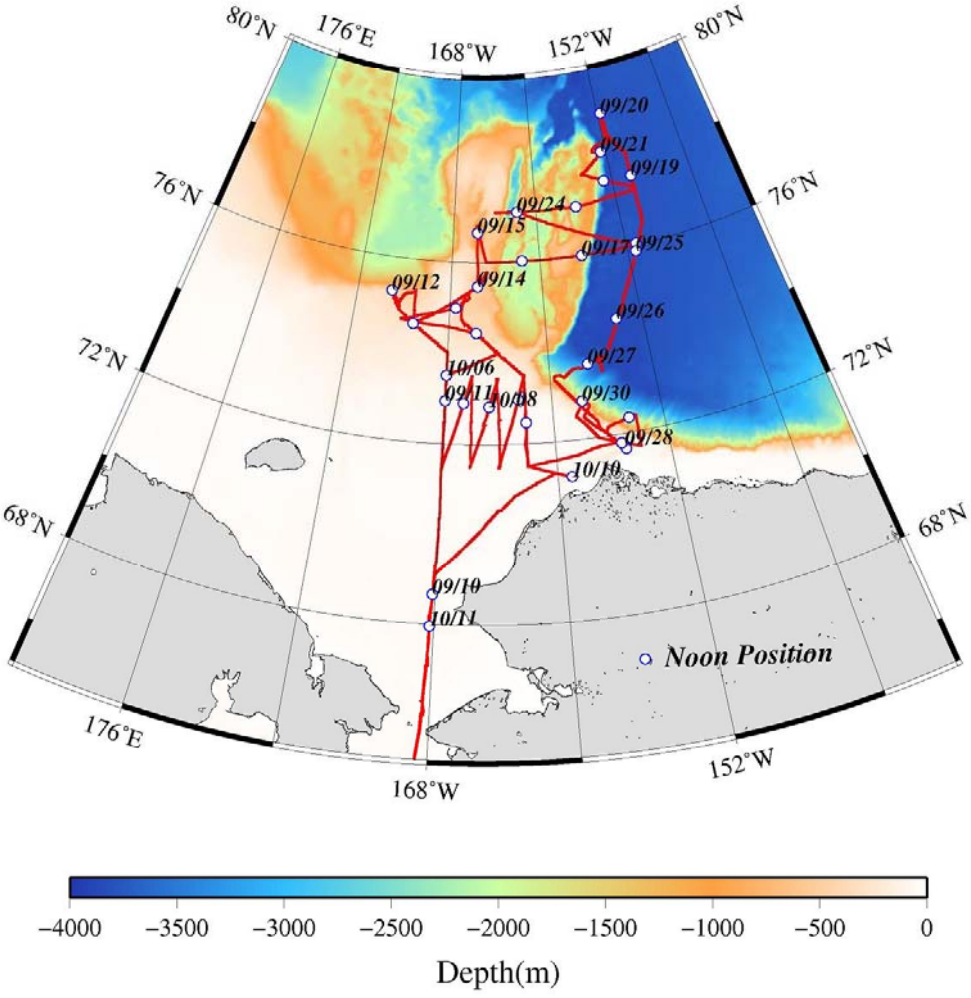
Leg1: Aug. 28, 2009 - Sep. 6, 2009 (Sekinehama - Hachinohe - Dutch Harbor)
Leg2: Sep. 7, 2009 - Oct. 15, 2009 (Dutch Harbor - Dutch Harbor)
Leg3: Oct. 16, 2009 - Oct. 25, 2009 (Dutch Harbor - Hachinohe - Sekinehama)

8. Research Areas

Arctic Ocean, Bering Sea, and North Pacific Ocean

9. Cruise Track




80°N
176°E
168°W
152°W
80°N
76°N
76°N
72°N
72°N
68°N
68°N
176°E
168°W
152°W
09/20
09/21
09/19
09/24
09/15
09/17
09/25
09/12
09/14
09/26
09/27
10/06
09/11
10/08
09/30
09/28
10/10
09/10
10/11
Noon Position
−4000
−3500
−3000
−2500
−2000
−1500
−1000
−500
0
Depth(m)

10. Overview of the Observation

-Purpose-

Multi-disciplinary observation cruise for the Arctic Ocean conducted by R/V Mirai in September-October 2009 focuses on;

a. To quantify on-going changes in ocean, atmosphere, and ecosystem, which are related to the recent Arctic warming and sea ice reduction,
b. To clarify important processes and interactions among atmosphere, ocean, and ecosystem behind changes of the Arctic Ocean,
c. To collect data for understanding the effects of the Arctic Ocean changes on global climate.

Keywords: Arctic Ocean climate system, Arctic Ocean circulation, Atmosphere-sea ice-ocean interaction, Arctic Ocean ecosystem

-Activities-

CTD/LADCP	101 casts
CTD/Water Samplings	66 casts
XCTD	102 casts
Radiosonde	136 points
Mooring Deploy	1 point
Surface Drifting Buoy	5 points
Turbulence Ocean Microstructures Acquisition Profiler (TurboMAP)	30 casts
Particle Meter (LISST-100)	11 casts
Spectroradiometer (PRR)	16 casts
Absorption and Attenuation Meter (ac-s)	15 casts
Plankton Nets	6 casts
Piston Cores	5 casts
Pilot Cores	5 casts
Water Vapor $\delta^{18}O$	112 points
Rainfall $\delta^{18}O$	23 points
Sea Surface Water $\delta^{18}O$	52 points
Biogenic Volatile Organic Compounds (BVOC)	57 points
ADCP Continuous Observation	
Sea Surface Water Monitoring System	
Meteorological Observation System	
Doppler Rador	
Dual Polarization Lidar	
Eddy Flux Measurement System	
DMS Continuous Measurement (Leg1)	

Seabeam
Geophysical Continuous Observation (Magnetometer, Gravity meter)

10. Data Policy

All data obtained during this cruise will be under the control of the Data Integration and Analysis Group (DIAG) of JAMSTEC.