Submission date 2013/10/15

Cruise Summary

1. Cruise Information

Cruise ID

NT13-20

Name of vessel

R/V NATSUSHIMA

Title of the cruise

Distribution and origin of gas hydrate off Abashiri, Okhotsk Sea

Chief scientist [Affiliation]

Satoshi Yamashita [Kitami Institute of Technology]

Representative of the Science Party [Affiliation]

Nobuo Takahashi [Kitami Institute of Technology]

Title of proposal

Basic study on distribution and origin of seabed methane and gas hydrate on continental slope off Abashiri, Okhotsk Sea

Cruise period

September 8, 2013 – September 18, 2013

Ports of call

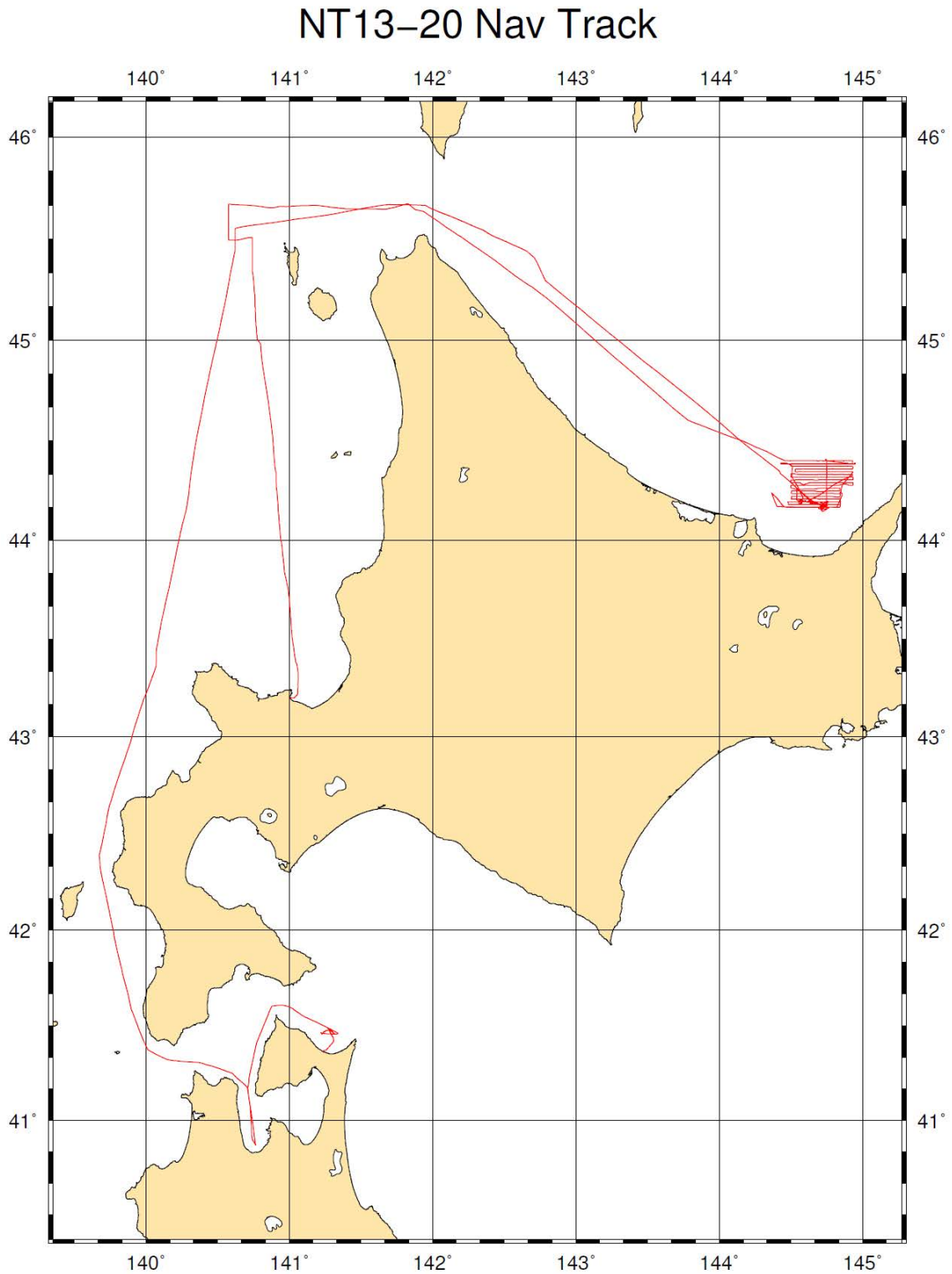
September 8, 2013 Dept. from Otaru

September 18, 2013 Arrive. at Sekinehama

Research area

Abashiri Submarine Canyon

Research map



Cruise Track

２. Overview of the Observation

Overview of the observation

[Background and purpose]

When Japanese resource project of gas-hydrate launched in 1995, the seismic data of Kitami-Yamato Bank off Abashiri, Okhotsk Sea caught outstanding BSRs (Bottom Simulating Reflectors), which indicated the existence of gas-hydrate. Then, obvious BSRs and geologic structures indicating gas-hydrate also showed in the seismic data collected by GH01 cruise in 2001 for the same area conducted by Geological Survey of Japan, AIST. However, the sufficient survey has not been carried out after GH01 cruise, and the actual geologic condition and its gas-hydrate formative condition have not been clear. Our recent survey cruises conducted in 2012 found many gas-flares and retrieved crystals of gas-hydrate from a part of off Abashiri. These facts suggest that promising wide gas-hydrate formative area exists around this area.

Therefore, to clarify the distribution of gas-hydrate and its formative environment of seabed methane, and to evaluate the potential as resource of gas-hydrate, the geologic survey was conducted by this cruise covering a wide area of Abashiri Submarine Canyon. The conducted investigations are the seismic geologic survey, the bathymetry and the gas-flare observation by an echo sounder, and drill sampling of sea-bottom sediments.

[Research items and activities]

(1) Seismic survey

To analyze geological structure and obtain the depth distribution of BSR, the Single Channel Seismic (SCS) survey along following lines were conducted:

line 1	44°10.000’N, 144°30.000’E	－	44°10.000’N, 144°50.000’E
line 2	44°11.647’N, 144°30.000’E	－	44°11.647’N, 144°50.000’E
line 3	44°23.000’N, 144°30.000’E	－	44°23.000’N, 144°56.000’E
line 4	44°23.000’N, 144°56.000’E	－	44°24.000’N, 144°45.000’E
line 5	44°24.000’N, 144°45.000’E	－	44°10.000’N, 144°45.000’E.

(2) Bathymetry and gas-flare observation surveys

The bathymetry for the survey area conducted with the multi narrow beam system (SEBAT8600), and mapping and observations of gas-flares were conducted with the multi narrow beam system and the quantitative echo sounder (ER60). The following areas and points are surveyed:

- Abashiri Submarine Canyon (water depth; 500 - 1350 m)

  44°10.0’N, 144°30.0’E－44°24.0’N, 144°30.0’E－44°24.0’N, 144°56.0’E－44°10.0’N, 144°56.0’E

- North east of Rebun Island

  45°33.55’N, 140°34.57’E (water depth; 480 m)

  45°27.04’N, 140°44.55’E (water depth; 600 m).

(3) Core sampling of sea-bottom sediment and sea water

The sediment core sampling was carried out at three stations on the Abashiri Submarine Canyon by using the piston (PC) and gravity (GC) coring system. The sea water on the seabed was also retrieved by the Ashura corer (pilot corer). The total number of PC and GC sampling is 8. The lengths of piston corer are 4 or 6 m, and its weight is 480 kg. The gravity corer length is 4 m, and its weight is 200 kg. Their core diameters are 75 mm. The following table shows the sampling depth and core length.

Core ID	Corer type*	Depth (m)	Corebarrel length (m)	Core length (cm)		
PC01	Inner type PC	573	4	148.5		
PL01	Ashura corer		0.6	0.0	0.0	0.0
PC02	Inner type PC	580	4	219.6		
PL02	Ashura corer		0.6	0.0	0.0	0.0
PC03	Inner type PC	651	4	380.0 (include void)		
PL03	Ashura corer		0.6	27.2	30.1	27.5
PC04	Inner type PC	678	4	235.5		
PL04	Ashura corer		0.6	27.0	27.0	26.1
PC05	Inner type PC	704	6	463.8		
PL05	Ashura corer		0.6	29.8	27.9	29.6
PC06	Inner type PC	770	6	500.0 (pipe length)		
PL06	Ashura corer		0.6	41.9	37.1	44.4
PC07	Inner type PC	822	6	435.1		
PL07	Ashura corer		0.6	50.9	58.7	59.0
GC08	Gravity corer (200kg)	769	3	136.2		

*Weight of the PC is 480 kg.