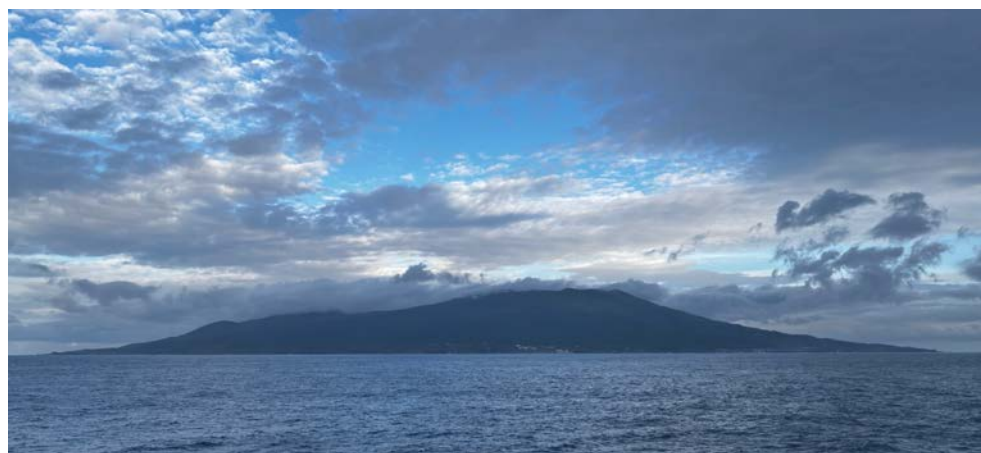




R/V Kaimei Cruise Report KM25-10C

Marine Seismic Refraction Survey around Miyake-jima



Miyake-jima, Izu Islands, Japan

Oct. 10, 2025 – Oct. 21, 2025

Japan Agency for Marine-Earth Science and Technology
(JAMSTEC)

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1. Cruise Information

- Cruise ID: KM25-10C
- Name of vessel: R/V Kaimei
- Title of cruise: Marine Seismic Refraction Survey around Miyake-jima
- Chief Scientist [Affiliation]: Aki Ito [JAMSTEC]
- Cruise period: Oct. 10, 2025 – Oct. 21, 2025
- Ports of departure / call / arrival: Yokosuka - Yokosuka
- Research area: Miyake-jima, Izu Islands
- Research map

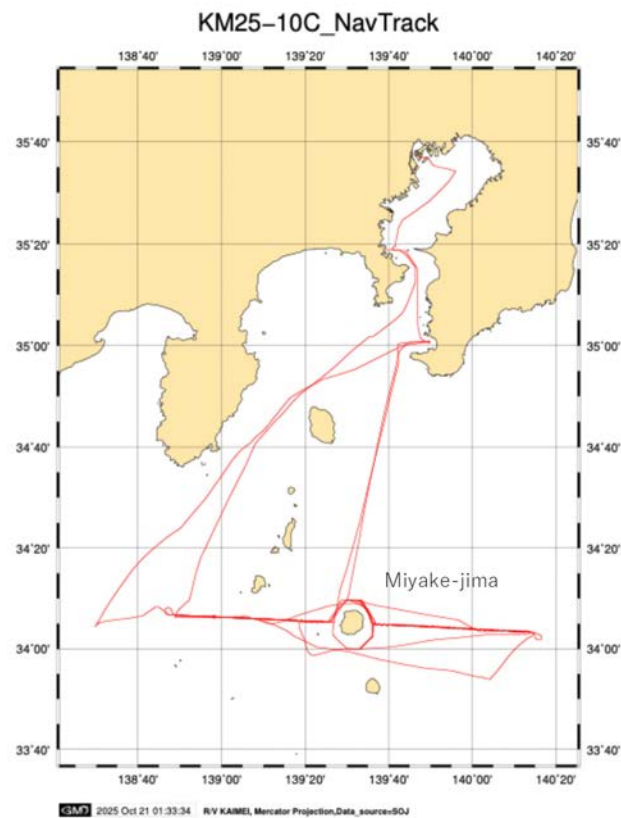


Figure 1 Ship track of KM25-10C cruise.

2. Research Proposal and Science Party

- Title of proposal: Active-source explorations in Miyakejima island

- Representative of Science Party:

Aki Ito [JAMSTEC]

- Science Party:

Aki Ito	[JAMSTEC]
Satoru Tanaka	[JAMSTEC]
Masaru Nakano	[JAMSTEC]
Tomoya Nakajima	[JAMSTEC]
Kenta Yoshida	[JAMSTEC]
Gou Fujie	[JAMSTEC]
Yasuyuki Nakamura	[JAMSTEC]
Seiichi Miura	[JAMSTEC]
Ryuta Arai	[JAMSTEC]
Kazuya Shiraishi	[JAMSTEC]
Tetsuo No	[JAMSTEC]
Yuka Kaiho	[JAMSTEC]
Ryo Miura	[JAMSTEC]
Shuichi Kodaira	[JAMSTEC]
Shigeaki Ono	[JAMSTEC]

- Onboard Scientist

Aki Ito	[JAMSTEC]
Satoru Tanaka	[JAMSTEC]

- Onboard Technician

Hikaru Iwamaru	[NME]
Yoshiki Horiuchi	[NME]
Kenya Yamanaka	[NME]
Natsune Iho	[NME]
Kakeru Harayama	[NME]
Toshimasa Nasu	[NME]
Hiroto Jimba	[NME]
Satoshi Okazaki	[NME]
Takuya Maekawa	[NME]
Taro Shirai	[NME]
Koki Ikeura	[NME]
Sota Shimura	[NME]
Tatsuya Sugiyama	[NME]

- Crew

Master	Naoto Kimura	[NME]
Chief Officer	Akira Suzuki	[NME]
1st Officer	Takeshi Muramatsu	[NME]
2nd Officer	Shun Ito	[NME]
Jr.2nd Officer	Tomohiro Yukawa	[NME]
3rd Officer	Yuya Ikeda	[NME]

Jr.3rd Officer	Yusei Tashiro	[NME]
Chief Engineer	Wataru Kurose	[NME]
1st Engineer	Kota Fujii	[NME]
2nd Engineer	Yusuke Tomiyama	[NME]
3rd Engineer	So Ikegami	[NME]
Chief Electronic Operator	Yoichi Inoue	[NME]
2nd Electronic Operator	Seiya Yokoi	[NME]
3rd Electronic Operator	Ikumi Ebitani	[NME]
Boat Swain	Yosuke Kuwahara	[NME]
Able Seaman	Takuya Miyashita	[NME]
Able Seaman	Akira Kurihara	[NME]
Able Seaman	Kenta Nasu	[NME]
Able Seaman	Takumi Miura	[NME]
Able Seaman	Ryo Nakanishi	[NME]
Sailor	Natsuki Omori	[NME]
No.1 Oiler	Hiroyuki Oishi	[NME]
Oiler	Ryota Suzuki	[NME]
Assistant Oiler	Yutaro Ono	[NME]
Assistant Oiler	Koitaro Saramoto	[NME]
Assistant Oiler	Seiya Noguchi	[NME]
Chief Steward	Katsuyuki Omiya	[NME]
Steward	Tatsuya Shiraishi	[NME]
Steward	Yoshitaka Yamamoto	[NME]
Steward	Kousei Ichinohe	[NME]
Steward	Taku Kato	[NME]

3. Research/Development Activities

- Purpose and background:

Miyake-jima, an active volcano in the Izu Islands, has erupted repeatedly and caused damage. As shown in Fig. 2 (compiled from the fourth edition of the *National Catalogue of the Active Volcanoes in Japan*), eruptions with a Volcanic Explosivity Index (VEI) ≥ 2 have occurred 11 times since 800 CE. The last four eruptions occurred at roughly 20-year intervals, and 24 years have already elapsed since the most recent event in 2000. Since the 2000 eruption, crustal deformation indicating deep-seated inflation beneath Miyake-jima has continued, suggesting ongoing magma accumulation (3rd Meeting of the Volcano Research Committee, 25 September 2024).

The 2000 activity included a summit eruption and caldera formation. Crustal-deformation studies associated with the 2000 activity indicate deformation sources interpreted as dikes and magma chambers at depths of 0–10 km beneath the island (Ueda et al., 2005). However, a deeper magma chamber at 6–8 km is only inferred from dike models and is not directly resolved by the geodetic data. More recently, electromagnetic observations imaged a low-resistivity zone at 1–2 km depth beneath the island, interpreted as an impermeable clay layer, whereas the structure below 5 km remains unconstrained (Gresse et al., 2021).

Despite this background, no seismic surveys across the volcanic body have been carried out on Miyake-jima. Consequently, fundamental seismic constraints on the magma supply system linking the dikes and magma chambers active in 2000 to the summit are lacking.

We therefore plan a large-scale seismic refraction survey to obtain a two-dimensional seismic velocity structure from depths of several kilometers—where the deformation sources are presumed to exist—to beneath the summit. Additionally, we aim to derive a one-dimensional velocity model down to ~ 20 km. These datasets will support subsequent analyses—such as relocation of earthquake hypocenters and autocorrelation analyses of ambient-noise/coda waveforms—to estimate magma migration pathways and the distribution of magma chambers from shallow to deep levels.

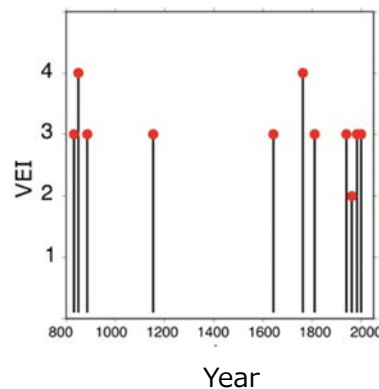


Figure 2 Eruption history (VEI ≥ 2) of Miyake-jima since 800 CE.

- List of observations

- (1) OBS deployment

We deployed ocean-bottom seismometers (OBSs) at 60 sites along the AG1-1 and AG1-2 survey lines at 2-km spacing (Fig. 3). In addition, five OBSs were deployed around Miyake-jima (S62, S63, S65, S66, S67). Deployment at the three planned sites around Miyake-jima (S61, S64, S68) was cancelled due to bad weather and/or existence of fishing boat. As a result, a total of 65 OBSs were used for the refraction survey. Planned coordinates are in Table 1. All OBS is of POBS-2024J type (Katsujima Co., Ltd), equipped with a three-component 4.5 Hz short-period seismometer, pressure sensor (RBR duet3 T.D deep, RBR Ltd.) and a hydrophone (HTI-99DY, High Tech, Inc.). The deployment scenes are presented in Fig. 4. The OBS were lifted by a crane at the end of the ship and were released by opening the crane hook at the sea level. The OBS was descended to the seafloor by the weight of the anchor. Acoustic communication between the ship and the OBS was conducted to monitor the OBS location during the descent. The position of the OBS on the seafloor was estimated by a Super short base line acoustic system (SSBL) of the vessel's positioning system.

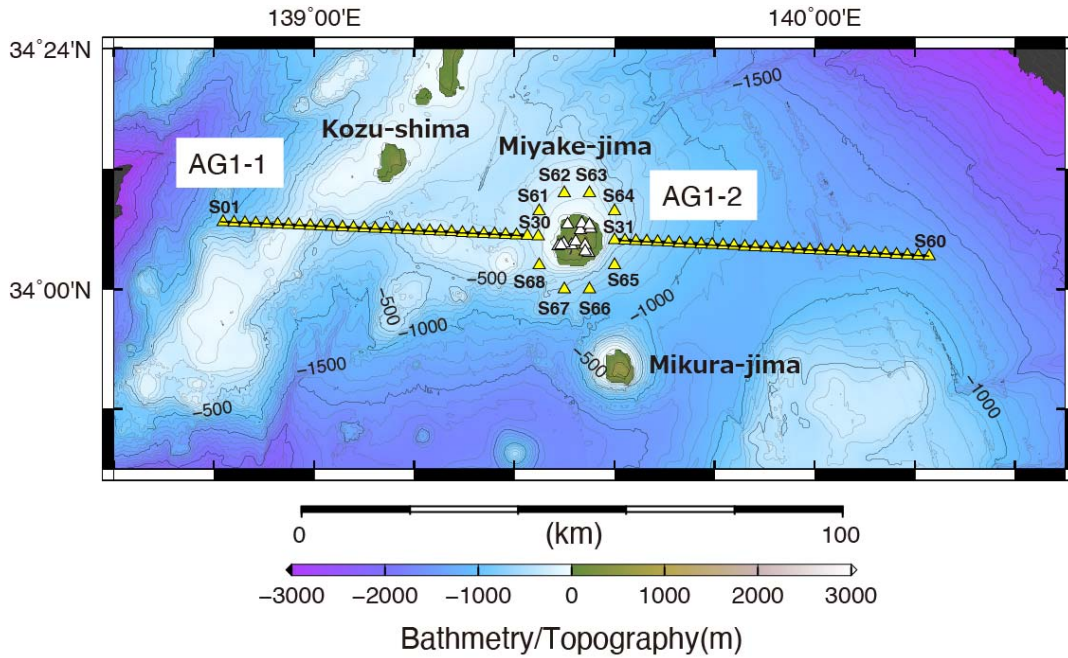


Figure 3 Layout of the refraction experiment. Black lines show the airgun shooting lines. Yellow and white triangles indicate OBSs and land seismic stations.

Table 1 Location of OBS (planned coordinates).

OBS ID	Lat. (N)	Lon. (E)	Depth (m)	Remarks
S01	34° 06.692'	138° 49.117'	712.9	AG1-1
S02	34° 06.647'	138° 50.419'	783.4	AG1-1
S03	34° 06.601'	138° 51.721'	843.0	AG1-1
S04	34° 06.556'	138° 53.024'	466.3	AG1-1
S05	34° 06.510'	138° 54.326'	433.8	AG1-1
S06	34° 06.464'	138° 55.628'	393.2	AG1-1
S07	34° 06.418'	138° 56.930'	268.2	AG1-1
S08	34° 06.372'	138° 58.232'	223.0	AG1-1
S09	34° 06.325'	138° 59.535'	229.3	AG1-1
S10	34° 06.278'	139° 00.837'	428.1	AG1-1
S11	34° 06.231'	139° 02.139'	496.9	AG1-1
S12	34° 06.184'	139° 03.441'	372.4	AG1-1
S13	34° 06.137'	139° 04.743'	392.1	AG1-1
S14	34° 06.089'	139° 06.045'	487.4	AG1-1
S15	34° 06.041'	139° 07.347'	553.1	AG1-1
S16	34° 05.993'	139° 08.649'	554.5	AG1-1
S17	34° 05.944'	139° 09.951'	481.5	AG1-1
S18	34° 05.896'	139° 11.253'	365.5	AG1-1
S19	34° 05.847'	139° 12.555'	276.7	AG1-1
S20	34° 05.798'	139° 13.857'	199.7	AG1-1
S21	34° 05.748'	139° 15.158'	212.0	AG1-1
S22	34° 05.699'	139° 16.460'	245.1	AG1-1
S23	34° 05.649'	139° 17.762'	300.8	AG1-1
S24	34° 05.599'	139° 19.064'	357.0	AG1-1
S25	34° 05.549'	139° 20.366'	353.0	AG1-1
S26	34° 05.498'	139° 21.667'	314.9	AG1-1
S27	34° 05.447'	139° 22.969'	296.8	AG1-1
S28	34° 05.397'	139° 24.271'	284.0	AG1-1
S29	34° 05.345'	139° 25.572'	253.0	AG1-1
S30	34° 05.294'	139° 26.874'	145.4	AG1-1
S31	34° 04.928'	139° 35.984'	328.6	AG1-2
S32	34° 04.875'	139° 37.286'	494.3	AG1-2
S33	34° 04.821'	139° 38.587'	618.4	AG1-2
S34	34° 04.767'	139° 39.889'	720.9	AG1-2
S35	34° 04.713'	139° 41.190'	796.7	AG1-2
S36	34° 04.659'	139° 42.491'	851.7	AG1-2
S37	34° 04.605'	139° 43.792'	905.4	AG1-2
S38	34° 04.550'	139° 45.094'	939.5	AG1-2
S39	34° 04.496'	139° 46.395'	986.4	AG1-2
S40	34° 04.440'	139° 47.696'	1017.1	AG1-2
S41	34° 04.385'	139° 48.997'	1049.8	AG1-2

S42	34° 04.330'	139° 50.298'	1079.8	AG1-2
S43	34° 04.274'	139° 51.599'	1125.5	AG1-2
S44	34° 04.218'	139° 52.900'	1141.4	AG1-2
S45	34° 04.162'	139° 54.202'	1168.8	AG1-2
S46	34° 04.105'	139° 55.503'	1177.9	AG1-2
S47	34° 04.049'	139° 56.803'	1172.1	AG1-2
S48	34° 03.992'	139° 58.104'	1168.7	AG1-2
S49	34° 03.935'	139° 59.405'	1174.3	AG1-2
S50	34° 03.877'	140° 00.706'	1250.8	AG1-2
S51	34° 03.820'	140° 02.007'	1244.9	AG1-2
S52	34° 03.762'	140° 03.308'	1225.1	AG1-2
S53	34° 03.704'	140° 04.609'	1219.0	AG1-2
S54	34° 03.646'	140° 05.910'	1211.2	AG1-2
S55	34° 03.587'	140° 07.210'	1200.5	AG1-2
S56	34° 03.510'	140° 08.951'	1206.0	AG1-2
S57	34° 03.470'	140° 09.812'	1203.5	AG1-2
S58	34° 03.410'	140° 11.112'	1211.4	AG1-2
S59	34° 03.351'	140° 12.413'	1229.4	AG1-2
S60	34° 03.291'	140° 13.714'	1268.3	AG1-2
S61	34° 07.800'	139° 27.000'	224.8	Around Miyake-Jima Cancelled
S62	34° 09.600'	139° 30.000'	161.9	Around Miyake-jima
S63	34° 09.600'	139° 33.000'	131.3	Around Miyake-jima
S64	34° 07.800'	139° 36.000'	312.8	Around Miyake-jima, Cancelled
S65	34° 02.400'	139° 36.000'	607.0	Around Miyake-jima
S66	34° 00.000'	139° 33.000'	729.1	Around Miyake-jima
S67	34° 00.000'	139° 30.000'	530.6	Around Miyake-jima
S68	34° 02.400'	139° 27.000'	336.1	Around Miyake-jima, Cancelled



Figure 4 Scenes of OBS deployment.

(2) Refraction experiment

An $\sim 10,600 \text{ in}^3$ airgun array was fired every 200 m along survey lines AG1-1 and AG1-2 (Fig. 3). During the transits around Miyake-jima between the two lines, additional shots were fired at $\sim 70\text{-s}$ intervals. Shooting along the survey lines was conducted in three passes: (1) 200-m spacing; (2) midpoints of pass-1 shot points (effective spacing 100 m); and (3) midpoints between passes 1 and 2 (effective spacing 50 m). Pass 1 started at the west end of AG1-1, passed north of Miyake-jima, and continued east along AG1-2. Pass 2 reversed and retraced the line westbound. Pass 3 reversed again, passed south of Miyake-jima, and ran east to the east end of AG1-2. Fig. 5 shows the photo of airgun array on the starboard side of the R/V Kaimei. Planned coordinates of AG1-1 and AG1-2 are in Table 2.

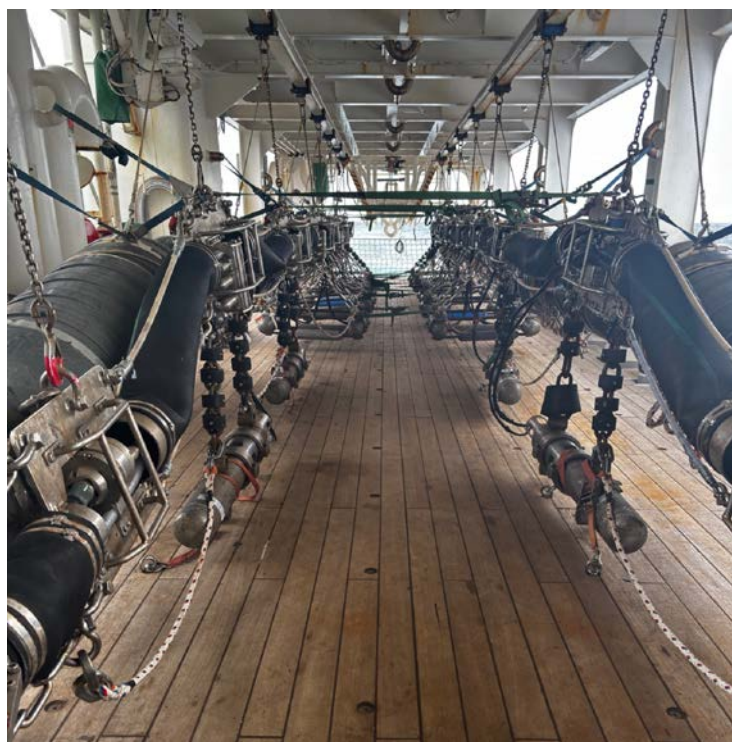


Figure 5 Airgun array of the R/V Kaimei.

Table 2 Location of Explorations (planned coordinates).

Line ID	Western End		Eastern End		Water depth (m)
	Lat. (N)	Lon. (E)	Lat. (N)	Lon. (E)	
AG1-1	34° 06.6915'	138° 49.1168'	34° 05.3453'	139° 25.5723'	200 – 850
AG1-2	34° 04.9118'	139° 36.3749'	34° 03.2914'	140° 13.7135'	500 - 1,300

(3) OBS recovery

We recovered all 65 OBSs. Although several OBSs at shallow water depths had difficulty receiving the acoustic release signal, the recovery operations were generally smooth. Fig. 6 shows the recovery scenes. To recover the OBS, we transmitted acoustic commands from the ship to activate the releases the anchor weights. The OBS ascended to the surface by buoyancy and was picked up by the hook and crane on the right side of the ship.



Figure 6 Scenes of OBS retrieval.

(4) Bathymetry, magnetometer, sub-bottom profiling

Bathymetry, magnetometer and sub-bottom profiling data were collected during the cruise. The bathymetry data were collected by Kongsberg EM712 and EM122 for shallow and deep water depths, respectively. The effective depth ranges of these two systems are from 3m to 3600m and from 20 to 11000m, respectively. Magnetic data were acquired by SFG-2015 three-component magnetometer from TERATECHNICA Inc. Sub-bottom profiling data were acquired Kongsberg sub-bottom profiler “TOPAS PS18”.

(5) XCTD (eXpendable-Conductivity, Temperature and Depth)

Four XCTD casts were made during the cruise to obtain seawater temperature and salinity.

4. Cruise Log

Date	Day of week	Remarks
2025/10/10	Fri	Departed Yokosuka HQ. Proceeded to the west end of AG1-1. Commenced OBS deployment along AG1-1 (S01–S14). Skipped S12 due to fishing boats.
2025/10/11	Sat	Continued OBS deployment (S15–S30). Returned to S12 and deployed. Proceeded to the west end of AG1-2. Commenced OBS deployment along AG1-2 (S31–S48).
2025/10/12	Sun	Continued OBS deployment (S49–S60). Proceeded to OBS sites around Miyake-jima. Commenced additional deployments (S67, S66, S65, S63, S62). Diverted to waters off Tateyama due to bad weather. Remained in waters off Tateyama.
2025/10/13	Mon	Remained in waters off Tateyama.
2025/10/14	Tue	Proceeded to the west end of AG1-1. Deployed the paravane and airgun array. Commenced airgun firing; passed north of Miyake-jima and continued east on AG1-2 (Pass 1).
2025/10/15	Wed	Continued airgun firing. Completed Pass 1. Reversed course and retraced the line westbound (Pass 2). Completed Pass 2. Reversed again, passed south of Miyake-jima, and proceeded east to the east end of AG1-2 (Pass 3).
2025/10/16	Thu	Continued airgun firing. Completed Pass 3. Recovered the airgun array and paravane.
2025/10/17	Fri	Commenced OBS retrieval from the west end of AG1-1 (S01–S24).
2025/10/18	Sat	Continued OBS retrieval (S25–S29). Proceeded to the east end of AG1-2. Continued OBS retrieval (S60–S36).
2025/10/19	Sun	Continued OBS retrieval (S35–S32, S62, S63, S31, S65, S66, S67, S30). Diverted to waters off Tateyama due to bad weather. Remained in waters off Tateyama.
2025/10/20	Mon	Remained in waters off Tateyama.
2025/10/21	Tue	Proceeded to Yokosuka. Arrived at Yokosuka. Disembarkation.

5. Notice on Using

This cruise report is a preliminary documentation as of the end of cruise.
This report is not necessarily corrected even if there is any inaccurate description (i.e. taxonomic classifications). This report is subject to be revised without notice. Some data on this report may be raw or unprocessed. If you are going to use or refer the data on this report, it is recommended to ask the Chief Scientist for latest status.

Users of information on this report are requested to submit Publication Report to JAMSTEC.

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