



KAIMEI “Cruise Report”
KM20-02 Leg3

GPC test cruise

Sagami bay

25th July 2020 to 27th July 2020

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

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1. Cruise Information

- Cruise ID: KM20-02 Leg3
- Name of vessel: KAIMEI
- Title of the cruise and proposal: KM20-02 Function test for Giant Piston Coring system
- Chief Scientist: Noriaki Sakurai (MarE3, JAMSTEC)
- Cruise period: 2020/July/25th to 27th
- Ports of departure / call / arrival: JAMSTEC Yokosuka HQ – JAMSTEC Yokosuka HQ
- Research area: Sagami bay
- Research map (Fig. 1)

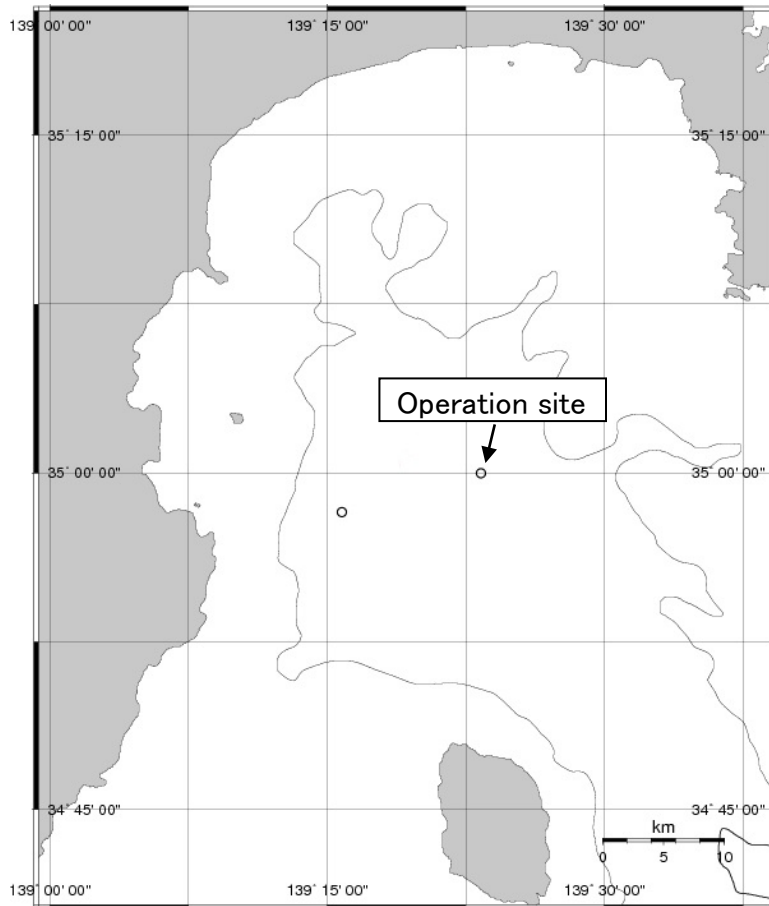


Fig. 1 Research map.

KM20-02 Leg3 Operation site of GPC and shipboard three components magnetometer calibration (35 ° 0.0026'N, 139 ° 23.1772'E; water depth: 1,397m)

2. Participant list

● Science Party [affiliation, assignment]

Noriaki SAKURAI	[JAMSTEC, Chief scientist]
Lena MAEDA	[JAMSTEC, Assistant chief scientist]
Ei HATAKEYAMA	[Marine Works Japan Ltd.]
Hiroaki MURAKI	[Marine Works Japan Ltd.]
Kazuma TAKAHASHI	[Marine Works Japan Ltd.]
Yohei KATAYAMA	[Marine Works Japan Ltd.]
Yu SHIMAZAKI	[Marine Works Japan Ltd.]

● KAIMEI crew [name, position]

Rikita YOSHIDA	Captain
Takeshi MURAMATSU	Chief Officer
Saito TAKATA	2nd Officer
Masaki OKADA	3rd Officer
Kazuhiko KANEDA	Chief Engineer
Wataru KUROSE	1st Engineer
Takaatsu INOMOTO	2nd Engineer
Yuna KAINO	3rd Engineer
Tokinori NASU	Chief Electronic Operator
Ryuji ONIKUBO	2nd Electronic Operator
Minami ISHIWATA	3rd Electronic Operator
Masanori OHATA	Boat Swain
Satoshi SHIMPO	Able Seaman
Saikan HIRAI	Able Seaman
Yuta OHJIRI	Able Seaman
Toru NAKANISHI	Able Seaman
Yudai YOSHIMI	Sailor
Ryo NAKANISHI	Sailor
Yuki SATO	Sailor
Hiroyuki OISHI	No.1 Oiler
Yuji FURUYAMA	Oiler
Makoto KOZAKI	Oiler
Masakazu ISHIDA	Assistant Oiler
Yukihide CHIKUBA	Chief Steward
Seiji HONDA	Steward
Ryu KUBOTA	Steward
Koichiro KASHIWAGI	Steward

3. Research Activities

3-1. Objectives

Function test for Giant Piston Coring system (GPC)

3-2. Operation

KM20-02 Leg3 is conducted as GPC functioning test, total shootings are 2 times at Sagami-bay. GPC assembly configurations are 3 tons weight, 15 m long outer barrels (5 m long per barrel), Coupler, piston, catcher, bit (long and short) and trigger which works as the balancer with trigger weight. Diagram of this system is shown in the Fig. 2. The chromium molybdenum pipes are used for outer barrels and polyvinyl chloride (PVC) inner tube is located inside of the outer barrels. The inner diameter (I.D.) of inner tube is 110 mm. The piston have two O-rings (size: P100). The Releaser (TELEDYNE BENTHOS co. Ltd.; maximum depth 12,000 m) is installed to Weighthead. The releaser also works as transponder which is for monitoring the GPC position. And inclinometer is attached on the just above Weighthead for

understanding GPC penetration behavior. The total weight of the system is approximately 4.6tons in the water. And Trigger weight is 333 kg.

GPC handling method is updated for this newly equipped GPC system, and which operation was done smoothly and safely by NME crew members and MWJ technicians which is shown in the Fig. 3.

GPC operation

#1 Shooting, Trigger works properly

Lowering GPC assembly with 0.2 m/s until 200 m (payout length) and activate heave compensator (AHC). After pass 200 m, winch speed gradually increased to 1.0 m/s until 1,300 m (payout length). After reach to 1,300m, wait for 3 minutes to reduce some pendulum motion of the GPC system then deactivated AHC. Continue to lowering with 0.3 m/s until Trigger weight hit to the seabed. At 1,426 m (payout length), observe winch tension drop suddenly, confirm GPC assembly launching from Trigger properly by Trigger weight hit to the seabed. Confirm the loss of the weight, immediately start picking up with 0.3 m/s until GPC assembly out from seabed, record maximum tension 8,300 kgf. At 1,404 m (payout length), confirm tension dropped to 5,100 kgf which indication shows the whole GPC assembly out from seafloor properly. Then recover GPC assembly to surface.

#2 Shooting, Trigger works properly

Lowering GPC assembly with 0.2 m/s until 200 m (payout length) and activate heave compensator (AHC). After pass 200 m, winch speed gradually increased to 1.0 m/s until 1,300 m (payout length). After reach to 1,300 m, wait for 3 minutes to reduce some pendulum motion of the GPC system then deactivated AHC. Continue to lowering with 0.3 m/s until Trigger weight hit to the seabed. At 1,427 m (payout length), observe winch tension drop suddenly, confirm GPC assembly launching from Trigger properly by Trigger weight hit to the seabed. Confirm the loss of the weight, immediately start picking up with 0.3 m/s until GPC assembly out from seabed, record maximum tension 9,100 kgf. At 1,397 m (payout length), confirm tension dropped to 5,200 kgf which indication shows the whole GPC assembly out from seafloor properly. Then recover GPC assembly to surface.

GPC specification

#1 Shoot

Weight: 3.0 ton

Outer Barrel: 15 m (1.05 ton)

Coupler: 2ea (0.18ton)

Bit: 1ea (0.06ton)

Trigger weight: 333 kg

Main rope $\Phi 28\text{mm} \times 27\text{m}$

Fuse wire rope $\Phi 24\text{mm} \times 1\text{m}$

Acoustic releaser: Benthos 865A

-deploy to weighthead: RX 10.0 kHz, TX: 11.0 kHz

-deploy to cable: RX 13.0 kHz, TX: 15.0 kHz

#2 Shoot (change penetration bit from #1 shoot)

Weight: 3.0 ton

Outer Barrel: 15 m (1.05 ton)

Coupler: 2ea (0.18ton)

Bit: 1ea (0.02ton)

Trigger weight: 333 kg

Main rope $\Phi 28\text{mm} \times 27\text{m}$

Fuse wire rope $\Phi 24\text{mm} \times 1\text{m}$

Acoustic releaser: Benthos 865A

-deploy to weighthead: RX 10.0 kHz, TX: 11.0 kHz

-deploy to cable: RX 13.0 kHz, TX: 15.0 kHz

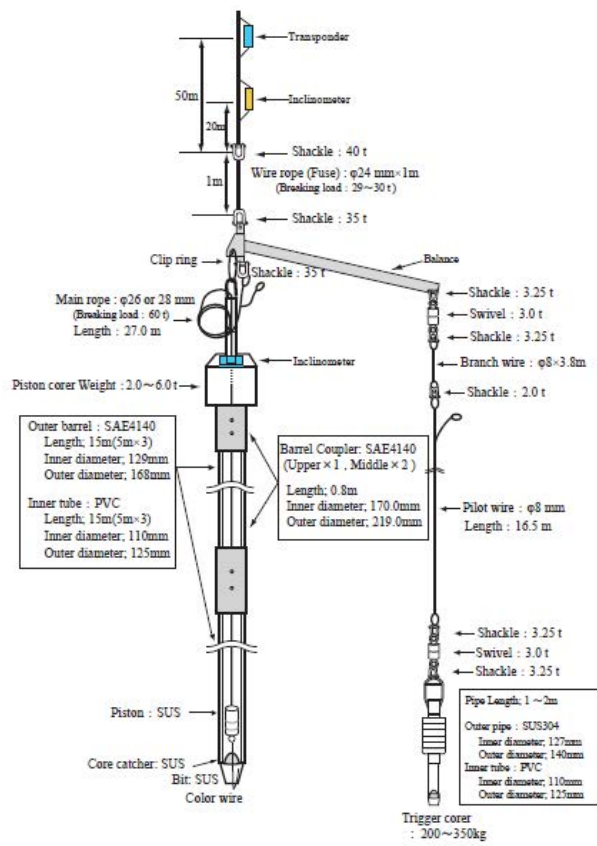


Fig.2 Configuration of 15 m Giant Piston Corer

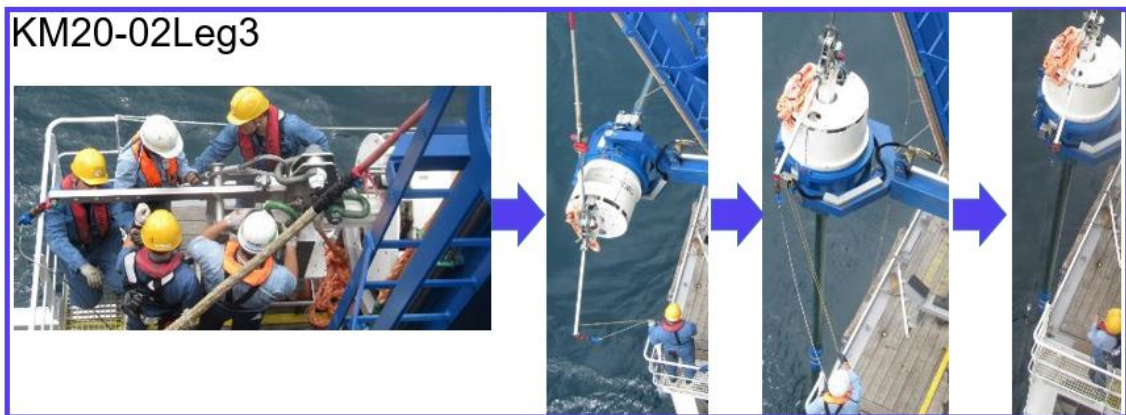


Fig.3 GPC handling

○ 4. Cruise Log

Date	Time (JST)	Description
2020/07/25	08:00	Leave the anchoring point in Yokosuka Port, sail to Sagami Bay
	09:00	Start preparation for 1 st GPC
	10:55	Arrive at the site, conduct XBT observation
	11:35	Start SBP observation
	11:50	End SBP observation
	12:30	Start 1 st GPC operation
	16:10	End 1 st GPC operation, move to off Ito for anchoring
	18:00	Arrive at the anchoring point
2020/07/26	08:00	Start preparation for 2 nd GPC
	08:15	Move to the site
	09:35	Arrive at the site
	10:00	Start 2 nd GPC operation
	13:15	End 2 nd GPC operation, turn around clockwise/anticlockwise for 3 components magnetometer calibration
	13:50	Move to off Tateyama for anchoring
	16:00	Arrive at the anchoring point
2020/07/27	08:45	Move to the anchoring point in Yokosuka Port
	11:15	Arrive at the anchoring point. End project.

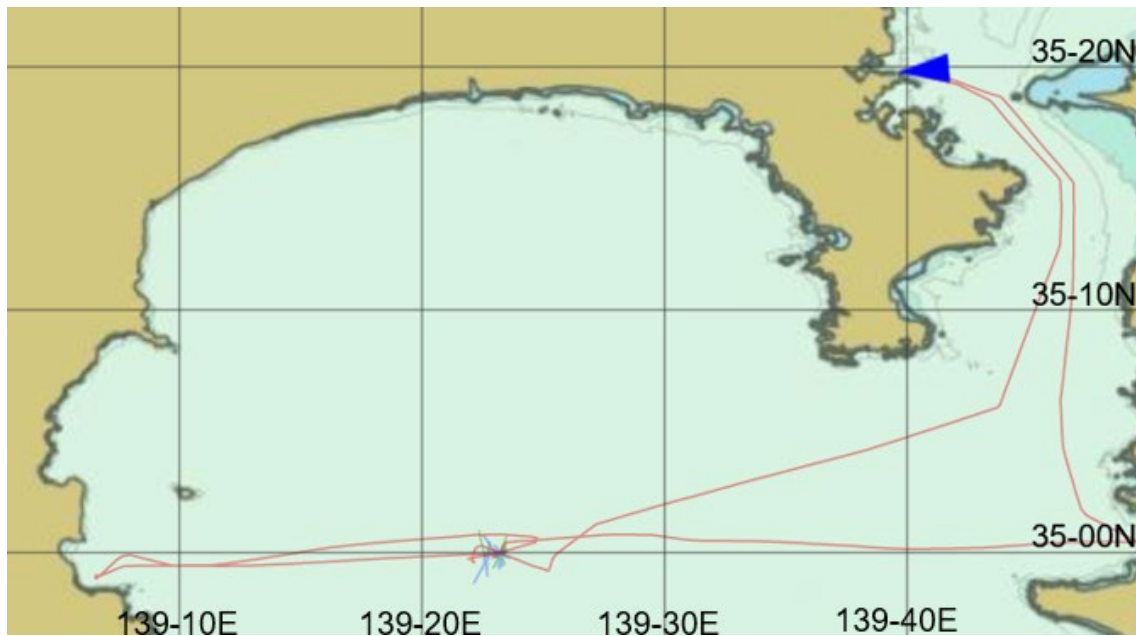


Fig 4. Ship track

● **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.
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