

M 11-08 “Cruise Summary” Trial operation of a new sediment sampling

July 5 2011-July 11 2011

1. Cruise Information

- Cruise ID: KY11-08
- Name of vessel: KAIYO
- Title of the cruise: Trial operation of a new sediment sampling system
- Title of proposal: Trial operation of a new sediment sampling system
- Chief scientist & Representative of the science party: Toshiya Kanamatsu [IFREE-JAMSTEC]
- Cruise period: 5th – 11th, July 2011
- Ports of call: JAMSTEC, Yokosuka -JAMSTEC, Yokosuka
- Research area: Sagami Bay and Kumano nada
- Research map: Refer to [Fig. 1](#)

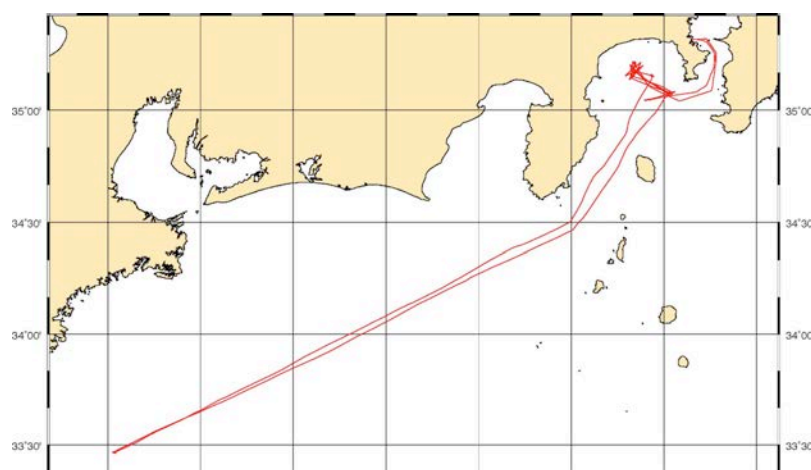


Fig.1: KY11-08 cruise started at Yokosuka (JAMSTEC) on 6th July, and ended at Yokosuka (JAMSTEC) on 11th July. Ship track is indicated in a red line.

Table 1: sampling points for corings

Operation	Date	Area	Latitude	Longitude	Water depth
MC01, NC01	2011/7/6	Sagami bay	35-05.00 N	139-32.00E	734m
MC02, NC02, PC01	2011/7/7	Sagami bay	35°04.50'N	139°32.00'E	750m
MC03, NC03, PC02	2011/7/8	Sagami bay	35°09.22'N	139°26.17'E	912m
MC04, NC04, PC03	2011/7/9	Kumano-nada	33°28.01'N	136°32.00'E	2065m
MC05, NC05, PC04	2011/7/10	Sagami bay	35°04.70'N	139°32.00'E	750m

2. Overview of the Observation

2.1. Objective

KY11-08 was planned for trial operation of a new sediment sampling system. Monitoring behaviors of the system during operations in various sediment settings, and evaluating quality of obtained sediment

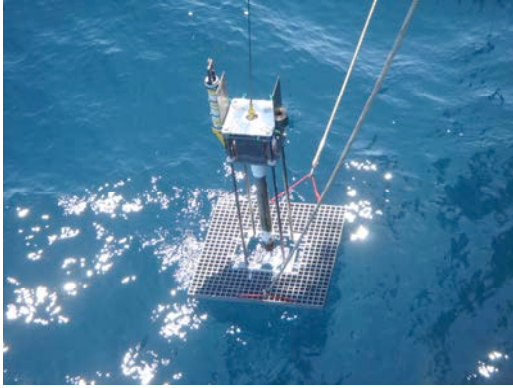


Fig.2 Photo of a New sampling system

sample are primal objectives in this cruise. To achieve these issues, sediment sampling by conventional sampling systems such as a piston corer and a multiple corer were carried out in order to compare recovery length and quality of obtained sediment samples between the new system and conventional systems.

Most recent geological records are archived in the very surface sediment, (e.g. climate change, earthquake record etc). The records in the surface sediment, therefore, are very valuable to understand geological

phenomena in near-past and contribute to predict phenomena in near-future. However generally the very surface sediment is very soft and easily disturbed by the coring. It makes difficult precise analysis. In order to overcome this situation, we designed a new concept. We have built a proto- sampling system, which can minimize the disturbance of sediment samples (Fig.2). The cruise is planned for the trial operation of this system. During the cruise we measured accelerations and tilting of the system, when the system is penetrating into the surface sediment. Detailed textures of the obtained sample will be examined using X-CT scanner at KCC in order to evaluate artificial disturbance by coring. So we did not split most of sampled cores. Onboard core splitting is restricted to samples Hand2 obtained by the multiple corer.

2.2. Summary of results

The following observations were obtained.

1. The new system penetration into sediment with 1G in vertical direction and 0G in horizontal direction.
2. No tilting during the penetration.
3. No pipe rotation during the penetration.
4. Generally longer recovery of sediment than gravity type core and multiple corer.
5. Gravity or piston corers will fall down when the penetration is relatively shallow. But the new system did not fall down despite short penetration. It could provide a better core quality, which is supposed by recovery.

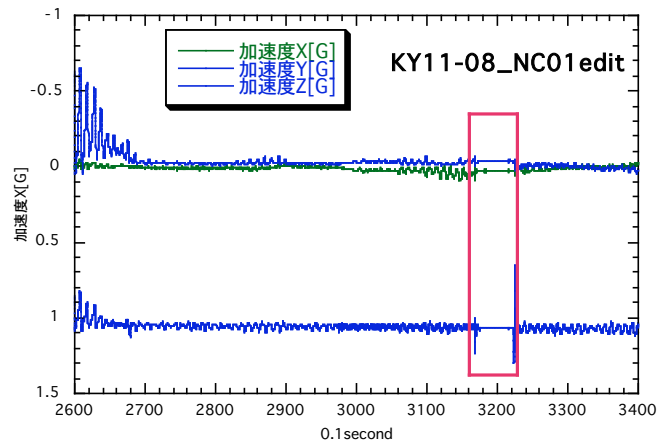


Fig.3 Acceleration of X, Y, and Z during the operation NC01. The new system penetration into sediment with 1 G in vertical direction and 0 G in horizontal directions. No tilting and no pipe rotation during the penetration was found. A red box indicates a duration of penetration of the systems.

2.3. Future development

In practice phase, the system behavior must be monitored only by tension meter. The observable tension change, which is signature of hitting sea bottom, should be ensured in this cruise. We could identify clear tension changes upto 2000m-depth. However considering the deeper condition (e.g. 7000-m) or rough sea condition, it is expected that background tension noises arisen from heaving of a ship increase. It should be difficult to observe a clear tension change in deep water such as Japan Trench. We believe that additional weight to the system can solve this problem.