

After the discovery of life and biosphere in subseafloor environment, the study of biomass, activity and function of subseafloor life and its ecological roles in biogeochemical cycles has become one of the major scientific objectives in the Integrated Ocean Drilling Program (IODP). In addition to this, biochemical analytical techniques such as more sensitive approaches using DNA are rapidly developing. Therefore, one of the IODP committees recommended routine sampling and storage of core samples in very low temperature condition for geomicrobiology. These sub-samples of cores are called "Routine Microbiological Sample (RMS)", and are being accumulated in the Kochi Core Center (KCC) since the IODP expedition in 2009.

Storage of the RMS under deep frozen condition is very important for preventing degradation of fragile bio-molecules such as DNA, RNA, enzymes, sugar chains, and intact polar lipids caused by abiotic hydrolysis, enzymatic reaction, and possible contamination. Moreover, aseptic sub-sampling and distribution of the RMS without thawing are highly desired for quality assurance of the samples.

KCC is equipped with apparatuses such as deep freezers (-80°C) and liquid nitrogen-cooled tanks (-160°C) for long-term storage, and an aseptic band saw system for "clean" processing of the frozen RMS. Using these geobiological sampling devices, aliquots of the RMS can be distributed to science community worldwide according to the IODP policy. We hope the RMS will contribute to the future geobiological research of subseafloor life and the least understood biosphere on Earth!



Microorganisms from marine subsurface sediments collected by *CHIKYU* off Japan

Curation of Routine Microbiological Sample (RMS)

RMS is the cored material obtained from the subseafloor during Integrated Ocean Drilling Program (IODP) expeditions, and adequately preserved in deep freezing and aseptic condition for microbiological studies.



Kochi Core Center (KCC)

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(on Monobe campus of Kochi University)
<http://www.kochi-core.jp/>



Collection, storage, and distribution of core samples for microbiological research

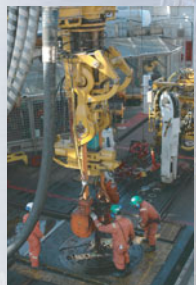
Onboard processing



Chikyu: an IODP platform



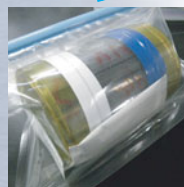
WRCs and aliquots in -80 °C freezer



Coring operation (Drill floor on Chikyu)



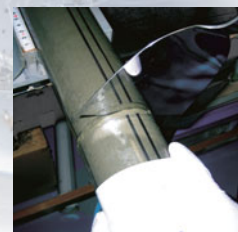
Subsampling with tip-cut syringe



Whole round core (WRC)



Taking out core from core barrel



Sampling for microbiology



Recovered core (Core cutting area on Chikyu)



Core cut into sections

Onshore processing and storage



Frozen core samples transferred to KCC and stored in deep freezer (-80 °C)

Aseptic subsampling by using a band saw system in a clean booth



Overview of the clean booth



Two HEPA-filter units fitted in the booth



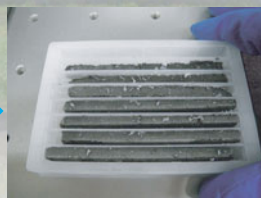
Motor-driven band saw machine



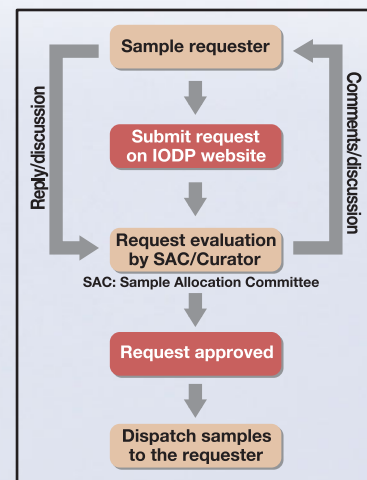
Frozen WRC cut under clean condition



WRC cut into halves



An example of subsampling (WRC cut into bars)



From sample request submission to receipt of samples



Core samples to be sent frozen with dry ice



Deep freezers (-80 °C)



Liquid nitrogen-cooled tanks (-160 °C)



Residual WRC and aliquots sealed in aluminum bag



WRC aliquots in perfluoroalcoxyalkane (PFA) cups