



**Call for Participation in IODP Expedition 370:
"T-Limit of the Deep Biosphere off Muroto"**

CDEX/JAMSTEC

21 April 2016

CDEX currently plans to implement IODP Expedition 370 "T-Limit of the Deep Biosphere off Muroto" (T-Limit). Using the drilling vessel *Chikyu*, Expedition 370 will explore the limits of subseafloor life and the biosphere in the protothrust zone of the Nankai accretionary prism off Cape Muroto, Japan. Expedition 370 will be from 10th September to 10th November in 2016, including 3 days of port call, and accompanied by shore-based activities at Kochi Core Center (KCC). We call out both shipboard and shore-based scientists for participation in the Expedition 370 science party. This expedition is based on IODP Proposal 865, "Constraining the temperature limit of the microbial deep biosphere in the Nankai Trough subseafloor".

IODP Expedition 370

Expedition 370 aims (1) to study the factors that control biomass, activity and diversity of microbial communities in a subseafloor environment where temperatures increase from ~30°C to ~130°C and which thus likely encompasses the biotic-abiotic transition zone, and (2) to determine geochemical, geophysical and hydrogeological characteristics in sediments and the underlying basaltic basement and elucidate if the supply of fluids containing thermogenic and/or geogenic nutrient and energy substrates may support subseafloor microbial communities in the Nankai accretionary complex.

To achieve these scientific objectives, we will retrieve sediment and basalt core samples from a site near ODP Site 1174 (Leg 190 in 2000), located in the landward protothrust zone of the Nankai Trough accretionary prism down to ~1.2 km below seafloor (water depth: 4730 m). Because of the high heat flow in this particular geological setting off Muroto, we expect temperatures of ~103-106°C at the décollement zone (870-900 m below seafloor [mbsf]) and ~133°C at the sediment-basement interface (1210 mbsf). Full descriptions of cored samples and downhole profiles as the basic data are available from ODP Legs 190. Taking advantage of the enormous progress in microbiological and biogeochemical approaches over the past 15 years, we will expand our knowledge of geosphere-biosphere interactions that define limits of subseafloor life and the biosphere (IODP Science Plan Challenge 6).

The drilling operation will start with installing a casing to top 140 mbsf, as was implemented in ODP Leg 190. Coring with Hydraulic Piston Coring System (HPCS) or Extended Shoe Coring System (ESCS) will start from ~200 mbsf and continue until reaching the basement at 1210 mbsf. A newly modified HPCS coring, with a short stroke and a reinforced design, will be attempted to collect high quality core samples from key intervals. In addition, the upper 50 m of basement will be cored by Rotary Core Barrel (RCB). Formation temperature will be measured



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in the course of coring with sensor tools. After coring operations, a string of multiple temperature sensor-loggers will be installed into the borehole down to the basement and monitor the temperature profile for 1-2 years.

Science party:

The Expedition 370 science party will generate samples and data using shipboard facilities of the *Chikyuu* as well as shore-based facilities at KCC to meet major scientific objectives. To this end, the Expedition 370 science party will consist of two groups: one aboard the *Chikyuu* and the other at KCC. The shipboard team will be onboard *Chikyuu* and responsible for sampling, quality assurance/quality control (QA/QC) including contamination assessments, time-sensitive (bio-)geochemical and microbiological analyses, and IODP standard measurements. The shipboard team will include professional researchers (and graduate students) in the following specialties: microbiologists, organic and inorganic geochemists/biogeochemists, physical properties specialists, sedimentologists, structural geologists, paleontologists, paleomagnetists, petrologists and hydrogeologists.

The shore-based team will gather at KCC on around 27th September for additional, but essential, microbiological and (bio-)geochemical sub-sampling and analyses to achieve major scientific goals in the IODP T-Limit project. This set of analyses will include, but is not limited to, cell count of low-biomass samples, molecular analysis, isotopic analysis, biomarker analysis, etc., which will be implemented concurrently with shipboard activities using anaerobically packed whole round core samples directly sent from the *Chikyuu*. The shore-based team activity at KCC is 8 hrs through 7 days a week. CDEX will provide the accommodation and per diem expenses during the shore-based team activity. Both groups of the Expedition 370 science party are responsible for the IODP Expedition Report, and all members of the science party will have access to samples and data according to IODP policies.

Applicants to join the science party of Expedition 370 are encouraged to read the summary prospectus from the science operator's expedition website (<http://www.jamstec.go.jp/chikyuu/e/exp370/index.html>) and to contact their program member office. The total of ~30 scientists (including graduate students) will be assigned to shipboard and shore-based teams based on their research plans and skills. Applicants are encouraged to document any preferences between shipboard and shore-based teams according to their scientific purposes.



| Exp. 370: T-Limit of the Deep Biosphere off Muroto | | | | |
|-----------------------------------------------------------|---------------------------------|----------------------------|-------------------------------------------------------------------|-----------------------|
| Schedule* (shipboard team) | Schedule* (shore-based team) | Place of port | Co-chief scientists | EPM |
| Sep 10 to Nov 10, 2016** | Sep 27 to Nov 24, 2016 | Shimizu to Kochi, Japan | Verena Heuer (MARUM) Fumio Inagaki, Yuki Morono (KCC) | Yusuke Kubo (CDEX) |

* The schedule is subject to change

** Includes 3 days of port call at Shimizu port