



Scientific Report for IODP Expedition 386 Japan Trench Paleoseismology



Weekly Report

14th February to 20th February 2022

1. Location

D/V Chikyu, Shimizu Port, Japan
Onshore Science Party

2. Activity Summary

On the 14th of February, all Chikyu Team SP members and Operator staff tested negative for Covid-19 on their final PCR test, and were able to embark the Chikyu. A series of meetings, safety briefings and ships induction were held and staff were introduced to their roles and workflow.

Normal shift working (midnight to noon) began on the 15th, and on this first day extra time was taken to establish best practice in workflows for all teams. Splitting and scanning of the first holes (M0081A and B) were completed and sampling began in the evening of the 15th.

Workflows for the ESO staff and remote Science Party began with uploads of scan data from the Chikyu, and QA, data entry and finally sharing with the Science Party.

On the 18th the first set of OSP samples (P-Wave, Sed GC) were shipped from the Chikyu to BCR. By this time many of the initial issues arising from remote working and unfamiliarity with the data input and workflow had been ironed out, and the remote SP members were gaining momentum and efficiency.

By 2400hrs JST on Sunday the 20th of February the team aboard the Chikyu had split, scanned, sampled and described 185 core sections from M0081, M0082 and M0083, and had taken 578 samples. PMag measurements were also completed on M0081, M0082 and M0083. The remote Science Party and ESO staff had further described 58 core sections from M0081 A, B, C and D, and entered the final descriptions into the DIS. The remote Physical Properties team worked up the MSCL Offshore data and began working with the Penetrometer, MAD, Colour Spectrometer and RGB data, whilst the remote Geochemists concentrated on data gathered from offshore sampling.

3. Activities for Next Week (21st February to 27th February)

Onboard Chikyu splitting, scanning, description and sampling will continue with cores from sites M0089, M0084 and M0085.

Onshore Science Party and ESO Teams will continue to update offshore VCD descriptions, analyse Phys Props data and commence analysis of shipped geochemistry samples from all core material available.

4. Current Status

Hole	Total Core Length (m)	Split Core Described (m)	No. Samples Collected
M0081A	1.21	1.21	3
M0081B	19.89	19.89	51
M0081C	1.07	1.07	5
M0081D	35.57	35.57	94
M0081E	1.07	1.07	10
M0081F	37.74	37.74	204
M0082A	1.455	1.455	6
M0082B	18.71	18.71	51
M0082C	0.97	0.97	5
M0082D	36.67	36.67	120
M0083A	1.615	1.615	5
M0083B	19.52	19.52	49
M0083C	1.4	1.4	6
M0083D	36.89	12	31

5. Preliminary Scientific Assessment

During the first day of core processing onboard Chikyu, both the day and night shifts (comprising only four science party members per shift, and co-chief Ken Ikehara) worked together with MarE3 staff to harmonize approaches to core description and core flow, respectively. Normal shift schedules began on February 15th, when also the first joint onboard and virtual crossover meeting with remote science party members connecting from all over the world was held. During the hybrid OSP, routine work by onboard Science Party members comprises visual core description and smear slide analyses (for mineralogical composition and radiolarian biostratigraphy), paleomagnetic measurements on subsampled u-channels, pocket penetrometer measurements, as well as sampling for undertaking IODP measurements. Only moisture and density is measured onboard Chikyu, all other IODP measurements are “outsourced” due to limited personnel onboard Chikyu. Samples are thus shipped to the ESO labs at the MARUM Bremen Core Repository (BCR) and European Petrophysics Consortium (EPC) at the Univ. of Leicester.

The first few days for the remote science party members was mainly dedicated to organization within the different discipline groups, establishing good communication within remote scientist groups and between onboard and remote scientists, defining workflows and schedules to analyze, discuss and report the scanned visual core description sheets, line-scan images, and data from IODP measurements that are being upload to the online science folder, after having been transferred from the Chikyu and quality controlled by ESO staff. By the end of the week 1, these data and workflow now mostly run smoothly and the first samples have arrived for measurements at BCR.

Onboard Chikyu visual core description, sampling and paleomagnetic measurements is already completed for Sites M0081 and M0082 of the southern focus area, located in the southernmost and deepest trench-fill basin of the studied Japan Trench area (at more than 8000-meter water depth). The split cores from Holes M0081A-F and M0082A-D reveal great details on the stratigraphic succession, comprising various types and scales of sedimentary event deposits, interbedded with fine-grained bioturbated hemipelagic sediments. Observation from the split cores, integrated with the pre-OSP acquired X-ray computed tomography data now analyzed by remote science party members, reveal great details of sediment structures below, within and above event beds and characteristic patterns in the sedimentary succession that can be correlated between holes. Furthermore, volcanic ashes are observed in different holes and sites, which are candidates to establish good tie-points for stratigraphic correlation.

The hypothesized difference in sedimentation rate between Site M0081, located in the central depocenter of the southernmost Japan Trench basin and Site M0082, located on relative bathymetric high within the basin, as inferred from high-resolution subbottom profiler data acquired during site-surveys prior to, as well as by the R/V Kamei during IODP Expedition 386, is confirmed by initial results from radiolarian biostratigraphy. These initial results also reveal Holocene ages for the succession recovered from this southernmost focus area (Site M0081 and M0082).

The geochemistry team has focused on analyzing the data obtained from measurements of pore-fluid and headspace gas samples taken offshore. Data allow to constrain the depth of sulfate-methane transition zone (SMTZ) nicely.

Physical property specialists have focused their work analyzing the data acquired on whole core Multi-Sensor Core Logger (MSCL) measurements offshore. Data quality is good and shows consistent downcore trends and patterns comparable between holes. First data of moisture and density on discrete samples and penetrometer measurements conducted on board the Chikyu have already been transferred to remote scientists to be included in their data analyses and reporting.

Paleomagnetic investigations on board the Chikyu are primarily designed to determine the characteristic remanence directions for use in magnetostratigraphic and structural studies of cores. Data quality from routine measurements on u-channels taken from working halves is good for measurements made so far; with promising prospects for establishing age constraints by using paleomagnetic secular variation.

6. Figures

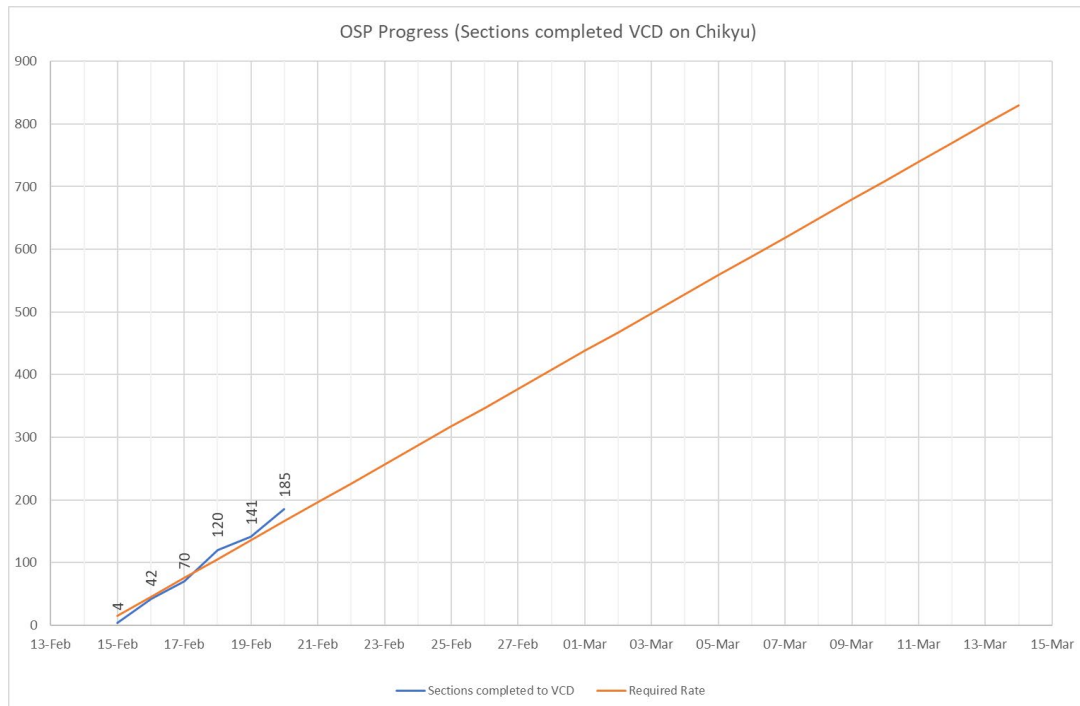


Figure 1: Number of core sections split, scanned and described aboard the Chikyu

7. Photographs

