

Figure F1. A. Pressure record of entire 5.3 y deployment, including predeployment and postrecovery, Hole C0010A. B. Bridge plug setting (installation). Hydraulic separation of the two sensors is demonstrated by lack of formation pressure response after bridge plug was set. C. GeniusPlug retrieval, demonstrating hydraulic isolation of the formation from the overlying ocean and borehole above the bridge plug.

Figure F2. Raw data record, not including deployment and retrieval disturbance, Hole C0010A. Sensor drift is indicated by linear regression.

Figure F3. 1.5 months of pressure data showing characteristic tidal forcing, Hole C0010A. Note smaller amplitude of the formation response relative to the seafloor (hydrostatic) response.

Figure F4. Pressure records at the time of the 11 March 2011 Tohoku earthquake, Hole C0010A. A. Both sensors register a response approximately 2 min after Tohoku earthquake (05:46:24 h [UTC] on 11 March 2011). B. Detail of shorter time window shows pressure transients related to aftershock and passing tsunami wave.

Figure F5. A. Data record showing removal of corrosion cap, 1 April 2016 earthquake, and reentry of drill string, Hole C0010A. B. Pressure transients related to 1 April 2016 earthquake. C. Detailed view of earthquake-induced pressure offset in formation pressure.

Figure F6. A. Temperature record of entire 5.3 y, as recorded with the three temperature sensors, Hole C0010A. Peak at beginning of record reflects shipboard air temperature. B. Detailed view of rapid temperature increase after installation. T logger = platinum sensor; T hydrostatic = T sensor on upward-looking P sensor.

Figure F7. Temperature record, not including deployment and retrieval disturbances, Hole C0010A. Temperature drops discussed in text are labeled A, B, and C.

Figure F8. Kuroshio Current speed during GeniusPlug recovery, Hole C0010A. Shaded area indicates when VIV was measured by drill pipe accelerometer.

Figure F9. VIV acceleration (ACC) data recorded by drill pipe accelerometer attached to 5½ inch drill pipe during GeniusPlug recovery, Hole C0010A. Dashed lines = design limit of 2.0 G.

Figure F10. Guide roller over the moonpool used to support tubing and cables during deployment, Hole C0010A.

Figure F11. Pressure Port P1 with 3 miniscreens plumbed to single ¼ inch hydraulic line, Hole C0010A.

Figure F12. Strainmeter suspended from rig floor, Hole C0010A.

Figure F13. Instrument carrier suspended from rig floor, Hole C0010A. Instruments mounted on carrier, from top to bottom: geophone and accelerometer module, SAHF digitizer, and Lily tiltmeter (all part of tilt combo) and broadband seismometer (CMG3T).

Figure F14. Thermistor node attached to 3½ inch tubing, Hole C0010A.

Figure F15. Spacing of centralizers, tie wraps, and steel bands used to secure cables to 3½ inch tubing, Hole C0010A. FWD = forward.

Figure F16. Bottom of swellable packer at 1549 mbsl after 3.5 days in seawater, Hole C0010A.

Figure F17. Time series of pressure data at Port P2 during cementing, Hole C0010A.

Figure F18. PSD plots of sensor responses in the tilt combo module after cementing, Hole C0010A.

Figure F19. A. Pressure and temperature record recovered just after LTBMS deployment on 15 April 2016, Hole C0010A. These data record pressure and temperature between 11 and 15 April. B. Detailed view of the end of the record showing valve closing by ROV.

Figure F20. Generalized stratigraphic columns for Holes C0010C and C0010D (hanging wall) and Hole C0010E (footwall).

Figure F21. Results of bulk sediment XRD, Holes C0010C and C0010D (hanging wall) and Hole C0010E (footwall).

Figure F22. Results of bulk sediment carbon-nitrogen-sulfur analyses, Holes C0010C and C0010D (top; hanging wall) and Hole C0010E (bottom; footwall).

Figure F23. Correlation between CaCO_3 values from carbon-nitrogen-sulfur analyses (Table T22) and normalized relative abundances of calcite from XRD, Site C0010. Dashed black line = 1:1 reference line, red line = linear regression with a correlation coefficient (r) equal to 0.99.

Figure F24. (A) Bedding dips and (B) fault dips, Holes C0010C and C0010D. Gray lines = depth of megasplay fault.

Figure F25. Split core image of a fault (365-C0010C-3R-3, 69–71 cm; ~322.1 mbsf). Arrow = sense of slip.

Figure F26. A. Split core image of faults (365-C0010C-4R-3, 18–30 cm; ~330.85 mbsf). Arrows = sense of slip for two minor faults, white box = location of B. B. Close-up view of slickenlined fault surface shown in A. Fault strike direction is horizontal in this photograph. Arrow = slickenline direction.

Movie M1. 3-D MP4 movie of C0010C-4R-3. Crack-filling carbonate veins and carbonate-dominated filling mud in bioturbation burrows are shown by a large computed tomography (CT) number (red). A fault described in text and Figure F26 is shown in the upper part of the 3-D image. Note that red spots are distributed along fault surface and lithologic boundary between ash and mud layer in the hanging wall. A=anterior, P=posterior.

Movie M2. 3-D MP4 movie of crack-filling veins (red) in acidic tuff layer bounded by breccia layers above and below (gray, anastomosing) in 365-C0010C-4R-3. Note that vein strikes trend mostly anterior-posterior direction of the core.

Figure F27. 2-D XCT image of fault at 330.85 mbsf (365-C0010C-4R-3; see also Figure F26). Note the ~1 cm thick fault gouge and bright spots, indicating precipitated carbonates. These are difficult to observe by visual inspection of split archive half surface.

Figure F28. (A) Bedding dips and (B) fault and shear zone dips, Hole C0010E. Dashed lines = estimated depth of megasplay fault.

Figure F29. Split core image of an anastomosing shear zone (365-C0010E-3R-6, 37–39 cm; ~378.5 mbsf). Arrow = sense of slip.

Figure F30. Split core image of a reversed fault (365-C0010E-3R-4, 13–23 cm; ~375.6 mbsf). Arrow = sense of slip.

Figure F31. A. Vector component diagrams of progressive alternating field (AF) demagnetization, Sample 365-C0010C-10R-3, 85.0–87.0 cm. Steps are in mT for AF demagnetization. B. Distribution of soft component inclination.

Figure F32. A. Inclination. B. Declination. C Intensity. D. Magnetic susceptibility. Black = NRM, red = after 20 mT AF demagnetization.

Figure F33. Chlorinity concentrations in selected splits from OsmoSampler chemistry (chem) and biology (bio) coils. Concentrations from similar depths in Hole C0010C (1R-2 through 10R-3) and at Site C0004 (316-C0004D-26R-3 through 36R-2) are shown as a range. Bio mix includes Splits bio001, bio002, bio013, bio014, bio025, bio037, bio049, bio061, bio073, bio085, bio097, bio109, bio121, bio133, and bio145. Dashed line = chlorinity seawater concentration.

Figure F34. Sodium (solid blue) and magnesium (open green) concentrations in selected splits from OsmoSampler chemistry and biology coils. Concentrations from similar depths in Hole C0010C (1R-2 through 10R-3) and at Site C0004 (316-C0004D-26R-3 through 36R-2) are shown as a range. Blue dashed line = sodium seawater concentration, green dashed line = magnesium seawater concentration.

Figure F35. Potassium (solid blue) and calcium (open green) concentrations in selected splits from OsmoSampler chemistry and biology coils. Concentrations from similar depths in Hole C0010C (1R-2 through 10R-3) and at Site C0004 (316-C0004D-26R-3 through 36R-2) are shown as a range. Blue dashed line = potassium seawater concentration, green dashed line = calcium seawater concentration.

Figure F36. Bromide (solid blue) and sulfate (open green) concentrations in selected splits from OsmoSampler chemistry and biology coils. Concentrations from similar depths in Hole C0010C (1R-2 through 10R-3) and at Site C0004 (316-C0004D-26R-3 through 36R-2) are shown as a range. Blue dashed line = bromide seawater concentration, green dashed line = sulfate seawater concentration.

Figure F37. Dissolved silica (solid blue) and lithium (open green) concentrations in selected splits from OsmoSampler chemistry and biology coils. Concentrations from similar depths in Hole C0010C (1R-2 through 10R-3) and at Site C0004 (316-C0004D-26R-3 through 36R-2) are shown as a range. Blue dashed line = dissolved silica seawater concentration, green dashed line = lithium seawater concentration.

Figure F38. Boron (solid blue) and strontium (open green) concentrations in selected splits from OsmoSampler chemistry and biology coils. Concentrations from similar depths in Hole C0010C (1R-2 through 10R-3) and at Site C0004 (316-C0004D-26R-3 through 36R-2) are shown as a range. Blue dashed line = boron seawater concentration, green dashed line = strontium seawater concentration.

Figure F39. Barium (solid blue) and manganese (open green) concentrations in selected splits from OsmoSampler chemistry and biology coils. Concentrations from similar depths in Hole C0010C (1R-2 through 10R-3) and at Site C0004 (316-C0004D-26R-3 through 36R-2) are shown as a range. Blue dashed line = barium seawater concentration, green dashed line = manganese seawater concentration (at bottom of plot).

Figure F40. Cesium (solid blue), copper (striped black), and molybdenum (open green) concentrations in selected splits from OsmoSampler chemistry and biology coils. Concentrations from similar depths in Hole C0010C (1R-2 through 10R-3) and at Site C0004 (316-C0004D-26R-3 through 36R-2) are shown as a range. Bio mix includes Splits bio100, bio101, bio106, bio107, bio108, bio110, bio111, bio112, bio113, bio114, bio116, and bio117. Long blue dashed line = cesium seawater concentration, short black dashed line = copper seawater concentration, long green dashed line = molybdenum seawater concentration.

Figure F41. Rubidium (solid blue) and yttrium (open green) concentrations in selected splits from OsmoSampler chemistry and biology coils. Concentrations from similar depths in Hole C0010C (1R-2 through 10R-3) and at Site C0004 (316-C0004D-26R-3 through 36R-2) are shown as a range. Bio mix

includes Splits bio100, bio101, bio106, bio107, bio108, bio110, bio111, bio112, bio113, bio114, bio116, and bio117. Blue dashed line = rubidium seawater concentration, green dashed line = yttrium seawater concentration.

Figure F42. Lead (solid blue) and uranium (open green) concentrations in selected splits from OsmoSampler chemistry and biology coils. Concentrations from similar depths in Hole C0010C (1R-2 through 10R-3) and at Site C0004 (316-C0004D-26R-3 through 36R-2) are shown as a range. Bio mix includes Splits bio100, bio101, bio106, bio107, bio108, bio110, bio111, bio112, bio113, bio114, bio116, and bio117. Blue dashed line = lead seawater concentration, green dashed line = uranium seawater concentration.

Figure F43. A. Chemistry Pump 1 and chemistry coil. B. Biology Pumps 2 and 3 and biology coil.

Figure F44. Alkalinity concentrations in sediments, Holes C0010C and C0010E.

Figure F45. Chlorinity and sodium concentrations in sediments, Holes C0010C and C0010E.

Figure F46. Potassium, magnesium, and calcium concentrations in sediments, Holes C0010C and C0010E.

Figure F47. Phosphate and ammonium concentrations in sediments, Holes C0010C and C0010E.

Figure F48. Bromide, sulfate, and nitrate concentrations in sediments, Holes C0010C and C0010E.

Figure F49. Boron, lithium, silicon, and strontium concentrations in sediments, Holes C0010C and C0010E.

Figure F50. Barium and manganese concentrations in sediments, Holes C0010C and C0010E.

Figure F51. Molybdenum and rubidium concentrations in sediments, Holes C0010C and C0010E.

Figure F52. Vanadium, cesium, uranium, and copper concentrations in sediments, Holes C0010C and C0010E.

Figure F53. Lead and yttrium concentrations in sediments, Holes C0010C and C0010E.

Figure F54. Dissolved hydrocarbon C_1/C_2 values, Site C0004 and Holes C0010C–C0010E.

Figure F55. $CaCO_3$, TOC, TN, TOC/TN ratio, and TS in sediments, Site C0004 and Holes C0010C–C0010E.

Figure F56. Microscope images of microbiology cultures. 250 μL of each culture was filtered onto a 0.2 μM filter, stained with SYBR Green I, and viewed with an epifluorescent microscope. Inoculum for each culture: (A) FLOCS fluids, (B) crushed barite, (C) Site C0004 sediment, (D) olivine, (E) rust from GeniusPlug casing, (F) control.

Figure F57. MSCL-W results, Holes C0010C (red) and C0010D (blue). A. V_p . B. GRA density. C. Magnetic susceptibility. D. NGR.

Figure F58. MSCL-W results, Hole C0010E. A. V_p . B. GRA density. C. Magnetic susceptibility. D. NGR.

Figure F59. Composite of MSCL-W results (V_p , GRA density, magnetic susceptibility, and NGR), Holes C0010C (red), C0010D (blue), and C0010E (purple). These are referenced to the depth of the fault (inferred from seismic reflec-

tion images and LWD data in Hole C0010A), which is 407 mbsf in Holes C0010C and C0010D and estimated to lie at or above 360 mbsf in Hole C0010E.

Figure F60. Wet bulk density measured on discrete samples. Solid line = expected depth of megasplay fault from LWD Hole C0010A and seismic reflection data, dashed line = approximate megasplay fault depth in Hole C0010E defined from seismic reflection data and coring observations that indicate it lies above C0010E-1R.

Figure F61. Grain density measured on discrete samples. Solid line = expected depth of megasplay fault from LWD Hole C0010A and seismic reflection data, dashed line = approximate megasplay fault depth in Hole C0010E.

Figure F62. Porosity measured on discrete samples. Solid line = expected depth of megasplay fault from LWD Hole C0010A and seismic reflection data, dashed line = approximate megasplay fault depth in Hole C0010E.

Figure F63. (A) Electrical conductivity and (B) anisotropy measured on discrete samples. Solid line = expected depth of megasplay fault from LWD Hole C0010A and seismic reflection data, dashed line = approximate megasplay fault depth in Hole C0010E.

Figure F64. P-wave (A) velocity and (B) anisotropy measured on discrete samples. Solid line = expected depth of megasplay fault from LWD Hole C0010A and seismic reflection data, dashed line = approximate megasplay fault depth in Hole C0010E.

Figure F65. Thermal conductivity measured on discrete samples using half space method. Solid line = expected depth of megasplay fault from LWD Hole C0010A and seismic reflection data, dashed line = approximate megasplay fault depth in Hole C0010E.

Figure F66. Color reflectance L* data (lightness). Solid line = expected depth of megasplay fault from LWD Hole C0010A and seismic reflection data, dashed line = approximate megasplay fault depth in Hole C0010E.

Figure F67. Color reflectance a* data (chromaticity). Solid line = expected depth of megasplay fault from LWD Hole C0010A and seismic reflection data, dashed line = approximate megasplay fault depth in Hole C0010E.

Figure F68. Color reflectance b* data (chromaticity). Solid line = expected depth of megasplay fault from LWD Hole C0010A and seismic reflection data, dashed line = approximate megasplay fault depth in Hole C0010E.