Figure F1. A. Bathymetry and location of Site U1518. Red lines with triangles = thrust faults, red lines = anticlines. B. Detailed location map of holes drilled at Site U1518. White dots = LWD Holes U1518A and U1518B drilled during Expedition 372, orange dots = Holes U1518E and U1518F cored during Expedition 375, yellow dots = Holes U1518G and U1518H drilled for observatory operations. Black line in A and yellow line in B show location of Seismic Profile 05CM-04 in Figure F2 (Barker et al., 2018).

Figure F2. Seismic reflection image from Profile 05CM-04 through Site U1518 (pre-expedition interpretation on prestack time migration depth section; Barker et al., 2018). Location of seismic line shown in Figure F1. Red lines = interpreted faults. VE = vertical exaggeration. BSR = bottom-simulating reflector.

Figure F3. Site U1518 observatory installation. A. ACORK wellhead with pressure loggers and casing string with screens. B. ACORK drilling stinger assembly. C. ACORK with FFF, ROV platform, and bridge plug. D. CORK-II wellhead and casing string with packers and quadrant seal.

Figure F4. Lithostratigraphic summary and provisional facies interpretations, Site U1518. Core recovery: black = recovery, white = no recovery. Red arrows = fault zones. Vshale represents the estimated shale fraction in the rock and is calculated on the basis of the gamma ray logs: 0 represents end-member behavior expected from clean sand and higher values represent behaviors more similar to those of silty mudstone or shale. Logging units were defined during Expedition 372 (see Logging while drilling).

Figure F5. Lithostratigraphic summary and normalized abundances of total clay minerals, quartz, feldspar, and calcite from bulk powder XRD analyses, Site U1518. See Table T3 for data.

Figure F6. Representative X-ray diffractograms for bulk sediments (generated using MacDiff software), Site U1518. Total clay minerals (Cl), quartz (Q), feldspar (F), and calcite (Cc) labels coincide with diagnostic peaks used in computation of relative abundance.

Figure F7. Top: inferred thin-bedded turbidite deposit from Subunit IA and generic interpretation, Hole U1518E. Bottom: characteristic sandy silt and very fine sand.

Figure F8. Event bed thickness, Site U1518. See DESCRIPTION in Supplementary material for spreadsheets with supporting data. MTD is a descriptive abbreviation for contorted domains of variegated mudstone layers and mudstone clasts in matrix. Silt includes the full grain size range from sandy silt to silty sand and very fine sand.

Figure F9. Lithic fragments and heavy minerals in sand and silt fractions in Unit I, Hole U1518E. A. Microlitic volcanic lithic fragment including feldspar crystals (7H-2, 72 cm; 51.7 mbsf; cross-polarized light [XPL]). B. Felsic (?) volcanic lithic fragment (9H-2, 107 cm; 58.2 mbsf; plane-polarized light [PPL]). C. Lithic fragment displaying foliation fabric, indicating metamorphic rock origin (7H-3, 83 cm; 53.2 mbsf; PPL). D. Euhedral zircon grain clearly showing zoning structure (4H-3, 130 cm; 31.9 mbsf; PPL).

Figure F10. Magnetic susceptibility (MS) profile with graphic lithology, Holes U1518E and U1518F. A. Unit I. B. Units II and III.

Figure F11. Statistical analysis of silt layer thickness in Subunit IA, Site U1518. A. Bed thickness distribution of silty layers. B–D. Histograms of bed thickness frequency (blue = 0–36 mbsf, purple = 36–99 mbsf, red = 99–172 mbsf). E–G. Log-log plots of bed thickness frequency. N = number of beds, T = bed thickness for log-log plots, n = number of beds thicker than T, β = exponent for power law equation.

Figure F12. Ash layers in Subunit IA, Hole U1518E. A. Normally graded, pinkish grayish ash layers with sharp, inclined boundary in contact with hemipelagic sediment below and gradational contact with background sedimentation above. B. Larger portion of white fine ash at the top and drilling-disturbed subhorizontal boundary at the base. C. Fine white ash with sharp and subhorizontal boundaries to background sedimentation above and below. D. Fine white ash with sharp, planar and horizontal boundary in contact with hemipelagic sediment below and gradational contact with background sedimentation above. Black spots in lower 1 cm of ash layer indicate enrichment of magmatic minerals.

Figure F13. A. Thick ash deposit, Hole U1518E. Dashed areas = areas rich in black minerals and coarse pyroclastic particles. B. Relation between lithology and physical properties. Volcanic ash (pink) generates low NGR, low GRA, and low MS. Siliciclastic silt generates low NGR, low GRA, and high MS. Silty clay (green) generates high NGR, high GRA, and medium MS. cps = counts per second. SHMSL = Section Half Multisensor Logger, WRMSL = Whole-Round Multisensor Logger.

Figure F14. Textures and vesicles of pyroclasts in smear slides of ash layers, Hole U1518E. A, K. Pumiceous clasts and cuspate glass shards with round and elliptical vesicles. B. Round and elliptical to elongate vesicles in pumiceous clasts. C, G, J. Cuspate glass shards originating from large round to elliptical bubble walls. D. Pumiceous clasts with tubular and elongated vesicles. E, F, I. Predominantly blocky and dense appearance of glass shards. H. Pumiceous clasts with tubular and elongated vesicles.

Figure F15. Left: greenish gray mudstone characteristic of Unit II, Hole U1518F. Right: pyrite-rich silt (PPL).

Figure F16. Lithic fragments and dense minerals in silt fractions in Unit II, Hole U1518F. A. Microlitic volcanic lithic grain (20R-3, 106 cm; 373.4 mbsf; PPL). B. Polycrystalline quartz indicating chert or metamorphic rock (20R-3, 108 cm; 373.5 mbsf; XPL). C. Pyroxene grain displaying dissolution fabric (15R-3, 42 cm; 324.8 mbsf; PPL). D. Amphibole (hornblende?) also showing dissolution fabric (15R-3, 42 cm; 324.8 mbsf; PPL). E. Detrital glauconite grain (21R-4, 58 cm; 383.0 mbsf; PPL). F. Silt-sized monocrystalline calcite grains (17R-3, 39 cm; 343.0 mbsf; XPL).

Figure F17. Visual estimates of sand-sized fraction in coarse event beds in Unit III based on smear slides, Hole U1518F.

Figure F18. Examples of MTDs in Unit III, Hole U1518F. A. MTD deposits (contorted domain) (26R-3, 44–52 cm). B. Mudstone clast from contorted domain. Note the serrated edges of the clast. C. Contorted bands and mixing of variegated mudstone.

Figure F19. Examples of inferred turbidites and soft-sediment stratal disruption in Subunit IIIB, Hole U1518F. A. Parallel-laminated siltstone with normal grading. Disrupted silty claystone overlies the graded bed and fragments of lighter greenish gray mudstone mixed into darker gray mudstone. Base of silty layer was truncated by drilling disturbance. B. Parallel-laminated siltstone containing disrupted, fragmented mudstone clasts. Both laminae and dispersed mudstone clasts were overprinted by common forms of bioturbation, which is indicative of syndepositional deformation and postdeformational bioturbation.

Figure F20. Core-log integration showing correlation between LWD bed thickness estimates and observations of cores with relatively poor recovery (375-U1518F-21R through 24R). Depth scale corresponds to logging depth in Expedition 372 Hole U1518B. Core recovery: black = recovery, white = no recovery. Depth offsets between the two holes preclude bed-to-bed correlation. Sand counts and bed thickness were determined using LWD inputs including ring resistivity, T_2 relaxation time, and button resistivity. Bed thickness calculated from LWD data includes all material between the bottom of one silt layer and the bottom of the next. Silt layer thickness in cores was measured from the sharp base of a graded bed to the point where turbidite mudstone merges into the background of hemipelagic mudstone. Note the explanation in text emphasizing why specific bed correlations between Hole U1518F core data and Hole U1518B logging data are not possible.

Figure F21. Summary of lithostratigraphy, planktonic foraminifer abundance, interpreted oceanicity, paleowater depths, downslope reworking, *Truncorotalia truncatulinoides* coiling record, and biostratigraphic datums, Site U1518.

Figure F22. Paleomagnetic inclination and intensity (archive halves and discrete specimens) and MS (Bartington MS2K point sensor; see Physical properties), Holes U1518E and U1518F. Inclination shows GAD field predictions in normal (negative inclination) and reversed (positive inclination) field.

Figure F23. Magnetic declination (archive halves) (left) as recorded and (right) after rotating each core so that mean direction points north (375-U1518E-1H through 6H). All data displayed were recorded after AF demagnetization to 20 or 30 mT.

Figure F24. Paleomagnetic declinations compared with core images (375-U1518F-20R-1 and 20R-2). Offsets in declination records correlate with identified biscuit boundaries.

Figure F25. Representative vector components and NRM intensity diagrams for samples affected by GRM acquisition during static AF demagnetization, Hole U1518E. Static AF demagnetization procedures usually ended with the AC field applied along the *x*-axis (here: north), resulting in GRM acquisition along the *y*-axis (here: east). Dec. = declination, Inc. = inclination.

Figure F26. Typical vector components and NRM intensity diagrams for samples subjected to thermal demagnetization, Hole U1518E. Note the presence of low-temperature overprints. Dec. = declination, Inc. = inclination, MAD = maximum angular deviation.

Figure F27. Flinn diagram showing shape of AMS, Site U1518. $F = \chi_2/\chi_3$ quantifies magnetic foliation, $L = \chi_1/\chi_2$ quantifies lineation.

Figure F28. Rock magnetic parameters, Holes U1518E and U1518F. A. Magnetic foliation (F) = χ_2/χ_3. B. $S_{-300mT} = (IRM_{-300mT}/IRM_{1T} + 1)/2$ as proxy for antiferromagnetic minerals with 300 mT ≤ coercivity ≤ 1 T. C. IRM_{1T}/χ as proxy for iron sulfide content.

Figure F29. Key structural observations in Hole U1518F, including the Pāpaku fault zone, comprising a main brittle fault and a subsidiary fault separated by a zone of less intense and dominantly ductile deformation. Scale is approximate, and structures are representative rather than exact.

Figure F30. Dip angles of planar structures with lithostratigraphy, density, and porosity (core and LWD), Holes U1518E and U1518F (see Lithostratigraphy and Physical properties). MAD = moisture and density. Bedding, fault, and fracture dips: solid symbols = high confidence, open symbols = low confidence. Assessed drilling disturbance intensity (DDI) has an index from 0 to 4 (see Structural geology in the Expedition 372B/375 methods chapter [Wallace et al., 2019a]) shown in grayscale (white = intact [DDI = 0] intervals, black = heavily damaged [DDI = 4] intervals). Yellow shading = Pāpaku fault zone.

Figure F31. Summary of LWD bedding and fracture orientations measured from GVR resistivity image logs, Holes U1518A and U1518B. No shifts have been applied to depth scales. Borehole breakout orientations observed from GVR image logs are shown by long axes of pink ovals; "dip angle" is arbitrary for borehole breakouts. Dip azimuths are indicated by direction of tail on tadpole symbols (up = north). Bedding dip angles measured in cores (Figure F30) are plotted for comparison. RAB = resistivity-at-the-bit.

Figure F32. Representative hanging wall features, Hole U1518F. A. Hinge zone of subhorizontal fold with fractured bedding around hinge zone (10R-2, 35–65 cm). Inverse grading suggests an overturned lower limb. B. Normal faults displacing thin silt beds with centimeter-scale offsets (10R-1, 53–57 cm). C. Filled fracture sets in hanging wall mudstone (6R-2, 32–37 cm). D. Breccia zone defined by filled fractures in hanging wall mudstone (10R-2, 10–15 cm).

Figure F33. Representative fault zone structures (archive half unless otherwise noted), Hole U1518F. A. Breccia interval (14R-1, 28–38 cm). B. Fine flow banding gradually decreasing in intensity with depth (13R-3, 21–28 cm; working half). C. Sliver of lighter colored material in the fault zone, characterized by distorted muds and a silt layer truncated by a minor fault (14R-1, 109–116 cm). Note the fine brittle overprint. D. Discrete normal faults crosscut color bands interpreted to be ductile flow banding (14R-2, 37–41 cm).

Figure F34. Examples of structures from Domains 2B and 3 representing the zone of brittle–ductile deformation below the main fault and the subsidiary fault, respectively, Hole U1518F. A. Thin fine-grained shear band with adjacent lenticular clasts and dismembered beds (15R-1, 17–22 cm). B. Localized zone of ductile flow structures and minor normal faults (17R-1, 68–72 cm). C. Zone where elongate clasts form a fabric subparallel to bedding (top half) and oblique to bedding (lower half) (17R-1, 51–58 cm). D. Discrete faults in Domain 3, the subsidiary fault zone, crosscutting and locally parallel to flow banding (18R-1, 55–67 cm).

Figure F35. Lower hemisphere, equal-area stereonets of bedding orientation data, Hole U1518E. Dashed great circles = low-confidence orientation measurements because of drilling disturbance or poor 3-D exposure of bedding. A. Data from APC cores (1H–25F; 0–123.3 mbsf) in core reference frame (see Structural geology in the Expedition 372B/375 methods chapter [Wallace et al., 2019a]). B. Data from A oriented to geographic reference frame using paleomagnetic declination data (N = 71). C. Dip data determined from GVR image logs below 123 mbsf. D. Data from XCB cores (26X–32X; 123.5–174.7 mbsf) in core reference frame. E. Data from D oriented to geographic reference frame using paleomagnetic declination data (N = 46). F. Dip data determined from GVR image logs for 123–175 mbsf, which do not show a good match to oriented core data. LWD dip orientations are more reliable than oriented core data for this interval.

Figure F36. Fracture intensity averaged over 10 cm intervals throughout Hole U1518F. Assessment was performed at a scale from 1 to 5, describing fracture spacing from >1 m to <1 mm in logarithmic intervals as described in Structural geology in the Expedition 372B/375 methods chapter (Wallace et al., 2019a).

Figure F37. Drilling deformation. A. Sediment flow upward along center of APC core (375-U1518E-18F-3, 30–50 cm), referred to as midcore flow. B. Biscuiting of XCB core (32X-2, 40–60 cm). C. Biscuiting, differential biscuit rotation, and sediment flow in RCB core (375-U1518F-24R-1, 85–105 cm).

Figure F38. Sulfate, alkalinity, ammonium, bromide, and phosphate concentration profiles, Holes U1518E and U1518F. Upper gray shaded interval = main brittle fault zone, lower gray shaded interval = subsidiary fault zone, arrows = seawater values. Sulfate and phosphate were measured by two methods: open dots = inductively coupled plasma–atomic emission spectrometry (ICP-AES), solid dots = ion chromatography (sulfate) and spectrophotometry (phosphate).

Figure F39. Salinity, chloride, alkalinity, sulfate, potassium, sodium, calcium, and magnesium concentration profiles, Holes U1518E and U1518F. Upper gray shaded interval = main brittle fault zone, lower gray shaded interval = subsidiary fault zone, arrows = seawater values. Note that major cations were measured by ion chromatograph (IC) and ICP-AES, but only IC data for potassium and sodium and ICP-AES data for calcium and magnesium are plotted because those techniques yielded more precise data.

Figure F40. Boron, lithium, silica, strontium, barium, and manganese concentration profiles, Holes U1518E and U1518F. Upper gray shaded interval = main brittle fault zone, lower gray shaded interval = subsidiary fault zone, arrows = seawater values.

Figure F41. Methane (CH_4), ethane (C_2H_6), and propane (C_3H_8) concentration profiles and calculated methane/ethane ratio in samples, Holes U1518E and U1518F. Concentrations are given in parts per million by volume, representing the volume of the respective hydrocarbon in the headspace of the serum vial. Upper gray shaded interval = main brittle fault zone, lower gray shaded interval = subsidiary fault zone.

Figure F42. TC, $CaCO_3$, TOC, inorganic carbon, and TN concentration profiles and TOC to TN weight (C/N) ratio, Holes U1518E and U1518F. Upper gray shaded interval = main brittle fault zone, lower gray shaded interval = subsidiary fault zone.

Figure F43. Summary of core sample physical properties, Site U1518. Yellow shading = fault zones interpreted in core and LWD data (see Structural geology).

Figure F44. Summary of core sample physical properties, 0–40 mbsf, Site U1518.

Figure F45. Comparison of core sample and LWD physical properties, Site U1518. Median values of bulk density and mean values of MAD bulk density, MAD porosity, and NGR calculated for each core are shown. Error bars (±1σ) show standard deviation.

Figure F46. K, Th, and U concentrations calculated from NGR data, Site U1518.

Figure F47. Temperature-time series measured during APCT-3 deployment, Hole U1518E (purple line). Unshaded area = data used for equilibrium temperature fit, pink line = theoretical equilibrium curve, triangle = beginning of fit, inverted triangle = end of fit, diamond = temperature decay at ⅔ of the curve fitting window (not used), horizontal line = estimate of equilibrium temperature. A. 35.2 mbsf. B. 49.6 mbsf. C. 56.4 mbsf. D. 63.3 mbsf. E. 82.0 mbsf.

Figure F48. Estimated equilibrium temperatures. Red dots = data from Measurements 1, 3, and 5 used to calculate best-fitting thermal gradient of 0.035°C/m, black dots = estimated equilibrium temperatures from Measurements 2 and 4 (not used in thermal gradient fit), black line = best-fitting thermal gradient extrapolated to bottom of Holes U1518E and U1518F.

Figure F49. Drilling parameters, Hole U1518A.

Figure F50. Drilling parameters, Hole U1518B. Green arrows between Logging Units 3C and 4 and between Units 5A and 5B represent the main and subsidiary faults, respectively, as identified from LWD data.

Figure F51. LWD measurements, Hole U1518A.

Figure F52. LWD measurements, Hole U1518B. Green arrows between Logging Units 3C and 4 and between Units 5A and 5B represent the main and subsidiary faults, respectively, as identified in LWD data.

Figure F53. Resistivity image log data with interpretation of bedding and fracture orientation, Hole U1518A. Ticks on planar structure symbols point in dip direction, with azimuthal orientations as defined in legend.

Figure F54. Resistivity image log data with interpretations of bedding, fracture, and borehole breakout orientations, Hole U1518B. The "tick" on each planar structure symbol points in dip direction, with azimuthal orientations as defined in legend. Borehole breakout orientations are shown by long axes of pink ovals; "dip angle" is arbitrary for borehole breakouts. Green arrows between Logging Units 3C and 4 and between Units 5A and 5B represent the interpreted main and subsidiary faults, respectively, as identified in LWD data.

Figure F55. A. Comparison of Hole U1518B sonic V_P with pre-expedition PSDM and FWI V_P profiles near the site. PSDM velocity models from Barker et al. (2018). FWI velocity model provided by R. Bell (unpubl. data; Imperial College London). B. Comparison of time-depth relationships derived from different V_P profiles. TWT = two-way traveltime.

Figure F56. A. Synthetic seismic-well tie produced using LWD sourceless neutron-gamma density, Hole U1518E laboratory MAD data from the upper 40 m, and Hole U1518B *P*-wave velocity sonic data with no depth shifts applied. RC = reflection coefficient. Inset shows source wavelet used that was produced from stacking 10 wavelets from an area of flat seafloor. B. Preferred synthetic seismic-well tie produced by depth shifting LWD logs below 200 mbsf upward by 15 m. The high-amplitude reflections around 300–360 mbsf are much better fit when this depth shift is applied.

Figure F57. Comparison of Hole U1518A–U1518B LWD data, Hole U1518E–U1518F laboratory physical properties data, and Line 05CM-04 seismic reflection data. LWD, core, and seismic data sets are aligned in terms of mbsf depths, and mbrf depths for Holes U1518A–U1518B are shown.

Figure F58. Interpreted seismic units (SU) near Site U1518 on Seismic Line 05CM-04.

Figure F59. Comparison of Hole U1518B LWD data, Hole U1518F laboratory physical properties data, and Line 05CM-04 seismic reflection data around primary thrust fault zone. LWD, core, and seismic data sets are aligned in terms of mbsf depths, and mbrf depths for Holes U1518B and U1518F are shown.

Figure F60. Correlation of the LWD physical properties signature at 322 mbsf with structural geology interpretations in cores, Site U1518. Two possible end-member correlation scenarios are discussed in text. LWD and core data sets are aligned in terms of mbrf. Black bar = Hole U1518H observatory screen location, gray bars = proposed equivalent location of screen in Hole U1518F for each scenario. Colored sinusoids on resistivity images are identified features (blue = bedding, yellow = resistive fracture, green = conductive fracture).

Figure F61. Completed observatory, Hole U1518H. CrN-DLC = chromium nitride-diamond like carbon. OD = outside diameter, ID = inside diameter.

Figure F62. Pressure sensing components, Hole U1518H. A. Pressure monitoring screen (above) and umbilical pressure lines strapped to ACORK casing. B. Pressure monitoring data logger and pressure gauges on ACORK wellhead. C. Valves and external sampling ports connected to pressure umbilicals on ACORK wellhead.

Figure F63. Upper portion of 8 inch diameter swellable packer along CORK-II casing as it is lowered through the moonpool, Hole U1518H.

Figure F64. OsmoSampler assembly components, Hole U1518H. A. Example osmotic pump (right) and a portion of a sampling coil (left). B. Copper and Teflon tubing sampling coils assembled and inserted into steel and titanium housing in the foreground. C. Tapered lower titanium portion of OsmoSampler assembly (with flowmeter ports). This portion of the OsmoSampler assembly is made of titanium and seats in the titanium piston seal integrated into the CORK-II casing.

Figure F65. A. Temperature sensor, Hole U1518H. B. Open temperature sensor showing battery, desiccant, and O-ring seal. MicroUSB plug on opposite side is used for programming and downloading data.

Figure F66. Steps in attaching temperature sensors to rope components, Hole U1518H. A. Sensor tied to handling eye and taped to rope. B. Rubber sheeting wrapped around sensor and rope and taped. C. Entire covering wrapped in electrical tape.

Figure F67. Temperature sensor installed between two Teflon coils within the OsmoSampler assembly, Hole U1518H.

Figure F68. Rope splices, Hole U1518H. A. End eye splice (tails are taped down during use). B. Handling eye. C. Attachment eye.

Figure F69. Portions of the three lower sinker bars, Hole U1518H. Sinker bar in the foreground is connected with a wooden block clamp used to lift it into the drawworks and lower it into the drill pipe.

Figure F70. Weak links, Hole U1518H. A. Three weak links programmed to different tensile strengths based on number of holes woven with polypropylene threads. B. Weak link connected to a yoke and rope section. Side view shows separate pieces held together with woven plates.

Figure F71. A. Top plug hanging ring, Hole U1518H. B. Entire top plug connected to rope and hanging upside down.