Figure F1. Cuttings analysis flow, Expedition 358. NGR = natural gamma radiation, GC = gas chromatograph, FID = flame ionization detector, PDHID = pulsed discharge helium ionization detector, PAL = micropaleontology, CA = carbonate analyzer, EA = elemental analyzer, XRD = X-ray diffraction, XRF = X-ray fluorescence, MAD = moisture and density, MS = magnetic susceptibility, TS = total sulfur, SEM = scanning electron microscope, XCT = X-ray computed tomography. Green = handled by laboratory technicians.

Figure F2. Core analysis flow, Expedition 358. PAL = micropaleontology, GC-FID = gas chromatograph–flame ionization detector, HC = hydrocarbon, CT = computed tomography, WR = whole round, MSCL-W = whole-round multisensor core logger, GRA = gamma ray attenuation, MS = magnetic susceptibility, PWV = *P*-wave velocity, NCR = noncontact resistivity, NGR = natural gamma radiation, HPCS = hydraulic piston coring system, ESCS = extended shoe coring system, MSCL-Image = photo image logger, VCD = visual core description, SRM = superconducting rock magnetometer, RCB = rotary core barrel, MAD = moisture and density, PWD = *P*-wave logger for discrete samples, IMP = impedance (resistivity), P-mag = paleomagnetism, IW = interstitial water, Alk = alkalinity, DA = discrete analyzer, IC = ion chromatograph, ICP-OES = inductively coupled plasma–optical emission spectroscopy, ICP-MS = inductively coupled plasma–mass spectrometry, XRF = X-ray fluorescence, XRD = X-ray diffraction, CA = carbonate analyzer, EA = elemental analyzer, SEM = scanning electron microscope.

Figure F3. Graphic patterns and symbols used for visual descriptions of cores, Expedition 358. For thin repetitive interbeds of two lithologies (e.g., silty clay and sand), dominant lithology is on the left. Note that patterns for Hole C0002T core lithologies are the same as patterns for Site C0002 cuttings (Figure F4). WH = wellhead.

Figure F4. Graphic patterns and symbols used for visual descriptions of cuttings, Expedition 358.

Figure F5. Representative example of 1–4 and >4 mm cuttings and >4 mm cuttings segregated by lithology, Hole C0002Q.

Figure F6. A. Two cuttings size fractions with scattered cement/concrete fragments (arrows), Hole C0002S. B. Type 1 gray cement. C. Type 1 gray cement with inclusion of silty claystone. D. Type 1 gray cement showing ratio between sand- and silt-sized minerals. Most of the grains are floating in the matrix. E. Type 1 gray cement with two types of oxidation; reddish oxide associates with dark minerals, and yellow/orange oxide fills small depressions in cement. F. Type 2 yellow-orange cement. G. Homogeneous Type 2 yellow-orange cement. H. Homogeneous Type 2 yellow cement showing typical ratio of silt-sized minerals floating in very fine grained matrix. I. Type 2 cement with white sand-sized minerals floating in the matrix.

Figure F7. Mineral composition for different lithologies and comparison between smear slide and thin section petrographic observations (fine silty claystone: 358-C0002Q-40-SMW, siltstone: 43-SMW, silty claystone: 38-SMW, very fine sandstone: 358-SMW).

Figure F8. Examples of random bulk powder X-ray diffractograms for mixtures of standards with known proportions of minerals. Note positions of diagnostic peaks for total clay minerals (Cl), quartz (Q), feldspar (F), and calcite (Cc). Digital data were processed using MacDiff. Green line = baseline for computing integrated peak area (total counts). Enlargement highlights angular (°2θ) range of counts for total clay minerals, including chlorite (003) reflection.

Figure F9. Log sheet (structural geology observation sheet) used to record structural observations and measurements on cuttings, Expedition 358.

Figure F10. Log sheet (structural geology observation sheet) used to record structural observations and measurements on working half of split cores, Expedition 358.

Figure F11. Modified protractor used to measure apparent dip angles, bearings, plunge angles and rakes of planar and linear features in working half of split cores, Expedition 358.

Figure F12. Core reference frame for visual core description and X-ray computed tomography (CT) and *x*-, *y*-, and *z*-coordinates used in orientation data calculations, Expedition 358. Orientations of planar features identified in X-ray CT scans can be calculated from the trend and plunge (α and β) of the lineation formed by the intersection of the plane with the slice and coronal X-ray CT images. α_1 = angle between 000° and the intersection of the plane with the slice X-ray CT image (plane perpendicular to core axis), β_1 = 0°, β_2 = angle of the intersection of the planar feature with the coronal X-ray CT images (where α_2 = 90° or 270°).

Figure F13. A. Determination of geological plane orientation (shaded) from two auxiliary measurements, Expedition 358. First auxiliary measurement is done on the flat-lying split core surface and consists of measuring the bearing (α_1) and plunge angle (β_1) of the trace of the plane on the split surface. Second auxiliary measurement is done on a surface that is perpendicular to the flat-lying split core surface and contains the core axis. It consists of measuring the bearing (α_2) and plunge angle (β_2) of the trace of the plane on the surface. B. Rake (ϕ_a) measurement of slickenlines on a fault surface. In this example, slickenlines rake from the azimuth of the plane that points in the western (270°) quadrant in the core reference frame.

Figure F14. Example of Excel spreadsheet used for recording and calculating orientation data, Expedition 358.

Figure F15. Relation of orientation between archive half and cube sample, Expedition 358. SQUID = superconducting quantum interference device.

Figure F16. Mud-gas monitoring system on *Chikyu* (modified from Expedition 319 Scientists, 2010b; Expedition 337 Scientists, 2013; Strasser et al., 2014a; Tobin et al., 2015a), Expedition 358. Drilling mud–bearing gas at top of drill bit is pumped out by the mud pump and flows along mudline to a degasser, where gas is extracted and forwarded to mud-gas monitoring laboratory. Degasser was placed downstream from Gumbo separator during this expedition. After separating the gas, drilling mud flows to a shale shaker, where cuttings are removed. Mud is recovered into mud tanks and is pumped downhole again. HC = hydrocarbon, GC-FID = gas chromatograph–flame ionization detector, GN4 = Geoservices mud logging data acquisition system.

Figure F17. Degasser (DG) around shale shaker, Expedition 358. During this expedition, Trough degasser was positioned downstairs next to Geoservices degasser.

Figure F18. Newly installed degasser, Expedition 358. Degasser has a sealed degassing tank to avoid atmospheric contamination. Zero air is pressurized from mud-gas monitoring laboratory (MGML) at ~500 mL/min to generate bubbles, and released gas is vacuumed up to MGML at ~500 mL/min from the tank.

Figure F19. Gas flow in mud-gas monitoring laboratory, Expedition 358. Mud gas is separated into two lines: (1) part of the gas is dried and distributed to methane carbon isotope analyzer (MCIA), gas chromatograph (GC)–natural gas analyzer (NGA) with flame ionization detector and thermal conductivity detector, Rn detector, and process gas mass spectrometer (PGMS) quadruple mass filter to measure gas compositions and methane carbon isotopic composition and (2) part of the gas is directed through IsoTube sampling system to sampling line, which consists of glass flasks and copper tubes for personal sampling. PS = pressure sensor, NV = needle valve, FM = flowmeter, V = valve, PR = pump right (spare pump below V1R shown in flow diagram is named PL originally, reflecting in situ location), PS_{DIF} = pressure sensor difference (not absolute pressure), PS_{DU} = pressure sensor for dry sample located upstream, PS_{DD} = pressure sensor for dry sample located downstream, PS_{MI} =

pressure sensor mud gas in, PS_{WU} = pressure sensor for wet sample located upstream, PS_{WD} = pressure sensor for wet sample located downstream.

Figure F20. Precision and accuracy for carbon isotope analyses of various methane concentrations using methane carbon isotope analyzer, showing batch analyses results of (A) Liso-1 standard gas (2500 ppm), (B) Liso-1 (500 ppm), and (C) Liso-1 (250 ppm) and flow analyses results of (D) Liso-1 (2500 ppm) and Tiso-3 (250 ppm) for 1 min and (E) Tiso-3 (250 ppm) for ~6 min, Expedition 358. VPDB = Vienna Peedee belemnite.

Figure F21. A. Counterbalanced weighing scale system, Expedition 358. B. 5-chamber pycnometer.

Figure F22. *P*-wave measuring unit with acrylic sample used for calibration, Expedition 358.

Figure F23. A. Impedance measurement system, Expedition 358. B. Electrodes where sample is placed for measurement.

Figure F24. 2-D measurement system for elliptical section of whole-round cores, Expedition 358.

Figure F25. Procedures and equipment for anelastic strain recovery (ASR) measurement, Expedition 358. A. 18 strain gauges on a core sample. B. Double-bagged core sample after it was bagged in plastic. Sample was then bagged again in aluminum. C. Instruments for ASR measurement.

Figure F26. Measurement-while-drilling/Logging-while-drilling bottom-hole assembly configurations used during Expedition 358. A. Hole C0002Q Run 2 and Hole C0024A. PDC = polycrystalline diamond compact. B. Hole C0002Q Runs 4 and 5. C. Hole C0002R Run 3. D. Hole C0002R Run 4. E. Hole C0002S Run 2.

Figure F27. seismicVISION acquisition geometry on *Chikyu*, Expedition 358. Air gun array is deployed from end of Crane 2 and is 57 m from the rotary table.