Figure F1. *Fugro Synergy*, operated by Fugro N.V.

Figure F2. *Fugro Synergy* operational aft deck area showing location of ESO containers, drill floor, and drilling derrick.

Figure F3. Sample VCD sheet used during offshore phase, Expedition 381.

Figure F4. Sample VCD sheet used during onshore phase, Expedition 381. Red dot on left side indicates the position of a sample.

Figure F5. Example of small fault with normal displacement (381-M0079A-125R-3).

Figure F6. Protractor used to measure apparent dips, azimuths, and plunges of planar and linear features in split cores, Expedition 381.

Figure F7. Core reference frame and *x*-, *y*-, and *z*-coordinates used in orientation data calculations. Modified from McNeill et al. (2017a).

Figure F8. Lower hemisphere equal area stereographic projections showing the procedure for converting 2-D measured data to 3-D data, modified from McNeill et al. (2017a). A. Plane orientation determined using two apparent dips (black dots), one on the core surface and the other on the cutting (split-core) surface. B. With paleomagnetic correction.

Figure F9. Calculation of plane orientation (shaded) from two apparent dips. Intersections of plane with split-core surface and a section perpendicular to split-core surface and parallel to core axis are shown. (α_1, β_1) and (α_2, β_2) are the azimuths and plunges of the traces of the plane on these two sections, v_1 and v_2 are unit vectors parallel to the traces of the plane on these two sections, and v_n is the unit vector normal to the plane (its pole). Modified from McNeill et al. (2017a).

Figure F10. Examples of tectonic faults observed in Hole M0080A cores. A. Normal faults (138R-3). Lower fault has a 2 cm thick black fault gouge. B. Two sampled fault planes from Unit 3 with slickenlines on polished mirror surfaces indicating dip-slip (ss2) and oblique-slip (ss1) (113R-2). C. One sampled fault surface (blackened) from Unit 4 with slickenlines indicating oblique-slip (ss3) (133R-2).

Figure F11. Examples of DID, Hole M0078A. A. Upward arching of bedding and lensing of coarse beds (dark material) in the cores of arches (73V-2). B. Biscuits with flow along core liner and inflow of darker sediment and/or drilling fluids between biscuits (44P-1). C. Upward flow of sediment along the center of a core associated with upward drag of bedding on either side. The flow channel terminates in a chaotic disturbed bed above (7H-1). D. Drilling-induced small faults and tilting of beds in fault blocks (105R-1).

Figure F12. Position and orientation of cubic discrete samples collected from core working halves for paleomagnetic analysis during OSP, Expedition 381.

Figure F13. Fugro probe for temperature CPT, Expedition 381.

Figure F14. Logged intervals, Holes M0079A and M0080A.

Figure F15. Depth setup during downhole logging operations, Holes M0079A and M0080A. TP = through pipe.

Figure F16. Standalone slimline logging tools, Expedition 381.

Figure F17. Estimated source wavelet, Site M0078.

Figure F18. *P*-wave velocity profile estimated from existing data prior to Expedition 381 (Nixon et al., 2016).

Figure F19. Example of initial MSCL density data and a filtered and smoothed density function in the deeper part of Hole M0078A.