Figure F1. Bathymetric map of Fantangisña Seamount flank region, Holes U1498A and U1498B, and ship tracks for MCS Lines EW0202 59-60 with common midpoints labeled. Bathymetry data was collected by Simrad EM300 during a 2003 R/V *Thomas G. Thompson* cruise (Oakley et al., 2008).

Figure F2. MCS Line EW0202 59-60 and Holes U1498A and U1498B with the estimated depth of penetration (Oakley et al., 2008; Oakley, 2008). The horizontal dashed line is the reflector that defines the contact between the serpentinite matrix and underlying pelagic sediment, which was recovered from both holes.

Figure F3. Location map of Site U1498 showing its position on the flanks of Fantangisña Seamount.

Figure F4. Lithostratigraphy, Hole U1498A. Colors are according to Figure F5 in the Expedition 366 methods chapter (Fryer et al., 2018a) with slight changes for subunits or when representative for the particular unit.

Figure F5. Lithostratigraphy, Hole U1498B. Colors are according to Figure F5 in the Expedition 366 methods chapter (Fryer et al., 2018a) with slight changes for subunits or when representative for the particular unit.

Figure F6. Major lithologies, Hole U1498A. A. Clasts of mafic metavolcanic rock in microbreccias (Subunit IIC). B. Lenticular bedding in pale green, pale yellowish orange, pale blue, and dark blue serpentinite sand (Subunit IIIA). Drilling disturbance is minimal. C. Nannofossil-rich silty mud and volcanic ash (Subunit IVA).

Figure F7. Major lithologies, Hole U1498B. A. Serpentinized ultramafic rock cut by bright serpentine veins (Unit I). Original mud matrix lost during rotary coring. B. Mafic metavolcanic rock cut by abundant veins of quartz and calcite (Unit II). C. Variegated blue-green serpentinite mud with disaggregated clasts (Unit III). D. Large (meter scale) clast consisting of pink cherty limestone (pink; 116–132 cm) in depositional contact with mafic metavolcanic rock (green; 99–116 cm) (Subunit IVA). Cherty limestone is highly deformed by numerous small faults. E. Brown nannofossil-rich volcanic ash (Unit VIII).

Figure F8. Contacts between ultramafic rock, mafic rock, metamorphic cherty limestone, ophicarbonate, and serpentinite mud (Core 366-U1498B-21R). A. Sheared contact between ultramafic rock and metabasite (21R-1, 22–37 cm). B. Primary contact between metabasite and cherty limestone (21R-1, 108–128 cm). C. Brecciated cherty limestone (21R-2, 20–38 cm). D. Ophicarbonate on the basal contact of cherty limestone and serpentinite mud (21R-2, 66–86 cm).

Figure F9. Downhole changes in mud composition, Hole U1498A. D = dominant (>50%), A = abundant (20%–50%), C = common (10%–20%), R = rare (1%–10%), Tr = trace (<1%).

Figure F10. Downhole changes in mud composition, Hole U1498B. D = dominant (>50%), A = abundant (20%–50%), C = common (10%–20%), R = rare (1%–10%), Tr = trace (<1%). The sample at 200.21 mbsf is scratched from a green metabasite.

Figure F11. Pelagic sediment and embedded serpentinite mud in Unit I, Hole U1498A. A, B. Siliceous microfossils, pumice (Pum) fragments, and volcanic crystal fragments (1R-1, 18 cm) Rad = radiolarian, Spg spc = spongue spicule. C, D. Embedded serpentine (Srp) with partly oxidized serpentine, acicular aragonite (Arg) crystals, and a radiolarian (1R-2, 33 cm). Glt = glauconite. E, F. Calcareous microfossils, a discoaster, and volcaniclastic fragments including feldspar and small crystal fragments (1R-2, 57 cm). Foram = foraminifer, Pl = plagioclase, Ptp = pteropod, Dsc = discoaster.

Figure F12. Serpentinite mud in Units II–IV, Hole U1498A. A. Chlorite (Chl) grain (3R-1, 7 cm). B. Aragonite (Arg) crystals and minute magnetite (Mt) in matrix (4R-2, 42 cm). C. Garnet (Grt) and chlorite (5R-2, 20 cm). Srp = serpentine. D. Aragonite inclusion in clear serpentine grain (4R-2, 50 cm). Magnetite, glauconite (Glc), and spinel (Spl) are also shown. E. Foraminifer (Foram) in serpentinite mud (4R-2, 45 cm). Most serpentine grains are yellowish in color due of oxidization. F. Limonite (Lm) and hematite (Hem) grains in oxidized layer (5R-3, 31 cm).

Figure F13. Volcanic ash layers, Holes U1498A and U1498B. A. Clear glass, feldspar (Fsp) fragment, sponge spicule (Spg spc), and discoasters (Dsc) (366-U1498A-13R-2, 52 cm). B. Coccoliths (C) and discoasters (13R-3, 14 cm; cross-polarized light [XPL]). C. Foraminifer (Foram) and clear glass (366-U1498B-24R-1, 53 cm). D. Discoasters and clear glass (27R-1, 22 cm).

Figure F14. Serpentinite mud and metabasite, Hole U1498B. A. Spinel (Spl) in a dusty serpentine (Srp) matrix (2R-CC, 13 cm). B. Spinel and colorless calcite (Cal) grains (4R-1, 52 cm). C. Tiny garnet (Grt) grains in a clear serpentine flake (7R-3, 70 cm). D. Radial tremolite (Tr) fibers (23R-1, 84 cm). E, F. Metabasite with amphibole (Amp) and chlorite (Chl) flakes (23R-1, 11 cm).

Figure F15. Reactive diffuse porous flow textures in harzburgite (366-U1498B-13R-3, 106–109 cm; TS 142; XPL). A. Orthopyroxene (Opx; tan) filling in between and enclosing olivine (Ol). B. Orthopyroxene in center of view at extinction, filling in between olivine grains. Lobate margins against olivine, and cusps point into olivine grain boundaries. C. Orthopyroxene grain at extinction (black) with ragged margins. SP = spinel. D. Orthopyroxene grain at extinction (black) with ragged grain boundaries, extreme interstitial textures, and disconnected fragments that are optically continuous with the main body.

Figure F16. Fine-grained aphyric basalt with intergranular texture and elongate plagioclase and interstitial clinopyroxene (Cpx) (366-U1498A-3R-2, 80–82 cm; TS 118; XPL).

Figure F17. Microbreccia (366-U1498A-3R-2, 94–96 cm; TS 119; plane-polarized light). A. Vesicles filled by bright green minerals in microbreccia matrix. B. Elliptical pale green glass bleb with prismatic clinopyroxene (Cpx) crystals.

Figure F18. Veined ultramafic rock clasts, Hole U1498A. A. Serpentine veins (3R-2, 18–30 cm). B. Serpentine veins (dark) crosscut by a carbonate vein (bright) (3R-3, 16–22 cm).

Figure F19. Large veined clasts, Hole U1498B. A. Ultramafic rock clasts with serpentine veins (3F-3, 0–28 cm). B. Mafic rock clasts with wide carbonate veins (8R-1, 0–18 cm). Red arrow = direction of movement on the wide fault trace filled by carbonate.

Figure F20. Breccias, Hole U1498A. A. Polymict breccia (3R-2 [Piece 15, 18–30 cm]). B. Oxidized polymict breccia clast (2R-CC [Piece 2, 4–9 cm]).

Figure F21. Fault zone in large greenstone clast (366-U1498B-23R-1, 35–70 cm). Red arrows = direction of displacement on faults bounding the fault zone.

Figure F22. Headspace and interstitial water H_2, CH_4, and AVS concentrations, Holes U1498A and U1498B. CH_4/H_2 ratio and pH, chloride, and sulfate concentrations are shown for comparison. Brown shading highlights sulfidic zone potentially associated with subseafloor microbial sulfate reduction.

Figure F23. Interstitial water alkalinity, pH, and salinity concentrations, Holes U1498A and U1498B. Bottom seawater values are from Mottl et al. (2003, 2004).

Figure F24. Interstitial water phosphate, sulfate, and ammonium concentrations, Holes U1498A and U1498B. Bottom seawater values are from Mottl et al. (2003, 2004).

Figure F25. Interstitial water Cl, Br, and Na concentrations, Holes U1498A and U1498B. Bottom seawater values are from Mottl et al. (2003, 2004).

Figure F26. Interstitial water K, Na, Sr, Ca, B, Li, Mg, and SiO_2 concentrations, Holes U1498A and U1498B. Bottom seawater values are from Mottl et al. (2003, 2004).

Figure F27. Interstitial water DIC and DOC concentrations, Holes U1498A and U1498B. Bottom seawater values are from Eglinton and Repeta (2014).

Figure F28. PMCH concentrations from the interior, halfway, and exterior of the microbiology whole-round, the top of the core, and the drilling fluid recovered from the top of the core, Site U1498. LOD = limit of detection for PMCH analysis. Alkalinity and pH data are shown to provide a measure for the level of active serpentinization and potential seawater contamination (see Fluid geochemistry).

Figure F29. Color reflectance, GRA density and discrete bulk density, *P*-wave velocity, magnetic susceptibility, and natural gamma radiation data, Hole U1498A.

Figure F30. Color reflectance, GRA density and discrete bulk density, *P*-wave velocity, magnetic susceptibility, and natural gamma radiation data, Hole U1498B.

Figure F31. Index property data (grain density, bulk density, and porosity), thermal conductivity, and shear strength, Hole U1498A.

Figure F32. Index property data (grain density, bulk density, and porosity), thermal conductivity, and shear strength, Hole U1498B.

Figure F33. Downhole log data, core recovery, and lithostratigraphic units, Hole U1498B.

Figure F34. NRM decay (left) and AF demagnetization vector (right) diagrams of discrete samples, Site U1498. A. 366-U1498A-4R-2, 27.93 mbsf. B. 366-U1498B-22R-5, 196.93 mbsf. C. 366-U1498B-21R-2, 187.63 mbsf. Demagnetization diagrams: points = projected endpoints of the remanent magnetization vector measured for each sample in core coordinates, blue lines = principal component directions from discrete samples, open symbols = vector endpoints projected on a vertical plane, solid symbols = vector endpoints projected on a horizontal plane.

Figure F35. Paleomagnetic intensity, inclination, and declination of archive halves and discrete samples after 5 mT AF demagnetization, 0–5.2 mbsf, Hole U1498A. Pink rectangle = area of strong horizontal overprint. Both original data (dots) and running mean (line) are shown for intensity and inclination.

Figure F36. Paleomagnetic intensity, inclination, and declination of archive halves and discrete samples after 5 mT AF demagnetization, 26–39 mbsf, Hole U1498A. Core 4R layered serpentinite silt and sand with beds of pelagic sediment: gray shading = relatively high NRM intensities, yellow shading = relatively low NRM intensities. Both original data (dots) and running mean (line) are shown for intensity and inclination.

Figure F37. Paleomagnetic intensity, inclination, and declination of archive halves and discrete samples after 5 mT AF demagnetization from the volcanic ash-rich units of Hole U1498A. Both original data (dots) and running mean (line) are shown for intensity and inclination.

Figure F38. Paleomagnetic intensity, inclination, and declination of archive halves and discrete samples after 5 mT AF demagnetization from the serpentinite mud units of Hole U1498B. Both original data (dots) and running mean (line) are shown for intensity and inclination.

Figure F39. Paleomagnetic intensity, inclination, and declination of archive halves and discrete samples after 5 mT AF demagnetization from the lower part of Hole U1498B. Both original data (dots) and running mean (line) are shown for intensity and inclination.