## Figure Captions

**Figure 23.** Photograph of hand specimen of gabbro fragment showing coarse-grained, nonlaminated nature. No layering was apparent at the scale of the recovered material (Sample 180-1117A-13R-1, 19–23 cm).

**Figure 24.** Plots of diabases and metadiabases from Sites 1109, 1114, 1117 and 1118 where they were recovered in situ. Samples from the other holes are normalized to values from Site 1109 (presumed closest to pristine diabase). av. = average.

**Figure 25.** Plot of diabase and metadiabase samples from talus samples at Sites 1108, 1111, and 1114 normalized to the average values for unaltered diabase from Site 1109. Key: 1 = foliated, epidote-rich schist in Hole 1111A (Sample 180-1111A-16R-CC, 8–15 cm); 2 = metadiabase pebble in sediments of Hole 1108B (Sample 180-1108B-47R-CC, 1–3 cm); 3 = nonfoliated metadiabase in Hole 1114A (Sample 180-1114A-36R-2, 40–42 cm); 4 = foliated metadiabase pebble in Hole 1114A (Sample 180-1114A-36R-1, 70–72 cm).

**Figure 26.** Plot of major and trace elements of diabases and metadiabases from Sites 1108, 1109, 1111, 1114, 1117, and 1118 normalized to E-MORB using the values of Sun and McDonough (1989).

**Figure 27.** Close-up photograph of highly sheared gabbro with a well developed foliation plane and shear bands (Sample 180-1117A-9R-1, 24–32 cm).

**Figure 28.** Core photograph of the fault gouge recovered at Site 1117. This shows soft, light-colored clayey material that contains talc, chlorite, calcite, ankerite, and serpentine. This material is consistent with intense shearing and hydrothermal alteration of underlying deformed gabbro.

**Figure 29.** Schematic cross section showing the increasing proportion (circles) of strike-slip and oblique-slip faults toward the Moresby Seamount. Note that oblique- and strike-slip faults at Sites 1109 and 1115 occur in the pre-rift sequence.

**Figure 30.** Estimated thermal gradients (in °C/km) from Leg 180. Confidence in data is discussed in the text.

**Figure 31.** Plot of dissolved Ca, Mg, and SiO$_2$ at northern Woodlark Rise sites. The shapes of the Ca and Mg profiles reflect the effects of carbonate diagenesis and a variable extent of alteration of volcanic matter in the upper portion of the sedimentary column of each site. Deeper downhole, alteration of volcanics exerts a more dominant control on pore-water profiles. Large increases in dissolved Ca result primarily from alteration of plagioclase whereas depletion of Mg reflects its uptake during authigenic smectite formation. The dissolved SiO$_2$ profiles depict a downhole progression including dissolution of volcanic ash in the upper sedimentary column, and WST reactions deeper downhole. Particularly elevated SiO$_2$ concentrations deep in Site 1118 are attributable to an abundance of fresh to slightly altered volcanic matter in higher porosity sediments.

**Figure 32.** Biogeochemical profiles in sediments from the Woodlark Basin, Leg 180: A. Total bacterial populations at Sites 1109, 1115, and 1118. The solid curve represents a general regression line of bacterial numbers vs. depth in deep-sea sediments (Parkes et al., 1994), with 95% upper and lower prediction limits shown by dashed curves. Sulfate, ammonia, and methane depth profiles at Sites (B) 1118, (C) 1109, and (D) 1115. Unconformity at each site represented by wavy line. E. $C_1/C_2$ ratios at Sites 1108, 1109, 1115, and 1118.

**Figure 33.** Natural gamma ray from the triple-combo runs in Holes 1114A, 1118A, 1109D, and 1115C.
Figure 34. Neutron porosity and density porosity from the triple-combo runs in Holes 1114A, 1118A, 1109D, and 1115C.

Figure 35. Photoelectric effect (PEFL) from the triple-combo runs in Holes 1114A, 1118A, 1109D, and 1115C.

Figure 36. Sonic velocity ($V_p$) from the array sonic tool in Holes 1114A, 1118A, 1109D, and 1115C.

Figure 37. This dynamically normalized, double pass FMS image from Site 1115 shows well-defined, flat-lying, conductive clayey layers interbedded with thin (~10 cm), resistive sandy or carbonate-rich beds, which are characteristic of the stratigraphy observed in FMS images from each of the three hanging wall drill sites (1109, 1115, and 1118). The dashed lines mark the Pad 1 azimuth trace of each FMS pass. The FMS images are oriented from 0° to 360° from geographic north.

Figure 38. Statically normalized FMS image (left) and tadpole plot (right) from Site 1114. Sinusoidal fit to dipping beds (dashed) and fractures (solid) are used to measure dips and dip directions, which are shown on the tadpole plot. Dominant bed dips are ~30° oriented northwest, while dominant fracture dips are ~50° to ~60° oriented north within the same interval.

Figure 39. Bed and fracture dip direction distributions from Site 1114. A, B. Histograms of bed and fracture dip directions. C, D. Rose diagrams of bed and fracture strikes. The two main populations consist of beds that strike northeast and fractures that strike just north of east.

Figure 40. Depth converted multichannel seismic (MCS) traces at Sites 1118 and 1109, displayed with the lithostratigraphic columns. The MCS data in time, spanning the two sites, is shown correlated with depth. CMP = common midpoint. TWT = two-way traveltime. Lithologic patterns as in Figure 9.
Figure 24

Major Elements Normalized to Site 1109

Trace Elements Normalized to Site 1109
Figure 25
Figure 26

Major Elements Normalized to E-MORB

Trace Elements Normalized to E-MORB

Sample/MORB

Sample/MORB
Figure 28
Figure 29
Figure 31
Figure 32
Figure 33
Figure 34
Figure 35
Figure 36
<table>
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**Figure 37**
Figure 38
Figure 39