

## INDEX

- Abaco fracture zone, 28  
Acmite, pyroxene components, 1044  
Acoustic impedance, basement, 1581  
Age, effect of on mineral assemblages, 1570  
determination, Site 105, calcite, strontium isotope ratios, 1174  
of calcites, 1173  
basement, paleontological evidence, 815  
Site 418, 360  
Sites 417 and 418, 897  
crust formation, Hole 418A, 1172  
basalt, chemical composition as compared to, 1261  
Age-depth constancy hypothesis, 1501  
Aging of basaltic layer of the sea floor, 1159  
crust, alteration, 1577  
oceanic crust, 1563  
Agrading neomorphism, defined, 756  
Alkali metals, decrease downhole, Hole 417A, basalt, 1087, 1092  
basalt, 1171, 1175  
Hole 395A, basalt, 1088  
Hole 417D, basalt, 1088  
Alteration, apophyllite, basalt, 1232  
basalt, 1021, 1299, 1131, 1137  
budget of, 1326  
chemical balance of, 1285  
clinopyroxene, 1224  
glass, 1137, 1279  
groundmass, 1300, 1305  
Hole 417A, 65, 947, 1087  
low-temperature, 1231  
minerals, 1185  
near-vein, 1229  
phenocrysts, 1278, 1280, 1299, 1305  
pillow lavas, 1274  
margins, 1301  
plagioclase, 1224  
Site 417, 1185, 1275  
volcanic glass, 1223, 1278  
chemical balance of, 1310  
decrease downhole, Holes 417A and 417D, 93  
depth of, 1279, 1281, 1583  
glassy margins, 1307  
Hole 417A, basalt, 93  
Holes 417A and 417D, basalt, 988, 1104  
intensity of, 1299  
low-temperature sea water, 1261  
oxygen isotope studies, basalt, 1153  
Hole 417A, basalt, 93  
processes, Holes 417A and 417B, differences in the nature of, 1260  
minor elements and, 1513  
temperatures of, 1132  
product, calcite, as an, 1304  
chlorite, as an, 1302  
products of basalt, mineralogy and geochemistry, 1273  
sequence, 1305, 1309  
Altered basalt  
aluminum, 1325  
barium, 1323  
boron, 1323  
calcium, 1322  
chemistry of, 1319  
chromium, 1323  
clay minerals from, 1257  
copper, 1323  
iron, 1325  
lithium, 1323  
magnesium, 1323  
mineral assemblage, 1219  
nickel, 1323  
opaque mineralogy of, 1407  
oxidation of iron in, 1325  
potassium, 1320  
silicon, 1325  
sodium, 1323  
strontium, 1324  
titanium, 1325  
vanadium, 1324  
yttrium, 1324  
zirconium, 1324  
rocks, bulk mineralogy, 1258  
Alternating field (AF) demagnetization, 1372  
Aluminum, altered basalts, 1325  
Analcime, 65, 68  
basalt alteration, 1221  
formation of, 1232  
oceanic basalt, 1569  
Analcite, 1309  
basalt, secondary mineral, 1245  
Analytical methods, Hole 417D, basalt, 939, 988, 1055, 1064, 1087, 1137, 1243  
Angiosperm evolution, 903  
Anisotropy, Mid-Atlantic Ridge, 686  
oceanic crust, 676, 686  
Antilles Outer Ridge, 28, 30  
Aphyric zones, Hole 417A, pillow basalt, 1012  
Apophyllite, alteration of, 1221, 1232  
oceanic basalt, 1569  
Asthenospheric upwelling, 968  
Atterberg limits, 1453  
Authorship, responsibilities for, 11  
Average sedimentation rate, North Atlantic Ocean, 871  
Pacific Ocean, 871

- Azores plume, 982  
 ARM intensity, basalt, 1394  
 Background and objectives, Legs 51 to 53, 5  
     Site 417, 25  
     Site 418, 353  
 Barite crystals, Hole 418A, 363  
 Barium, altered basalts, 1323  
     oceanic crust, 1574  
 Basal enrichment in iron, magnesium, and potassium, 1519  
 Basalt, alkali metals, 1171, 1175  
     decrease downhole, Hole 417A, 1087, 1092  
         Hole 395A, 1088  
         Hole 417D, 1088  
 alteration, 1021, 1131, 1137, 1299  
     apophyllite, 1232  
     clinopyroxene, 1224  
     Hole 417A, 93, 947, 1087  
     Holes 417A and 417D, 1104  
     Holes 417D and 418A, 988  
     mineralogy, Hole 417A, 65  
     oxygen isotope studies, 1153  
         Hole 417A, 93  
         plagioclase, 1224  
         Site 417, 1185  
 ARM intensity, 1394  
 budget of, alteration, 1326  
 calcite values, Site 417, 1183  
     vein formation in, 1183  
 calcite-quartz veinlet, 1229  
 carbon isotope composition, 1149  
 carbonate in, 1186  
 celadonite in, 1186, 1203  
 chalcopyrite, occurrence of in, 1436  
 chemical analyses, analytical methods, 390, 939, 988, 1055, 1087, 1137, 1185, 1243  
     Hole 418A, 10, 1021  
     Holes 417A and 417D, 977, 1099, 1001  
 carbonate correction, Hole 418A, 390, 988, 1021  
     Site 417, 76  
 glass and whole-rock analyses compared, 965  
 Leg 46, 998  
     major elements, 1224  
     Site 417, 76  
 composition, 947  
     Site 417, 93  
     variation downhole, 953  
 data, 1224  
 gradients, Mid-Atlantic Ridge, 967  
 stratigraphy, Hole 417D, 947, 962  
     Hole 418A, 963  
     Sites 417 and 418, 939, 955  
 variation, Holes 417D and 418A, 994  
     Site 418, 391, 395  
     Site 417, 76  
 chemistry of altered, 1285, 1319  
 chlorite in, 1186  
 chromite, occurrence of in, 1433  
 clay minerals, vein and, vesicles filling in, 1185, 1300  
 Hole 417A, 1202  
 compressional wave velocities, 1457  
 crack anisotropy, 1482  
     distribution, 1481  
     features, 1481  
 crystal fractionation, Holes 417D and 418A, 985, 1557  
 crystallization sequences, Holes 417D and 418A, 1040  
 Curie temperatures, 87  
 D/H ratios, 1178  
 density-porosity relationships, 1469  
 dikes, 74, 92, 372, 380, 395, 947, 965  
 downhole geophysical logging results, Hole 417D, 708  
 electrical resistivity, 1458  
 electron microprobe analyses, Holes 417A and 417D, 1002  
     microprobe analyses, 1055, 1099, 1243  
 eruptive stratigraphy, Hole 417D, 947  
     Hole 418A, 949  
     units, 949, 974  
 experimental procedures, magnetic properties of, 1391  
 feldspar in, 1187  
 flow dynamics, post-eruptive, 1025  
 fluid permeability, 1458, 1473  
 fractional crystallization, 954, 979  
     crystal segregation, 1047  
     Hole 417D and 418A, 960  
 general characteristics, Holes 417D and 418A, 987  
 glass composition, Holes 417D and 418A, 1039  
 glassy inclusions, chemical analyses, analytical methods, Hole 417D, 1064  
     electron microprobe analyses, Hole 417D, 1064  
 granophytic textures, 1040  
 groundmass, 1070  
     Hole 417D, 941  
     Hole 418A, 373, 375, 376, 377, 378, 379, 380, 947  
 high-temperature reaction, 1177  
 haloclastic breccias, Hole 417A, 64  
 hydrogen isotopes, low-temperature alteration effect on, 1178  
 ilmenite, occurrence of in, 1432  
 initial susceptibility, 1394  
 ion microprobe analyses, 1055  
 iron oxidation, 1224  
 isotope-balance calculations, 1177  
 isotopic and mineralogical studies, 1243  
     composition, 1155  
         D13C of carbonates, 1154  
         D18C of carbonates, 1154  
         water content, 1154  
 Königsberger ratio, 1394  
 late-stage alteration of, 764  
 liquid fraction, 1557  
 lithologic stratigraphy, Hole 417D, 962  
     Hole 418A, 963  
     Sites 417 and 418, 939  
     units defined, Holes 417D and 418A, 940

low-pressure fractional crystallization, 970, 957  
low-temperature alteration, 1021, 1033, 1072, 1156,  
1177, 1185, 1219, 1231, 1243  
magma mixing, 1107  
variation, 985  
  crystal fractionation, 1106  
  settling, 998  
  flow differentiation, 998, 1033, 1107  
magnetic properties, 1379, 1391, 1407  
  intensity, susceptibility, stability of magnetization, 1363  
stratigraphy, Hole 417D, 962  
  Hole 418A, 963  
  Holes 417D and 418A, 941  
Site 418, 394  
  Sites 417 and 418, 939  
major-element analyses, Holes 417A and 417D,  
1104  
  Hole 417D, 989  
  Holes 417A and 417D, 979, 1001  
  Hole 418A, 991, 1087  
  chemistry, FAMOUS area of the Mid-Atlantic  
    Ridge, 1009  
marcasite, occurrence of in, 1436  
microtectonic data, 1491  
Mid-Atlantic Ridge, 987  
mineral chemistry, clinopyroxene, 1041  
  electron microprobe analyses, 1040  
  olivine, 1040  
  plagioclase, 1041  
  spinel, 1040  
mineralogy, Holes 417D and 418A, 988, 1266  
minerals, electron probe microanalyses of, 977  
minor elements analyses, 1087  
normative composition, Holes 417D and 418A, 996  
  Site 417, 76  
oxygen isotope composition, 1149  
  isotopes, low-temperature alteration, effect on,  
    1177  
palagonite, glass, 1243  
paleomagnetic results, 1337, 1351  
paleomagnetics, Hole 418A, 381  
paleomagnetism and magnetic properties of,  
86, 1363  
pentlandite, occurrence of in, 1435  
permeability of fresh, 1475  
petrogenesis, Holes 417A and 417D, 1109  
petrographic types, Holes 417A and 417D, 1099  
petrography, Hole 417D, 941, 1127  
  Hole 418A, 947, 1025  
petrology, 92  
phase chemistry, Holes 417A and 417D, 1007  
phenocryst morphology, Holes 417D and 418A,  
1043  
  redistribution, Hole 418A, 1033  
phenocryst-liquid differentiation, post-eruptive,  
1021  
phenocrysts, clinopyroxene, 62, 379, 944, 947, 975,  
979, 1070, 1101  
  glass inclusions, Holes 417D and 418A, 1040  
  modal analyses, Holes 417D and 418A, 984  
morphology, Holes 417D and 418A, 1040  
olivine, 62, 70, 373, 375, 377, 379, 941, 947,  
975, 978, 1069  
plagioclase, 62, 70, 373, 375, 377, 378, 379, 941,  
947, 975, 978, 1069, 1101  
  chemical zonation of, 1055, 1107  
  composition, undercooling role in, 1056  
  glass inclusions, 965  
  major-elements analyses, 1055  
  spinel inclusions, 1044  
physical properties, 1457  
pillow basalt, petrography, Hole 418A, 1021  
  phenocryst zonation patterns, 1055  
porosity of, 1457  
potassium-argon age determinations, 1127, 1149  
  compared to paleontological age determinations,  
    Hole 417D, 1127  
pyrite, occurrence of in, 1435  
pyrrhotite, occurrence of in, 1435  
quartz, granophytic intergrowths of, 1041  
rare-earth element abundances, Holes 417A and  
417D, 1099  
  FAMOUS area, 967  
  geochemistry of, Ulwan volcano, New Bri-  
    tain, 1114  
  patterns, Holes 417A and 417D, 1107  
elements, 1137, 1285  
  analyses, 991, 1114  
  effect of alteration, Holes 417A and 417D,  
    1105  
  Site 417, 1113  
saturation magnetization, 1396  
remanent magnetization, 1396  
seawater-rock interaction, 1201  
secondary alteration, Hole 418A, 1162  
  mineral, analcite, 1245  
  carbonate, 1243  
  hydrated iron oxide, 1243  
  potassium feldspar, 1224, 1243  
  saponite, 1244  
  mineralogy, 1186  
silica-enrichment, Hole 418A, 1033  
smectite and celadonite, near-vein zoning, 1229  
smectite in, 1203  
stable magnetic inclinations, Holes 417D and 418A,  
955  
structural features, Holes 417A and 417D, 74  
sulfide, Hole 417D, 74  
sulfur isotope composition, 1149  
temperature gradient, Hole 417D, 708  
  of the alteration medium, D18O evidence, 1154  
thermal conductivity, 1458  
trace element analyses, 979, 990, 993, 1033, 1104  
  low-temperature alteration, 979  
  variation diagrams, Hole 418A, 954  
transition metal abundances, Holes 417A and  
417D, 1104  
  effect of alteration on, 1106  
variation diagrams, Holes 417D and 418A, 961,  
979  
vein mineral formation in, 1170

- velocity-density relationships, 1467  
 velocity-porosity relationships, 1467  
 water circulation effects on alteration, Hole 417A, 1035  
 weathering, 1201  
 zeolites in, 1187  
 $^{87}\text{Sr}/^{86}\text{Sr}$ , 1137  
 Basalt-sea water interaction, 1245  
 Basaltic basement as a source of geomagnetic anomaly  
     lineation, 1360  
 breccias, Hole 417A, 1274  
     Hole 417D, 1275  
 glass, alteration, 1137  
     chemical analyses, analytical methods, 1069  
     stratigraphy, Holes 417D and 418A, 957, 1069  
 chemical-stratigraphic units, 974  
 Cretaceous, 8, 753, 765  
 electron microprobe analyses, 1069  
     probe microanalyses of, 957, 973  
 fission track dating, experimental procedures, 1129  
 FAMOUS area of the Mid-Atlantic Ridge, 1107  
 Holes 417D and 418A, 957  
 isotopic composition, 1122  
 magnetic stratigraphy, Holes 417D and 418A, 960  
     major-element chemistry of, 973  
     mantle argon concentrations, 1123  
     potassium concentrations, 1124  
     rare-earth elements, 1122, 1137  
     radiogenic argon-40 concentrations, 1123  
     uranium concentration, East Pacific Rise, 1129  
         and distribution, 1129  
         Mid-Atlantic Ridge, 1129  
 layer of the sea floor, aging of, 1159  
 magmas, 952  
 rocks, brittle deformation of, 1491  
 sequence, Hole 417A, 1274  
     Hole 417D, 1275  
 Basement, acoustic impedance, 1581  
     composition of, 1595  
     density, 1581  
     lithology and physical properties, 1580  
     permeability, Hole 417D, 711  
     porosity, 711, 1581  
     resistivity, Hole 417D, downhole geophysical  
         logging, 711  
     rocks, physical properties, 77, 92, 382  
     subsidence as a factor in depth reconstruction, 1501  
     velocity, 1581  
         Hole 417D, downhole geophysical logging, 711  
 Bathymetric chart, Sites 417 and 418, Site survey, 629  
     reconstruction, Central Atlantic Basin, 1501  
 Bathymetry, Early Cretaceous to Cenomanian, 1506  
     Hole 417D, 1505  
     Late Cretaceous, 1506  
     Late Jurassic, 1505  
     Tertiary, 1507  
 Benthic foraminifers, 796  
 Bermuda, Oligocene volcanism of, 28  
     Rise, 6, 28
- Biostratigraphic conventions, Legs 51 to 53, 19  
 Biostratigraphy, Hole 417D, nannofossils, 815  
     Hole 418A, nannofossils, 815  
     Hole 418B, nannofossils, 815  
     Holes 418 and 418A, 363  
 Bioturbation, evidence for, 363  
 Black clay facies, 363  
     Hole 417D, 898  
     Hole 418, 898  
 Sea, comparison of sediment ages, with other  
     DSDP sites, 1525  
 Blake fracture zone, 28  
     Nose, 797  
     Plateau, downslope transport of diatoms from, 851  
 Block, faulting, 1360  
     rotation, 1429  
 Blocking temperature, 1386  
 Borehole-compensated velocity (BHC) tool, 705  
 Boron, altered basalts, 1323  
     oceanic crust, 1574  
 Bottom-water temperature, upper Cretaceous, 763, 765  
 Breccia, 1539  
     zones, paleomagnetism, 1379  
 Brittle deformation of basaltic rocks, 1491  
 Broken pillow breccia, 1539  
 Brown smectites, composition of, 1269  
 Budget of alteration, basalt, 1326  
 Bulk mineralogy, altered rocks, 1258  
     sediments, X-ray analysis of, 721  
     rock compositions, 1310  
 Ca-Tschermark's component, pyroxene, 1044  
 Calcedony, 1188  
 Calcisphaerulidae, 847  
 Calcite, 1224, 1309  
     basalt alteration, 1220, 1304  
     Hole 418A, 1171  
     oxygen isotope analysis, Hole 418A, 1174  
     Sr isotope ratio age determination, 1172  
     strontium isotope ratios, age determination, Site  
         105, 1174  
     vein, chalcedony in, 1205  
         opal in, 1205  
         quartz in, 1205, 1221  
         formation in, Hole Site 417, basalt, 1183  
         genesis model, 764  
         veins, oxygen values, Site 417, 1183  
 Calcite-quartz veinlet, near-vein alteration, Basalt, 1229  
 Calcites, age of, 1173  
 Calcium, altered basalts, 1322  
 Carbon isotope analysis, carbonate, oxygen, 1245  
     composition, basalt, 1149  
 Carbon-13 ratios, interpillow limestones, 764  
 Carbonate, basalt, secondary mineral, 1186, 1243  
     oxygen and carbon isotope analysis, 1245  
     compensation depth, 795, 827, 857, 1509  
         Leg 51, sediments, 731  
     composition, 1204  
     contents, sediments, gasometric determinations of,  
         721

- minerals, oceanic basalt, 1569  
 occurrence, Hole 417A, Hole 418A, 1204  
 Carbonates, carbon-13 ratios, interpillow limestones, 764  
     isotopic composition of, Hole 417A, 1161  
     paleotemperatures of precipitation, 763  
     strontium exchange in, 1174  
 Caribbean, comparison of sediment ages to other DSDP sites, 1525  
 Celadonite, 1169, 1188  
     basalt alteration, 1219  
         secondary mineral, 1244  
     near-vein zoning, 1229  
     oceanic basalt, 1186, 1203, 1564  
 Central American isthmus, emergence of, 6  
     Atlantic Basin, bathymetric reconstruction, 1501  
 Central North Atlantic Sea, Aptian to Albian, 905  
 Cesium, crustal reservoir, 1175  
     oceanic crust, 1574  
     partition coefficients, 1175  
 Chabazite, 66  
 Chalcedony, 1221  
     in calcite vein, 1205  
 Chalcopyrite, 1070  
     basalt, 1435, 1436  
     Hole 418A, 1206  
 Chemical alteration, oceanic basement, 1253  
     analysis methods, 939, 977, 988, 1021, 1055, 1064, 1069, 1099, 1137, 1185, 1243, 1331  
     glass and whole-rock analyses compared, 965  
     Holes 417D and 418A, basaltic glass, 957  
     major elements, 1224  
     manganese oxide micronodules, 772  
 Chemical-stratigraphic units, basaltic glasses, 974  
 Chemistry, oceanic crust, 1571  
     basalt, 1319  
     sediments, Western Atlantic, 1515  
 Chert, thin-section descriptions, 48  
*Chiastozygus litterarius* Zone, 824  
 Chlorite, as an alteration product, 1302  
     in basalt, 1186  
     oceanic basalt, 1568  
 Chromite, occurrence of in basalt, 1433  
 Chromium in altered basalts, 1323  
*Classopolis spinosus* Sub-zone, 902  
*Clavatipollenites* Zone, 899  
 Clay mineralogy, sediments, X-ray analysis of, 721  
     minerals, electron microprobe analyses of, 1203  
         Hole 417A, 1305  
         vein and vesicles filling in basalt, 1185, 1202, 1300  
     X-ray diffraction patterns, Holes 417A and 417D, 731  
 Clays, oxygen isotope analysis, 1245  
 Clinopyroxene, basalt, alteration of, 1224  
     mineral chemistry, 1041  
     phenocrysts, 979, 1070  
     Hole 417A, basalt phenocrysts, 62  
     Hole 417D, basalt phenocrysts, 941  
     Hole 418A, basalt phenocrysts, 379, 947, 975  
     Holes 417A and 417D, basalt phenocrysts, 1101  
 Compensated formation density (FDC) tool, 706  
     neutron porosity (CNL) tool, 706  
*Complexiopollis* Zone, 900  
 Compressional wave velocities, 1585  
     basalts, 1457  
     velocity of basalt under pressure, 1461  
 Concentric structures in pillow lava, 1275  
 Cooling history on magnetic properties, effect of, 1401  
     rates, magnetic units, 1384  
     unit, defined, 977, 1383  
 Copper, altered basalts, 1323  
 Copper-rich sulfides, 1073  
 Core-handling, hard-rocks, 13  
 Correlation between sedimentary facies, DSDP sites, 1504  
     with lithology, Hole 417D, downhole geophysical logging, 711  
 Crack anisotropy, basalt, 1482  
     distribution, basalt, 1481  
         effect on fluid circulation, 1479  
         seismic velocity, 1479  
         formation permeability, 1479  
         seismic structure, 1479  
     features, basalt, 1481  
         orientation in Mid-Atlantic Ridge, 676  
 Cracks, evidence from resistivity data, 711  
     porosity data evidence, 709  
 Creeping transformation of rhodochrosite, 772  
 Cretaceous, basaltic glass, 8  
     black claystone, chemical characteristics of, 1519  
     mid-ocean ridge volcanism, 998  
     oceanic crust, 1379, 1535  
     palynology, 897  
     quiet zone, 28, 671, 1375  
     radiolarians, 791, 1579  
 Crustal construction, western Atlantic Ocean, 1540  
     evolution, 1508  
     permeability, 1484  
     reservoir, cesium, 1175  
 Crystal fractionation, variation, 1106  
     Holes 417D and 418A, 985  
         low-pressure, 6  
         segregation, 1047  
         settling, 998  
 Crystalline fraction, basalt, 1557  
 Crystallization sequences, Holes 417D and 418A, 1040  
 Curie temperature, 87, 1396, 1411  
 D/H ratios, basalt, 1178  
 Data analysis, oblique seismic experiment, 677  
 Density data errors, Hole 417D, 709  
 Density-porosity relationships, basalt, 1469  
 Depth of alteration, 1583  
     reconstruction, basement subsidence as a factor in, 1501  
         isostatic correction as a factor in, 1501  
         relief correction as a factor in, 1501  
 Diagenesis, Hole 417A, 775  
 Diagenetic pyrite, sulfur isotopes of, 1145  
 Diatom blooms in meromictic lacustrine systems, 906  
 Diatoms, 851

- Dike injection zone, 1388  
 Dikes, 1540  
   Hole 417D, basalt, 74  
 Dinoflagellate-cyst assemblages, 899  
 Dinoflagellates, 905  
   ecology of, 906  
 Diopside, 1044  
 Dolerites, 1047  
 Dolomite, 1220  
 Dolomite-rhodochrosite lozenges, 360  
 Downhole conditions, 1585  
   geophysical logging, basement resistivity, Hole 417D, 711  
     velocity, Hole 417D, 711  
     borehole compensated velocity (BHC) tool, 705  
     caliper tool, 705  
     compensated formation density (FDC) tool, 706  
       neutron porosity (CNL) tool, 706  
     correlation with lithology, Hole 417D, 711  
     density data errors, Hole 417D, 709  
     electrical resistivity (DIL) tool, 707  
     high-resolution temperature (HRT) tool, 705  
     Hole 396B, 705  
     natural gamma ray (GR) tool, 705  
     permeability, Hole 417D, 710  
     porosity data errors, Hole 417D, 709  
     results, Hole 417D, 708  
     temperature data, Hole 417D, 711  
   logging, Hole 417D, 1583  
   variation of magnetic properties, 1383  
   variations, Hole 418A, 1210  
 Downslope transport of diatoms from Blake Plateau, 851  
   North American shelf, 851  
 Early Cretaceous paleolatitudes, North American plate, 87  
   to Cenomanian bathymetry, 1506  
 Eocene/middle Miocene, sedimentation rate, Hole 418A, 871  
 East Pacific Rise, basaltic glasses, uranium concentration in, 1129  
 Ecology of dinoflagellates, 906  
 Elasmobranchian hard parts, 857  
*Elateroplicites* Zone, 902  
 Electrical resistivity, 1585  
   basalts, 1458  
   (DIL) tool, 707  
 Electron microprobe analyses, basalt, 974, 977, 1002, 1040, 1055, 1099, 1201, 1243  
   clay minerals, 1203  
   glass, 957, 973, 1064, 1069  
   magnetic oxides, 1411  
   olivine and smectite, 1223  
 Emplacement mode as a factor in magnetic properties, 1388  
 Energy dispersive detector, 974  
 Enstatite, 1044  
 Eruptive stratigraphy, Cretaceous oceanic crust, Western Atlantic, 1535, 1540  
   Hole 417D, basalt, 947  
     Hole 418A, basalt, 949  
     Sites 417 and 418, 955  
     unit, basalt, 949, 974  
 Eu anomaly, 991  
 Euxinic black claystones, 827  
 Evolution of alteration with depth, 1281  
   palagonitization with time, 1282  
 Evolutionary changes in the composition of secondary minerals, 1260  
 Experimental procedures, basaltic glasses, fission track dating, 1129  
   magnetic properties of basalt, 1391  
   rock magnetism, 1379  
 Faulting, block, 1360  
 Faults and fissure, FAMOUS area of the Mid-Atlantic Ridge, 676  
 Feldspar in basalt, 1187  
 Ferrosilite, 1044  
 Field intensity, 1391  
 Fission track age, magnetic anomaly M-0, 1129  
   ages, corrected, 1132  
     FAMOUS area of the Mid-Atlantic Ridge, 1132  
     reliability compared to potassium-argon age determination, 1130  
     thermally lowered, 1132  
   dating, experimental procedures, basaltic glasses, 1129  
   evidence, Holes 417D and 418A, formation age of the crust, 1132  
 Fissures, anisotropy, Mid-Atlantic Ridge, 686  
   oceanic crustal Layer 2, 685  
 Floral province, Northern Gondwana Province, 904  
   South American/African Province, 904  
   Southern Laurasian Province, 904  
 Flow differentiation, basalt, magma variation, 998, 1107  
   Hole 418A, 1033  
   dynamics, post-eruptive, 1025  
 Fluid circulation, crack distribution, effect on, 1479  
   permeability of oceanic basalts, 1473  
 Foraminifers, 797  
   Hole 417D, 49  
   Hole 418B, 365, 794  
   Holes 367 and 370, 797  
   Holes 417 and 417A, 791  
   Holes 417A and 417B, 48  
   Holes 418 and 418A, 363, 794  
   Holes 417B and 417D, 791  
   Systematics, 797  
 Fractional crystallization, 1557  
   basalt, 954, 979  
   crystal segregation, 1047  
   Hole 417D and 418A, 960  
   least-squares models of, 964  
 FAMOUS area, Mt. de Venus, 974  
   Pluto, 974  
   basaltic glasses, 1107  
   fission track ages, 1132  
   major-element chemistry, 1009  
   rare earth element composition, 967

- median valley, faults and fissure, 676  
 Gasometric determinations of carbonate contents, sediments, 721  
 Geochemical mass balance calculations, potassium, 1210  
     measurements, Legs 51 and 53, 14  
 Geochemistry, alteration products of basalt, 1273  
     Site 418, 369  
     Site 417 sediments, 60  
 Geologic summaries, Site 417, 7  
     Site 418, 10  
 Geomagnetic anomaly lineation, basaltic basement as a source of, 1360  
     profiles, Sites 417 and 418, Site survey, 629  
     secular variation, 1375  
 Geophysical data, comparison of, 1592  
     logging, Hole 417D, 705  
 Geothermal gradient, Hole 418A, 1163  
     Holes 417A and 418A, 1159  
 Glass, alteration of, 1279  
     basalt, palagonite, 1243  
     composition, Holes 417D and 418A, basalt, 1039  
     inclusions, basalt, phenocrysts, plagioclase, 965  
         Holes 417D and 418A, basalt, phenocrysts, 957, 1040  
 Glass-sea water exchange, 1143  
 Glass/whole-rock chemical variation, 977  
 Glasses, mid-ocean ridge basalt (MORB), 966  
 Glassy inclusions, chemical analyses, 1064  
     electron microprobe analyses, Hole 417D, 1064  
     pillow lava, plagioclase phenocrysts, 1063  
         pyroxene phenocrysts, 1063  
     plagioclase, chemical composition, 1067  
     pyroxene, Hole 417D, 1067  
     margins, alteration, 1307  
     rims, petrography, 1122  
     zone, pillow lava, 1275  
 Granophytic intergrowths, 1041  
     textures, 1040  
 Groundmass, alteration of, 1300, 1305  
     basalt, 373, 375, 376, 377, 378, 379, 380, 941, 947  
 Hatteras abyssal plain, turbidites, 28  
 Hedenbergite, 1044  
 Hematite in basalt, vertical distribution, 1206  
 Hess Seamount, 28  
 High-resolution temperature (HRT) tool, 705  
     temperature reaction, basalt, 1177  
 High-pressure fractionation, 1557  
 Hole 386, limestone at basalt contact, 755  
 Hole 395A, alkali metals, 1088  
 Hole 396B, downhole geophysical logging, 705, 1595  
 Hole 417A, basalt, 8  
     alkali metals, 1087, 1092  
     alteration, 93  
         oxygen isotope studies, 93  
         mineralogy, 65, 947, 1087  
     clay minerals in, 1202  
     hyaloclastic breccias, 64  
     magnetization, 1407  
     phenocrysts, clinopyroxene, 62  
         olivine, 62  
     plagioclase, 62  
     water circulation effects on alteration, 1035  
 basaltic breccias, 1274  
     sequence, 1274  
 carbonates, isotopic composition of, 1161  
     occurrence, 1204  
 clay minerals, 1305  
 feldspar, 1206  
 ichthyoliths, 859  
 igneous petrography, 62  
 magnetic stratigraphy, 87  
 manganese, 1221  
     oxide micronodules, 771  
 massive basalt and dolerites, 1274  
 native copper, 66, 1206  
 natural remanent inclination, 8  
     intensity, 8  
 pillow basalt, 64, 1201  
     aphyric zones, 1012  
     lavas, 1274  
 potassium, 1161  
 radiolarians, 49  
 rhodochrosite, 771  
     diagenesis, 775  
 sedimentation, 867, 871  
 site data, 24  
 stratigraphic hiatus, middle Eocene/Late Cretaceous, 871  
 volcanic breccia, 1201  
 water content of sediments, 1453  
 weathering sequence in, 1211  
 Hole 417B, basalt weathering, Hole 417A, 1201  
     ichthyoliths, 866  
     sedimentation, 871  
     site data, 24  
 Hole 417D, basalt, 8  
     alkali metals, 1088  
     chemical stratigraphy, 947, 962  
     dikes, 74, 92  
     downhole geophysical logging results, 708  
     eruptive stratigraphy, 947  
     glassy inclusions, 1064, 1067  
     groundmass, 941  
     lithologic stratigraphy, 962  
     magnetic stratigraphy, 962  
     major-element analyses, 989  
     petrography, 941, 1127  
     phenocrysts, clinopyroxene, 941  
         olivine, 70, 941  
         plagioclase, 70, 941  
     potassium-argon age determinations, 1127  
     rare-earth elements (REE) analyses, 99  
     sulfide, 74  
     temperature gradient, 708  
     trace-element analyses, 990  
 basaltic breccias, 1275  
     glass, 753, 1122  
     sequence, 1275  
 basement permeability, 711  
     porosity, 711  
 bathymetry of, 1505

- black clay facies, 898  
 downhole geophysical logging, 709, 711, 1583  
 foraminifers, 49  
 formation density, 711  
 geophysical logging, 705  
 Hole 418A, physical properties, basalts, 1457  
 ichthyoliths, 866  
 igneous petrology, 68  
 interpillow limestone, 753, 754, 755  
 limestones, 1275  
 magma, composition of, 1067  
 magnetic stratigraphy, 88  
 massive dolerites, 1275  
 microfaulting in limestone beds, 45  
 nannofossil biostratigraphy, 815  
 natural remanent inclination, 8
  - intensity, 8
 oblique seismic experiment, 40, 675, 705  
 paleomagnetism, 60  
 palynomorphs, 899  
 pillow basalt, 1009, 1122
  - lava, 1063, 1275
 radiolarians, 49  
 sedimentary structures, 753  
 sediments, downhole geophysical logging results, 708
  - temperature gradient, 708
 site data, 25  
 stable inclination, 8  
 Hole 418, basalt, trace-element analyses, 993
  - black clay facies, 898
  - nannofossils, 364
  - sedimentation rate, late Miocene/late Pliocene, 871
 Hole 418A, age of crust formation, 1172
  - barite crystals, 363
  - basalt, 10
    - chemical analyses, 10, 1021
    - stratigraphy, 963
  - eruptive stratigraphy, 949
  - groundmass, 373, 375, 376, 377, 378, 379, 380, 947
  - lithologic stratigraphy, 963
  - low-temperature alteration, 1033, 1072
  - magma variation, flow differentiation, 1033
  - magnetic stratigraphy, 963
  - major-elements analyses, 991
  - paleomagnetics, 381
  - petrography, 947, 1025
  - phenocryst redistribution, 1033
  - phenocrysts, clinopyroxene, 379, 947, 975
    - olivine, 373, 375, 377, 379, 947, 975
    - plagioclase, 373, 375, 377, 378, 379, 947, 975
  - pillow basalt, 1021, 1201
  - secondary alteration, 1162
  - silica-enrichment, 1033
  - single cooling units, 1021
  - trace-elements, variation diagrams, 954
    - analyses, 1033
  - basaltic glass, chemical composition, 1069- calcite, 1171
  - oxygen isotope analysis of, 1174
- carbonate occurrence, Hole 417A, 1204
- chalcopyrite, 1206
- chlorite of, 1185
- dikes, basaltic, 372, 380, 395, 947, 965
- downhole variations, 1210
- geothermal gradient, 1163
- ichthyoliths, 364, 867
- igneous petrography, 372
- interstitial water chemistry, 369
- magnetic anomaly M-0, 381
  - properties, 381
  - stratigraphy, 11, 381
- nannofossils, biostratigraphy, 815
- natural remanent intensity, 11
- oxidation zones, 1211
- phillipsite, 1222
- physical properties, 11, 1457
- pyrite, 363, 374, 1206
- sedimentation, 871
- site data, 351
- smectites, 1169
- vesicle fillings, 1204
- water content of sediments, 1453
- weathering sequence, 1211
- Hole 418B, foraminifers, 365, 794
  - ichthyoliths, 366, 867
  - interstitial water chemistry, 369
  - nannofossils, 365, 815
  - operations, 359
  - palynomorphs, 903
  - radiolarians, 365
  - sedimentation, 871
- Hyaloclastic breccias, 1539
  - Hole 417A, 64
- Hydrogen isotopes, low-temperature alteration effect on basalt, 1178
- Hydrothermal alteration in oceanic crust, 6
  - circulation in cracks in the oceanic crust, 676
- Ichthyoliths, 50, 364, 366, 857, 859, 866, 867
  - species list, 874
  - systematics, 871
- Igneous petrography, Hole 417A, 62
  - Hole 418A, 372
  - Hole 417D, 68
  - Site 418, 395
- rocks, factors controlling permeability of, 1473
- Legs 51 to 53, X-ray fluorescence measurements, 14
  - classification, Legs 51 to 53, 20
- Ilmenite, 1432
- Initial susceptibility, 1379
  - basalt, 1394
- Interpillow limestone, 754, 761
  - carbon-13 ratios, 764
  - formation of, 764
  - Hole 417D, 753
  - petrography, 755
  - recrystallization, 758

- stable-isotope ratios, 762  
 structure grumeleuse, 758  
 Interstitial water studies, dissolved potassium, 748  
 sulfate, 748  
 Interstitial water chemistry, Hole 418A, 369  
   Hole 418B, 369  
   Site 417, 62  
 Ion microprobe analyses, basalt, 1055  
 Iron, 1325, 1519  
   hydroxides, 1223, 1309  
     occurrence of in basalt, 1436  
     oxidation, 1224  
 Isostatic correction as a factor in depth reconstruction, 1501  
 Isotope exchange reaction, 1177  
 Isotope-balance calculations, basalt, 1177  
 Isotopic and mineralogical studies, basalt, 1243  
   composition, basalt, 1155  
     carbonates, 1161  
       D13C of carbonates, 1154  
       D18O of carbonates, 1154  
     Hole 417D, basaltic glass, 1122  
     water content, basalt, 1154  
 J-anomaly, 28  
 J-anomaly Ridge, Site 384, 28  
 Jadeite, 1044  
 K-feldspar, 1569  
 Kerogen, 737  
 Königsberger ratio, 1351, 1394  
 Late-stage alteration of basalt, 764  
 Lateral velocity variations, oceanic crustal Layer 2, 684  
 Lattice constants, magnetic minerals, 1399  
 Layer 2, in situ, physical properties in, 1464, 1465  
 Layer 2/Layer 3 boundary, 1596  
 Leg 2, manganese nodules, 771  
   rhodocrosite, 771  
 Leg 37, basalt alteration, 1224  
   saponites in weathered basalt, 1204  
 Leg 46, basalt, chemical analyses, 998  
 Leg 51, basalts, magnetic characteristics, 1379  
   operational summary, 6  
   sediments, carbonate compensation depth, 731  
   stable isotope ratios, basalt, 1153  
 Leg 52, operational summary, 7  
 Leg 53, operational summary, 7  
 Legs 51 to 53, background and objectives, 5  
   biostratigraphic conventions, 19  
   explanatory notes, 11  
   geochemical measurements, 14  
   igneous rocks classification, 20  
   Interstitial water studies, 747  
   magnetic measurements, 14  
   physical properties, 13  
   sedimentologic analyses, 14  
   X-ray diffraction measurements, sediments, 14  
     fluorescence measurements, igneous rocks, 14  
 Limestones, Hole 417D, 1275  
   paleomagnetic measurements, 1429  
 Linear sea-floor, magnetic anomalies, 6  
   Lineated magnetic anomalies, 1402  
   Liquid fraction, basalt, 1557  
     limit, sediments, 1453  
   Listric fault, 381  
   Lithium, altered basalts, 1323  
     oceanic crust, 1574  
   Lithologic and magnetic units, 1356  
     stratigraphy, Hole 417D, basalt, 962  
       Hole 418A, basalt, 963  
       Sites 417 and 418, basalt, 939  
     units defined, Holes 417D and 418A, basalt, 940  
   Logging, Hole 396B, 1595  
   Long-wavelength, free-air gravity anomalies, 967  
   Low-partition coefficient elements, mid-ocean ridge basalt, (MORB), 1091  
   Low-pressure, crystal fractionation, 6, 957, 970  
   Low-temperature alteration, basalt, 979, 1021, 1185, 1231, 1243, 1261  
     Hole 418A, basalt, 1033, 1072, 1077  
     Holes 417A and 417D, basalt, 1156  
     Site 417, Site 418, basalt, 1219  
       Site 417, magnetic minerals, 87  
       reactions, basalt, 1177  
   M sequence of linear anomalies, 28  
   Macroscopic description, Hole 417D, interpillow limestone, 754  
   Magma, composition of, Hole 417D, 1067  
     batch, defined, 960  
     mixing, 1107  
     variation, 985  
       crystal fractionation, 1106  
       settling, 998  
       flow differentiation, 998, 1107  
       Hole 418A, 1033  
       Holes 417D and 418A, 954  
   Magmatic processes, 1088  
   Magnesium, altered basalts, 1323  
     and potassium, basal enrichment in iron, 1519  
   Magnetic anomaly *M*-0, 6, 8, 28, 394, 629, 753, 897, 987, 1099, 1127, 1370, 1402  
     fission track age, 1129  
       Hole 418A, 381  
     characteristics, Leg 51, basalts, general, 1379  
     grain-size range, 1382  
     hysteresis cycles, characteristics of, 1385  
     measurements, Legs 51 to 53, 14  
     minerals, changes of during thermomagnetic analysis, 1399  
       lattice constants, 1399  
       low-temperature alteration, 87  
     oxides, electron microprobe analysis, 1411  
       massive units, 1420  
       petrology of, Site 417, 1411  
       temperature of oxidation, 1354  
   properties, basalt, 1391  
     downhole variation of, 1383  
     effect of cooling history on, 1401  
     emplacement mode as a factor in, 1388  
     experimental procedures, 1391

- Hole 418A, 381  
 intensity, susceptibility, stability of magnetization, basalt, 1363  
 paleomagnetism and, 1363
- stratigraphy, Hole 417A, 87  
 Hole 417D, 88, 962, 941  
   Hole 418A, 11, 381, 963, 941  
 Site 418, basalt, 394  
   Sites 417 and 418, basalt, 939
- units, cooling rates, 1384  
 lithology and, 1356
- Magnetization, Hole 417A, basalts, 1407  
 spontaneous, 1382  
 component, secondary, 1382
- Major-element analyses, basalt, 1055, 1087  
 Hole 417D, 989, 1104  
   Holes 417A and 417D, 1001, 1104
- chemistry, Holes 417D and 418A, 979, 1224  
 basaltic glasses, 973  
 FAMOUS area of the Mid-Atlantic Ridge, 1009  
 Hole 418A, basalt, 991  
   Mid-Atlantic Ridge, 1009
- Makaopuhi lava lake, 1063
- Manganese, 1221, 1519  
 nodules, Leg 2, 771  
   Site 137, 771
- oxide micronodules, chemical analyses, 772  
 Hole 417A, 771  
 scanning electron microscope studies, 772  
 Site 7, 771  
   X-ray diffraction studies, 772
- Manihiki Plateau, 28
- Mantle compositions, 1088  
 argon concentrations, 1123
- Marcasite, occurrence of in basalt, 1436
- Mass balance models, 1021
- Masuda-Coryell plot, 1113
- Median destructive field (MDF), 1382  
 valley, faults and fissure, FAMOUS area of the Mid-Atlantic Ridge, 676
- Meromictic lacustrine systems, diatom blooms in, 906
- Mesostasis, alteration of the, 1278  
 in the pillow cores, alteration of, 1281
- Metamorphism in oceanic crust, 6
- Microfaulting in limestone beds, 45
- Microtectonic data, 1491
- Mid-ocean ridge, (MOR) volcanism, 1099  
 (MORB) chemistry, 1099  
   glasses, 966  
 basalts (MORB), 982  
   rare-earth element patterns, 1108  
   low-partition coefficient elements, 1091
- Mid-Atlantic Ridge, basalt, 987  
 chemical gradients, 967  
 major-elements chemistry, 1009
- basaltic glasses, uranium concentrations, 1129  
 crack orientation in, 676  
 fissures, anisotropy, 686  
 sediments, pollen/dinoflagellate ratios in, 905  
 sulfur isotopes, mean value, 1145
- Mineral assemblages, age, effect of on, 1570  
 altered basalt, 1219  
 carbon, 737  
 chemistry, clinopyroxene, 1041  
   electron microprobe analyses, 1040  
   olivine, 1040  
   plagioclase, 1041  
   spinel, 1040
- Mineralogical studies, basalt, 1243
- Mineralogy, alteration products of basalt, 1273  
 clay minerals from altered basalt, 1257  
 Holes 417D and 418A, basalt, 988  
   oceanic crust, 1563
- Minerals, electron probe microanalyses of, 977  
 separated from fracture fillings, altered basalt, 1256
- Minor-elements analyses, basalt, 1087  
 and the alteration process, 1573
- Mobilization of manganese in siliceous sediments, 748
- Mt. de Venus, FAMOUS area, 974  
 Pluto, FAMOUS area, 974
- Nannofossils, biostratigraphy, Hole 417D, 815  
 Hole 418A, 815  
 Hole 418B, 815  
 Hole 418, 364  
 Hole 418B, 365  
 Site 417, 50, 823  
 Site 418, 827  
 species epithets, 823  
 zonation, *Chiastozygus litterarius* Zone, 824
- Nares abyssal plain, turbidites, 28
- Native copper, Hole 417A, 66, 1206
- Natrolite, 65, 1222
- Natural gamma ray (GR) tool, 705  
 remanent inclination, Hole 417A, 8  
   Hole 417D, 8
- remanent intensity, basalt, Hole 417A, 8  
   Hole 417D, 8  
   Hole 418A, 11
- remanent magnetization (NRM), implication for magnetic anomalies, 1370  
 intensity, basalts, 1393
- Near vein alteration, basalt, 1229  
 zoning, 1229
- New Britain, rare-earth element geochemistry of Ulwan volcano, 1114
- Newfoundland fracture zone, 28  
 Ridge, 28
- Nickel, 1323
- Non-oxidative diagenesis, 1266
- Normative composition, Holes 417D and 418A, basalt, 996  
 Site 417, basalt, 76
- Northern Gondwana Floral Province, 904
- NRM: see Natural Remanent Magnetization
- Oblique seismic experiment, 1591  
 data analysis, 677  
 equipment and techniques, 676  
 Hole 417D, 40, 675, 705  
 travel times, 679

- Ocean-floor volcanology, 974  
 Oceanic basalts: see Basalt  
 Oceanic crust, anisotropy, 676, 686  
     barium, 1574  
     boron, 1574  
     cesium, 1574  
     chemistry, 1571  
     hydrothermal alteration in, 6  
     lithium, 1574  
     metamorphism in, 6  
     mineralogy, 1563  
     nature of cracks in, 676  
       void, 676  
     rare earth elements (REE), 1573  
     rubidium, 1574  
     sea-water alteration in, 6  
     strontium, 1574  
 crustal Layer 2, 5, 93, 353, 675, 679, 987, 1001, 1105  
     lateral velocity variations, 684  
     pores, vugs, fissures, 685  
     seismic velocities, 676  
 Layer 2A, 5, 705, 940  
 Layer 2B, 5  
 Layer 2C, 28  
     Layer 3, 5, 679  
 Oligocene volcanism of Bermuda, 28  
 Olivine, mineral chemistry, 1040  
     phenocrysts, 1069  
     electron probe analysis of, 1223  
 Hole 417A, 62  
 Hole 417D, 70, 941  
 Hole 418A, 373, 375, 377, 379, 947, 975  
 Opal in calcite vein, 1205  
 Opaque mineralogy of altered basalt, 1407  
     minerals, basalt, Holes 417D and 418A, 1431  
       secondary, 1435  
 Ophiolites, 1046  
 Organic carbon, 737  
     matter in Aptian to Cenomanian sediments, 737  
 Orosphaerids, 795  
 Oxidation of iron in altered basalts, 1325  
     zones, Hole 418A, 1211  
 Oxides, 1070  
     oceanic basalt, 1569  
 Oxygen and carbon isotope analysis, carbonate, 1245  
     isotope analysis, clays, 1245  
       composition, basalt, 1149  
       geochemistry of the sea floor, 1159  
       investigations, 1177  
       low-temperature alteration studies, 93, 1153  
       effect on, basalt, 1177  
       values, Site 417, calcite veins, 1183  
 Palagonite, 1223, 1243, 1567  
     formation, 1143  
     rare-earth elements, 1137  
 Palagonitization, chemical balance of, 1281  
     with time, evolution of, 1282  
 Paleolatitude, Site 417A, 904  
 Paleolatitudes, North American plate, Early Cretaceous, 87  
 Paleomagnetic measurements, limestones, 1429  
     record, 1359  
     results, basalt, 1337  
 Paleomagnetics, Hole 418A, basalt, 381  
     basalts, 86, 1351  
 Paleomagnetism, breccia zones, 1379  
     sediments, Hole 417D, 60  
     Site 417, 93  
 Paleosecular field variation, 1384  
 Palygorskite, 736  
 Palynology, Cretaceous, 897  
     paleoenvironment, 905  
 Palynomorphs, Hole 417D, 899  
     Hole 418B, 903  
     systematics, 906  
 Palynostratigraphic zonation, *Classopollis spinosus*  
     Sub-zone, 902  
     *Clavatipollenites* Zone, 899  
     *Complexiopollis* Zone, 900  
     *Elateroplicites* Zone, 902  
     *Psilatricolporites* Sub-zone, 900  
     *Retitricolpites georgensis* Zone, 900  
     *Tricopites minutus* Sub-zone, 900  
 Partition coefficients, rubidium and cesium, 1175  
 Pentlandite, occurrence of in basalt, 1435  
 Permeability, basalts, 1458  
     Hole 417D, downhole geophysical logging, 710  
       igneous rocks, factors controlling, 1473  
 Petrogenesis, Holes 417A and 417D, basalt, 1109  
 Petrogenetic synthesis, Site 417, Site 418, 1557  
 Petrographic types, Holes 417A and 417D, basalt, 1099  
 Petrography, Hole 417D, basalt, 941, 978, 1127  
     interpillow limestones, 755  
     pillow basalt, glassy rims, 1122  
 Hole 418A, basalt, 947, 978, 1025  
     pillow basalt, 1021  
 Petrology, basalt, 92  
     magnetic oxides, 1411  
 Phase chemistry, Holes 417A and 417D, basalt, 1007  
 Phenocryst morphology, 1043  
     redistribution, 1033, 1559  
     zonation patterns, 1055  
 Phenocryst-liquid differentiation, 1021  
 Phenocrysts, alteration of, 1278, 1280, 1299, 1305  
     clinopyroxene, 62, 379, 941, 947, 975, 979, 1070, 1101  
     glass inclusions, 1040  
     modal analyses, basalt, 984  
     morphology, basalt, 1040  
     olivine, 62, 70, 373, 375, 377, 379, 941, 947, 975, 978, 1069  
     plagioclase, 62, 70, 373, 375, 378, 379, 941, 947, 975, 978, 1069, 1101  
       chemical zonation of, 1055  
       compositional zoning, 1107  
       glass inclusions, 957, 965

- major-elements analyses, 1055
- spinel inclusions, 1044
- Phillipsite, 66, 1222
- Physical properties, basalts, Hole 417D, Hole 418A, 1457
  - basement lithology and, 1580
  - rocks, 382
  - Hole 418A, 11
  - Legs 51 to 53, 13
  - sediment, Site 418, 366, 394
  - sediments, Site 417, 51
  - seismic velocity, 1159
  - Site 417, 9, 93
- Phytoplankton blooms, 905
- Pigeonite, 1044
- Pillow basalt, 1535
  - aphyrine zones, 1012
  - compositional variation, 1009
  - glassy rims, 1122
  - Hole 417A, 64
  - petrography, 1021, 1039
  - phenocryst zonation patterns, 1055
- core, 1277
  - alteration of the mesostasis in the, 1281
  - vesicles and veinlets in, 1278
- lava, alteration of, 1274
  - composition of, 1274
  - concentric structures in, 1275
  - glassy zone, 1275
  - magnetic minerals of, 1425
  - pillow core, 1277
  - plagioclase phenocrysts, glassy inclusions in, Hole 417D, 1063
  - pyroxene phenocrysts, glassy inclusions in, Hole 417D, 1063
  - spherulitic zone, 1277
  - variolitic zone, 1275
- Plagioclase, alteration of, 1224
  - mineral chemistry, 1041
  - phenocrysts, 62, 70, 373, 375, 377, 378, 379, 941, 947, 975, 978, 1055, 1044, 1056, 1063, 1069, 1101, 1107
  - chemical zonation of, 1055
  - compositional zoning, 1107
  - glass inclusions, 957, 965
- Plastic limits, sediments, 1453
- Podocyrtis ampla* Zone, 49
  - chalara* Zone, 49, 364
  - mitra* Zone, 49, 364, 791
- Pollen Zone 1, 899, 903
  - II, 900, 904, 905
  - III, 900, 904
- Pollen/dinoflagellate ratios in Mid-Atlantic Ridge sediments, 905
- Polybaric melting experiments, 1557
- Porosity, basement, 1581
  - data errors, 709
  - evidence, cracks, 709
  - of basalts, 1457
- Post-eruptive basalt, flow dynamics, 1025
  - phenocryst-liquid differentiation, 1021
- Potassium-argon age determinations, basalt, 1127, 1149
- Potassium, altered basalts, 1320
  - basal enrichment in, 1519
  - concentrations, basaltic glasses, 1124
  - geochemical mass balance calculations, 1210
- Potassium/rubidium and potassium/cesium ratios, 1175
- Proto-celadonite, 1188, 1257, 1300, 1307
- Psilatricolporites* Sub-zone, 900
- Pyrite, 1070, 1075
  - basalt alteration, 1149
  - nodules, 363, 374, 394, 898
  - occurrence of in basalt, 1206, 1435
  - sulfur isotopes of, 1145
- Pyrolysis assay, 737
- Pyroxene components, acmite, 1044
  - Ca-Tschermak's component, 1044
  - diopside, 1044
  - enstatite, 1044
  - ferrosilite, 1044
  - Hedenbergite, 1044
  - jadeite, 1044
  - phenocrysts, 1063
- Pyrrhotite, 1070, 1073
  - occurrence of in basalt, 1435
- Quartz, granophytic intergrowths of basalt, 1041
  - in calcite vein, 1205, 1221
- Radiogenic 40 argon concentrations, basaltic glass, 1123
- Radiolarians, Cretaceous, 791
  - Hole 417A, 49
  - Hole 417D, 49
  - Hole 418B, 365
  - Holes 418 and 418A, 364
  - middle Eocene, 791, 794
  - orosphaerid, 795
  - zonation, *Podocyrtis ampla* Zone, 49
    - chalara* Zone, 49, 364
    - mitra* Zone, 49, 364, 791
  - Thrysocyrtis bromia* Zone, 365
- Rare-earth element abundances, Holes 417A and 417D, 1099
  - analyses, tholeiites, 1113
  - geochemistry of, Ulwan volcano, New Britain, 1114
  - patterns, Holes 417A and 417D, basalt, 1107
    - mid-ocean ridge basalts (MORB), 1108
- elements, analyses, basalt, 1114
  - basalt, 967, 1137, 1285, 1573
  - basaltic glasses, 1137
  - effect of alteration, Holes 417A and 417D, 1105
  - palagonite, 1137
  - Site 417, basalt, 991, 1113
- Rare-gas elemental abundance pattern, Hole 417D, 1122
  - studies, analytical methods, Hole 417D, 1122
- Rb/Sr dating techniques, smectite, 1171
- Recrystallization, interpillow limestones, 758
  - index, interpillow limestones, 758
- Reflector horizon A, 28

- Remanent magnetism, stable directions of, 1372  
*Retitricolpites georgensis* Zone, 900  
Rhodochrosite, chemical analyses of, 771, 772  
creeping transformation of, 772  
diagenesis, Hole 417A, 775  
Hole 417A, 771  
X-ray diffraction studies, 772  
Rift valley, 1505  
Rock compositions in, Layer 2, physical properties of, 1464  
magnetism, experimental procedures, 1379  
Rubidium, oceanic crust, 1574  
partition coefficients, 1175  
Rubidium-strontium isochron techniques, 1169  
Saponite, 1188  
basalt, 1244  
oceanic basalt, 1566  
weathered basalt, 1204  
Saturation magnetization, 1396  
remanent magnetization, 1396  
Sea-water, Sr isotope, 1172  
alteration in oceanic crust, 6  
chemistry, model for, 1175  
Seawater, thermally driven convection, 1169  
Sea-water-rock interaction, basalt, 1201  
Sedimentary structures, Hole 417D, 753  
Sedimentation, Hole 417A, 867  
Hole 417B, 871  
Hole 418A, 871  
Hole 418B, 871  
rate, early Eocene/middle Miocene, Hole 418A, 871  
late Eocene/late Oligocene, Hole 418B, 871  
Eocene/middle Miocene, Hole 418B, 871  
Miocene/late Pliocene, Hole 418, 871  
Oligocene/middle Miocene, Hole 418B, 871  
middle Eocene/middle Miocene, Hole 417A, 871  
Miocene/late Miocene, Hole 417B, 871  
rates, Site 417, 92  
Sedimentologic analyses, Legs 51 to 53, 14  
Sediments, carbonate compensation depth, Leg 51, 731  
downhole geophysical logging results, Hole 417D, 708  
gasometric determinations of carbonate contents, 721  
geochemistry of, Site 417, 60  
liquid limit, 1453  
manganese in, 1519  
paleomagnetism, 60  
Site 417, 92  
physical properties, 51  
Site 418, 366, 394  
sulfur isotopes of, 1145  
temperature gradient, Hole 417B, 708  
X-ray analysis of, bulk mineralogy, 721  
clay mineralogy, 721  
Seismic profiles, drilling results correlated with, Site 418, 393  
reflection profile records, Sites 417 and 418, Site survey, 629  
profiles, drilling results correlated with, Site 417, 89  
profiling, near-bottom hydrophones, 671  
sub-basement reflector, 672  
in the deep ocean, 681  
structure, crack distribution, effect on, 1479  
velocities, oceanic crustal Layer 2, 676  
Layer 3, 676, 683  
velocity, physical properties, 1159  
Shatsky Rise, 28  
Shipboard measurement procedures, 13  
Siliceous sediments, mobilization of manganese in, 748  
Site data, Hole 417A, 24  
Hole 417B, 24  
Hole 417D, 25  
Hole 418A, 351  
Hole 418B, 353  
survey, bathymetric chart, Sites 417 and 418, 629  
geomagnetic anomaly profiles, Sites 417 and 418, 629  
seismic reflection profile records, Sites 417 and 418, 629  
sonobuoy, 30  
Site 105, calcite, strontium isotope ratios, age determination, 1174  
Site 137, manganese nodules, 771  
rhodochrosite, 771  
Site 384, J-anomaly ridge, 28  
Site 417, alteration in basalts, 1275  
background and objectives, 25  
basalt, alteration of, 1185  
calcite values, 1183  
chemical analyses, 76  
carbonate correction, 76  
composition, 93  
variation of, 76  
normative composition, 76  
paleomagnetism of, 86  
rare-earth elements, 1113  
basement rocks, 92  
physical properties of, 77  
calcite veins, oxygen values, 1183  
Cretaceous oceanic crust, 1379  
description of basalt, 1274  
geologic summaries, 7  
ichthyoliths, 50  
interstitial water chemistry, 62  
magnetic minerals, low-temperature alteration, 87  
oxides, petrology of, 1411  
mineral carbon, 737  
nannofossils, 50, 823  
operations, 30  
paleomagnetism, 93  
physical properties, 9, 51, 93  
sediment lithostratigraphy, 40  
sedimentation rates, 92  
sediments, 92  
geochemistry of, 60  
seismic reflection profiles, drilling results correlated with, 89

- Site 418, basalt, low-temperature alteration of, 1219  
     mineralogy, basalts, 1266  
     petrogenetic synthesis, 1557  
 sonobuoy experiment, 89  
     refraction data, 28  
     summary and conclusions, 91  
 Site 418, age of basement, 360  
     background and objectives, 353  
     basalt, chemical analyses, carbonate corrections, 390  
         variation, 391, 395  
         low-temperature alteration of, Site 417, 1219  
             magnetic stratigraphy, 394  
     dolomite-rhodochrosite lozenges, 360  
     geochemistry, 369  
     geologic summaries, 10  
     ichthyoliths, 866  
     igneous petrology, 395  
     mineralogy, basalts, Site 417, 1266  
     nannofossils, 827  
     operations, 353  
     petrogenetic synthesis, Site 417, 1557  
     physical properties, 366, 394  
     pyrite nodules, 394  
     sediment lithostratigraphy, 360  
     sediments, 394  
     seismic profiles, drilling results correlated with, 393  
         southern end of the Bermuda Rise, 351  
         summary and conclusions, 394  
 Skjaldbreidur type volcanoes, 974  
 Slickensides, 1491  
 Smectites, basalt alteration, 1203, 1219  
     chemical composition of, 1267  
     composition of, brown, 1269  
     electron probe analysis, 1223  
     Hole 418A, 1169  
     near-vein zoning, 1229  
     recorder of paleo-alkalinity, 1175  
     temperatures of formation of, 1266  
 Sohm abyssal plain, turbidites, 28  
 Sonobuoy, Site survey, 30  
     experiment, Site 417, 89  
     refraction data, Site 417, 28  
 South American Middle Cretaceous flora, 899  
     American/African floral province, 904  
 Species epithets, nannofossils, 823  
     list, ichthyoliths, 874  
 Sphalerite, 47, 360  
 Spherolitic zone, pillow lava, 1277  
 Spinel, mineral chemistry, 1040  
     inclusions, 1044  
 Sr isotope ratio age determination, 1172  
     isotope, 1172  
 Stable-isotope ratios, interpillow limestones, 762  
     basalt, 1153  
 Stratigraphic hiatus, middle Eocene/Late Cretaceous, 871  
 Strontium, altered basalts, 1324  
     isotope ratios, age determination, Site 105, calcite, 1174  
         oceanic crust, 1574  
 Structural features, 74  
 Structure grumeleuse, interpillow limestones, 758  
 Sub-basement reflector, seismic reflection profiling, 672  
 Subcalcic augites, 1044  
 Subsidence history, southern end of the Bermuda Rise, 897  
 Sulfate-reducing bacteria, 1147  
 Sulfide, 1069, 1147, 1434, 1569  
     Hole 417D, basalt, 74  
     globules, 1070, 1147  
         sulfur isotopes of, 1145  
     petrography, 1070  
     phase chemistry, 1073  
     secondary, 1223  
     sulfur isotopes of, 1145  
     veins, 1147  
 Sulfur, 1069  
     isotope composition, basalt, 1149  
     isotopes, mean value, Mid-Atlantic Ridge, 1145  
 Superparamagnetic (SPM) threshold, 1384  
 Systematics, foraminifers, 797  
     ichthyoliths, 871  
     palynomorphs, 906  
 Tectonic breccias, 1539  
     rotation, 1375  
 Temperature, alteration processes, 1132  
     data, Hole 417D, 711  
     gradient, Hole 417D, 708  
     of formation, smectites, 1266  
     of oxidation, magnetic oxide, 1354  
     Upper Cretaceous bottom-water, 763, 765  
 Tertiary bathymetry, 1507  
 Thermal conductivity, basalts, 1458  
     gradient, basalt, 1132  
 Thermally driven convection, 1169  
     lowered fission track ages, 1132  
 Thermomagnetic analysis, magnetic minerals, changes of during, 1399  
     measurements, 1411  
 Thin-section descriptions, chert, 48  
 Tholeiites, rare-earth element analyses, 1113  
 Tholeiitic basalts, 1099  
 Thorium/uranium ratio, 1106  
*Thrysocyrtis bromia* Zone, 365  
 Titanium, altered basalts, 1325  
 Titanomagnetite, 1044, 1432  
 Trace-element analyses, Holes 417A and 417D, basalt, 979, 1104  
     Hole 417D, basalt, 990  
     Hole 418, basalt, 993, 1033  
     low-temperature alteration, basalt, 979  
         variation diagrams, Hole 418A, basalt, 954  
 Transition metal abundances, Holes 417A and 417D, basalt, 1104

- metals, effect of alteration on, 1106  
 Triadolerites, 999  
*Tricopites minutus* Sub-zone, 900  
 Trondhjemite, 1046  
 Turbidites, Hatteras abyssal plain, 28  
     Nares abyssal plain, 28  
     Sohm abyssal plain, 28  
 Two-Bit ridge, 28  
 Ulwan volcano, New Britain, 1114  
 Upper Cretaceous, bottom-water, temperature, 763, 765  
 Uranium concentration, East Pacific Rise, 1129  
     and distribution, 1129  
     concentrations, Mid-Atlantic Ridge, 1129  
 Vanadium, altered basalts, 1324  
 Variolitic zone, pillow lava, 1275  
 Velocity-density relationships, basalt, 1467  
 Velocity-porosity relationships, basalt, 1467  
 Vema Gap, 6, 28, 30  
 Vesicle filling types, 1204, 1300  
     compositional zonation, Hole 418A, 1204  
     segregation, 1279  
 Viscosity coefficient, 1379  
 Viscous remanent magnetization (VRM), 1370  
     Volcanic breccia, Hole 417A, 1201  
         native copper, Hole 417A, 1206  
         glass, alteration of, 1223  
     Vugs, fissures, oceanic crustal Layer 2, pores, 685  
 Water-rock ratios, 1266  
 Weathered basalt, saponites in, 1204  
 Weathering, chemical changes, 1207  
     sequence, 418A, 1211  
         in Hole 417A, 1211  
 X-ray analysis of, bulk mineralogy, sediments, 721  
     clay mineralogy, sediments, 721  
     diffraction measurements, sediments, Legs 51 to 53, 14  
     patterns, Holes 417A and 417D, 731  
     studies, manganese oxide micronodules, 772  
         rhodochrosite, 772  
     fluorescence measurements, igneous rocks, Legs 51 to 53, 14  
 Yttrium in altered basalts, 1324  
 Zeolites, 361, 362, 1309  
     formation of, 1232  
     oceanic basalt, 1569  
 Zirconium, altered basalts, 1324