INDEX TO VOLUME 176

This index covers both the *Initial Reports* and *Scientific Results* portions of Volume 176 of the *Proceedings of the Ocean Drilling Program*. References to page numbers in the *Initial Reports* are preceded by "A" followed by the chapter number with a colon (A1:) and to those in the *Scientific Results* (this volume) by "B" followed by the chapter number with a colon (B1:).

The index was prepared by Earth Systems, under subcontract to the Ocean Drilling Program. The index contains two hierarchies of entries: (1) a main entry, defined as a keyword or concept followed by a reference to the page on which that word or concept appears, and (2) a subentry, defined as an elaboration on the main entry followed by a page reference.

The index covers volume text, figures, and tables but not core-description forms ("barrel sheets"), core photographs, smear slide data, or thin section descriptions. Also excluded from the index are bibliographic references, names of individuals, and routine front matter.

The Subject Index follows a standard format. Geographical, geologic, and other terms are referenced only if they are subjects of discussion. A site chapter in the *Initial Reports* is considered the principal reference for that site and is indicated on the first line of the site's listing in the index. Such a reference to Site 735, for example, is given as "Site 735, A3:1–255."

SUBJECT INDEX

A

accretion, crust, A1:2-5; B(narrative):9-12 actinolite alteration, A3:40 alteration vs. depth, A3:141 geochemistry, B4:11; B9:9-10 greenschist facies, B9:18-19 magmatic structures, A3:60 photomicrograph, B9:66 sulfides, B7:6 See also ferro-actinolite adcumulates, lower oceanic crust, B(synthesis):22-23, 38 age, trondhjemite, A1:7 albite alteration, B1:5 gabbro, B10:9-11 magnesium number, A3:49 veins, B9:8, 20, 29 See also anorthite/(anorthite+albite) ratio alteration compressional wave velocity, B5:7 downhole distribution, A3:33–34 geochemistry, A3:51 lithologic units, B6:3–14 minerals, A3:266 plagioclase, A1:14 shear zones, A1:5 sulfides, B7:6 vs. depth, A1:57 See also hydrothermal alteration alteration halos, photograph, A1:61; A3:146-147, 161 alteration rims, photograph, A3:147 aluminum amphibole, B4:11, 20-21

biotite, B9:11 clinopyroxene, B4:10; B10:12 gabbroic rocks, B8:3-4 high-temperature microscopic veins, B4:12–13 hornblende, B10:14 orthopyroxene, B10:14 phlogopite, B9:11 photomicrograph, B4:26, 30, 32 veins, B9:16, 33-36 vs. depth, B1:13 vs. magnesium number, B4:11, 37 vs. sodium + potassium, B4:11, 37, 41 vs. titanium, B4:37 See also strontium/aluminum ratio aluminum oxide amphibole, B9:10 apatite, B9:13 chlorite, B9:11 clinopyroxene, B4:10 diopside, B9:10 epidote, B9:12 gabbroic rocks, B6:16-17; B8:4-14 mica, B9:11 natrolite, B9:13 orthopyroxene, B4:10 titanite, B9:14 vs. depth, B6:35 vs. iron oxide, B9:32 vs. magnesium number, B4:34; B10:41 vs. scandium, B8:23 vs. titanium oxide, B4:34-35 See also calcium oxide/aluminum oxide ratio; iron oxide/aluminum oxide ratio

VOLUME 176 SUBJECT INDEX aluminum oxide/magnesium oxide ratio, vs. strontium • bathymetry

aluminum oxide/magnesium oxide ratio, vs. strontium, A3:51, 173 amphibole alteration, B6:3-4 alteration vs. depth, A3:139 chemical composition, B4:10-11, 41-42; B9:43-46 composition, B4:36-37 formation temperature, B4:11–12 gabbro, B8:3-14 geochemistry, B8:52-53 high-temperature microscopic veins, B4:25-26 lithologic units, B6:3-14 modal composition, A3:18 olivine gabbro, B4:6-7 olivine gabbro analysis, B4:53-54 photograph, A3:148 photomicrograph, A3:128-129; B4:31-32; B9:64-66 sulfides, B7:5 textures, B4:8-9 thin sections, A3:24-25 veins, A3:42-43; B4:7-8; B9:3-5, 9-10, 17-19, 30 See also actinolite; edenite; hornblende; magnesiohornblende; veins amphibole, brown alteration vs. depth, A3:140 high-temperature minerals, A3:35 amphibole, dark green, high-temperature minerals, A3:34-35 amphibole, green alteration vs. depth, A3:140 moderate-temperature minerals, A3:36 amphibole, magnesium-iron, high-temperature minerals, A3:35 amphibole, secondary photograph, A3:161 vs. depth, A3:135 amphibole formula, calculation, B4:20-21 amphibole gneiss lithologic units, B6:3 magnetic susceptibility, B11:16 photograph, A3:160 amphibolite, gneissic, structure, A1:7-8 amphibolite, mylonite, A1:14-16 amphibolite facies metamorphism, A3:45-47 shear zones, A1:8-10 veins, B9:17-19 analcime, alteration, B1:5 anhedral crystals lithologic units, A3:19-20 scan, A3:125 anisotropy magnetic susceptibility, A3:75, 222, 288-299 seismic reflection, B5:6 velocity in olivine gabbro, B2:4 vs. depth, B5:32 anorthite composition vs. depth, B(synthesis):52, 61; B8:12–13, 28 - 30crystal mush, B10:23-25 gabbroic rocks, B6:21; B10:9-11, 55

magnesium number, A3:49 olivine gabbro host vs. microgabbro, B8:22 percent in magmatic and vein plagioclase, B4:27 veins, B9:8, 29 vs. depth, B4:22; B6:33; B8:12-13, 28-30; B10:53 vs. forsterite, B10:54 vs. iron oxide, B10:35; B11:68 vs. magnesium number, B8:18 vs. magnesium number in clinopyroxene, B10:42 vs. magnesium number in hornblende, B10:42 vs. magnesium number in olivine, B10:42 vs. magnesium number in orthopyroxene, B10:42 anorthite/(anorthite+albite) ratio vs. strontium/aluminum ratio, A3:51, 174 vs. titanium oxide, A3:49, 167 anthophyllite, high-temperature minerals, A3:35 apatite chemical composition, B9:56 modal composition, A3:18; B6:10 olivine gabbro, B4:6–7 veins, B9:13 aragonite, low-temperature minerals, A3:38 Atlantis II Fracture Zone bathymetry, B5:33 geology, A1:1–70; B(synthesis):47; B(narrative):10–12 lower oceanic crust, B5:1-71 attenuation data summary, B5:42-69 oceanic crust, B5:14-15 seismic waves, B5:8-9 statistical analysis, B5:70 velocity, B2:3-4, 15-17 vs. depth, B5:31 waveforms, B5:40 augite exsolution, A3:20 gabbroic rocks, B10:11-12 grain size, A3:16–17 grain size vs. depth, A3:114 igneous rocks, A1:11 lithologic units, A3:16-17; B6:9 photomicrograph, A3:116 reaction textures, A3:21 relative abundance, A3:103-104 scan, A3:125 augite/plagioclase ratio, vs. calcium oxide/aluminum oxide ratio, A3:21, 119 azimuth, vs. depth, B5:32

В

barium gabbroic rocks, B6:16 veins, B9:16 basalt chemical composition, B(synthesis):68 melts, B10:26–27 *See also* ferrobasalt basalt liquidus temperature, vs. magnesium number, B8:19 bathymetry Atlantis Bank, A1:6, 45–46; B5:33

VOLUME 176 SUBJECT INDEX bathymetry (continued) • chromite

map, A4:1-13 biotite, veins, B9:11 blebs olivine gabbro, B4:6-7 sulfides, A3:27 borehole azimuth, vs. depth, A3:232 borehole deviation, vs. depth, A3:232 boreholes logging, A3:87 recovery vs. depth, A3:229 breccia Formation Microscanner imaging, A3:238-239 magnetic susceptibility, B11:13, 48, 56 breccia, magmatic core photograph, A3:195 magmatic structures, A3:59 magnetic susceptibility, B11:16 vs. depth, A3:193 breccia, tectonic, core photograph, A3:195 breccia, vein, magnetic susceptibility, B11:15-16 brittle deformation gabbro, A1:15, 18-22; B9:19 magmatic structures, A3:59-63 magnetic susceptibility, B11:16 microstructures, A3:64 brittle microstructures, photomicrograph, A3:194 buoyancy, differentiation, B(synthesis):23-24

C

calc-silicates, moderate-temperature minerals, A3:37 calcite alteration vs. depth, A3:138 low-temperature minerals, A3:38 magmatic structures, A3:60 photomicrograph, B9:66 See also veins calcite, vein-forming, X-ray diffraction data, A3:163 calcium gabbroic rocks, B8:3-4 high-temperature microscopic veins, B4:12-13 hornblende, B10:14 photomicrograph, B4:26, 30, 32 veins, B9:16, 33 calcium number correlation with clinopyroxene, B8:24 gabbroic rocks, B8:7, 11 olivine gabbro, A3:21; B3:3 vs. clinopyroxene number, B8:24 vs. depth, B8:12-13, 27, 29-30; B10:45-52 vs. gabbro magnetic susceptibility, B11:27-28 vs. magnesium number, A3:21, 120; B3:8; B8:20 vs. sodium number, B3:8 vs. titanium oxide, A3:21, 121 calcium oxide clay minerals, B9:14 diopside, B9:10 epidote, B9:12 gabbroic rocks, B6:18; B8:4-14 natrolite, B9:13 orthopyroxene, B4:10

thomsonite, B9:13 veins, B9:15 vs. depth, B6:42 vs. magnesium number, B10:41 vs. scandium, B8:23 vs. titanium oxide, B4:35 calcium oxide/aluminum oxide ratio gabbroic rocks, B8:7, 11, 14 vs. augite/plagioclase ratio, A3:21, 119 vs. magnesium number, B8:20 vs. scandium, B8:23 calcium oxide/sodium oxide ratio, thomsonite, B9:13 caliper logs electrofacies, A3:247-251 shear wave velocity, B5:41 vs. depth, A3:232, 234, 236; B5:26 carbon dioxide gabbroic rocks, B6:18 veins, B9:15 volatiles, A3:281 vs. depth, B6:47 carbon isotopes, carbonates, B1:6 carbonates chemical composition, B9:59 genesis, B1:6 low-temperature minerals, A3:38 photomicrograph, B9:65 veins, A3:43; B9:6-7, 14 See also aragonite; calcite; veins cataclasis gabbro, A1:18-22; B9:19 intensity vs. depth, A3:196 cataclasite core photograph, A3:195 photomicrograph, A1:65; A3:194 cataclastic deformation, magmatic structures, A3:59-63 cataclastic faults, vs. depth, A3:199 chadacrysts mineral inclusions, A3:20; B4:8 photomicrograph, B4:29-30 chalcopyrite gabbroic rocks, B7:5-9 moderate-temperature minerals, A3:37 photomicrograph, A3:128; B7:15-16 chemical discontinuities, intrusions, B10:18-25, 48-52 chemical stratigraphy, gabbro, A3:51-53; B(synthesis):14-17, 32-45; B10:16-21, 23-25 chlorite alteration, B1:4-5; B6:4 chemical composition, B1:10; B9:49-50 greenschist facies, B9:18-19 magmatic structures, A3:60 moderate-temperature minerals, A3:36 sulfides, B7:6 veins, A3:45; B9:11 See also veins chlorite, secondary, vs. depth, A3:135 chlorite/smectite composition, chemical composition, B1:10 chrome-spinel, photomicrograph, A3:127, 129-130 chromite. See ferrichromite

VOLUME 176 SUBJECT INDEX chromium • crust, lower oceanic

chromium clinopyroxene, B10:12 gabbroic rocks, B6:19; B8:3-14 hornblende, B10:14 vs. clinopyroxene number, B8:25 vs. depth, B6:51; B8:12-13, 27, 29-30 vs. magnesium number, B8:25 vs. magnesium oxide, A3:49, 169 chromium diopside, lithologic units, A3:13-14 chromium oxide diopside, B9:10 vs. magnesium number, B10:39, 41 clasts, core photograph, A3:195 clay minerals chemical composition, B9:58 veins, B9:14 See also chlorite/smectite composition; montmorillonite, magnesium; smectite cleavage planes, gabbro magnetic susceptibility, B11:22-23 clinopyroxene alteration, A3:40; B4:7-8 alteration vs. depth, A3:136 chemical composition, B4:9-10; B6:21, 71-73 classification, B4:33 composition, B4:34 correlation with calcium number and magnesium number, B8:24 crystal mush, B10:23-25 formation temperature, B4:11–12 gabbro, B8:3-14; B10:11-12 geochemistry, B8:43-48; B10:57 grain size, A3:113 intrusions, B10:18-19 lithologic units, B6:3, 5-14 magnetic susceptibility, B11:64 mineral chemistry, B10:15 modal composition, A3:18; B3:4-5 modal percent vs. modal percent olivine, A3:115 modal percent vs. modal percent plagioclase, A3:115 neoblasts, B9:17-19 olivine gabbro, B4:6-7 olivine gabbro analysis, B4:49-50 photograph, A1:61; A3:148 photomicrograph, A3:127; B4:23-24, 28-32, 39-40 sulfides, B7:6 textures, A3:63; B4:8-9, 12 veins, A3:41-42 vs. depth, B6:32; B10:38, 45-51 vs. major elements, B10:39 zoning, B10:12 clinopyroxene, altered, alteration vs. depth, A3:140 clinopyroxene, secondary, alteration vs. depth, A3:140 clinopyroxene magnesium number vs. forsterite, B10:43 vs. hornblende magnesium number, B10:44 vs. orthopyroxene magnesium number, B10:43 clinopyroxene number vs. calcium number, B8:24 vs. chromium, B8:25 vs. magnesium number, B8:24

vs. nickel, B8:25 vs. niobium, B8:26 vs. scandium, B8:23 vs. strontium, B8:26 vs. titanium oxide, B8:25 vs. vanadium, B8:25 vs. yttrium, B8:26 vs. zirconium, B8:26 clinopyroxenite, abundance and composition, A3:258-259 cobalt gabbroic rocks, B8:4–14 sulfides, B7:6-9 cobalt, in pentlandite, vs. depth, B7:20 composite intervals, olivine gabbro, B(synthesis):12-14 compressional wave velocity data summary, B5:42–69 downhole measurements, B5:9-10 igneous rocks, A1:25; A3:80-81, 307-312; B2:2-4, 7-11, 19 oceanic crust, B5:14 synthetic seismograms, B5:34-35 vs. density, B2:13; B5:29 vs. depth, A3:231; B5:25, 27 vs. porosity, B2:12; B5:28 vs. shear wave velocity, B2:14 well-logs, B5:36-37 confining pressure, attenuation, B5:8-9 cooling, crust, B9:21-22 copper gabbro, A3:49-50 gabbroic rocks, B6:19; B8:4-14 sulfides, B7:7-9 vs. depth, B(synthesis):64; B6:53; B7:21; B8:12–13, 27, 29 - 30vs. nickel, B7:22 core complexes, structure, B(narrative):10-12 core-log integration average data, B5:71 downhole measurements, B5:12-13 cores, orientation, B5:39 correlation, gabbro, Site 735; B(synthesis):43-45 covariations, silicates, B10:15 cracking front model, magmatic fluids, B4:15 cracks. See microcracks crescumulate texture igneous layering, A3:29-30 olivine gabbro, A1:12 cross sections, tectonics, A1:49-50 crust compressional wave velocity, B5:7 cooling, B9:21–22 structure, B(narrative):9-11 crust, lower oceanic composition, B3:1-13; B6:1-82 contruction, B(synthesis):18-23 hydrothermal alteration, B1:1-24 magma chambers, B(synthesis):4-6 silicates, B10:1-60 structure, A1:2-5 velocity structure, B5:1-71

VOLUME 176 SUBJECT INDEX crust–mantle transition, lower oceanic crust • drilling

crust-mantle transition, lower oceanic crust, B(synthesis):22–23 cryptic variation, magnetic susceptibility, B11:10, 24-25 crystal mush, intrusions, B10:23-25 crystal zoning, mineral texture, A3:20 crystal-plastic deformation intensity vs. depth, A3:185-186 magma chambers, B(synthesis):4-6 shear zones, A1:5, 15, 18-22; A3:55-58; B(synthesis):10 vs. magnetic susceptibility, B11:60, 63 See also crystal-plastic structures crystal-plastic foliation dip vs. depth, A3:188 intensity vs. depth, A3:184 crystal-plastic microstructures, photomicrograph, A3:190-191 crystal-plastic structures correlation with amphibole veins, A3:211-212; B9:21-22 correlation with oxides, A3:210 differentiation, B10:19-22 magmatic structures, A3:56-58, 65-69; B6:5-7, 11-12, 23 photograph, A3:159 photomicrograph, A3:205-207 crystallization lower oceanic crust, B(synthesis):18-22, 25-26 magmas, B10:24-25 pressure-temperature conditions, B8:5-14 temperature, B4:11–12 crystallization wall, nickel, B12:5 crystals, zoned, plagioclase veins, B9:4 cummingtonite, high-temperature minerals, A3:35 cumulates crystallization, B8:5-14 geochemistry, B3:3-5; B6:23 lower oceanic crust, B(synthesis):18-22; B10:27 cupolas, lower oceanic crust, B(synthesis):20-22

D

debris flows, structure, A1:6-8 deformation alteration, A3:38; B6:4-7 data summary, B5:42-69 fluids, B4:13-14 intergrowths, B4:13-14 magnetic susceptibility, B11:12, 29 oxide, A3:22-23, 124 relationship to oxide gabbros, B11:18-20 scan, A3:123-125 shear zones, A1:8-10, 18-22; B10:22 See also brittle deformation; cataclastic deformation; crystal-plastic deformation; crystal-plastic structures; plastic deformation; semi-brittle deformation deformation, low-temperature, magmatic structures, A3:59-61 deformation fabric, lithologic units, A3:19 deformation grades, vs. magnetic susceptibility, B11:63 deformation intensity

vs. depth, A3:126 vs. magnetic susceptibility, B11:60 demagnetization gabbro, A3:71-77 vector end-point diagrams, A3:220-221 density downhole measurements, B5:9-10 igneous rocks, A1:24; A3:79-80; B2:2-3, 7-11 vs. compressional wave velocity, B2:13; B5:29 density, bulk vs. depth, A1:69; A3:228, 301 vs. GRAPE density, A3:223 vs. shear wave velocity, B5:29 density, GRAPE igneous rocks, A3:77 vs. bulk density, A3:223 vs. depth, A3:227, 301 density logs electrofacies, A3:247-251 vs. depth, A3:233-234; B5:26 detachment faults fluid circulation, B9:21-22 structure, A1:7; B(narrative):9-12 diabase composition, B(synthesis):46 tectonics, A1:6-8 differentiation gabbro, B10:16-21, 24-27 intrusions, B(synthesis):11 magnetic susceptibility, B11:9-11, 17 shear zones, A1:3-5 differentiation, late-stage, lower oceanic crust, B(synthesis):23-24 dikelets, petrology, A3:32-33 dikes, basalt, Site 735; B(synthesis):44; B6:3 dikes, sheeted, oceanic crust, B5:13 diopside alteration vs. depth, A3:138 chemical composition, B9:47 high-temperature minerals, A3:34 mineral chemistry, B10:36-37 photomicrograph, B9:64-65 veins, A3:42-43; B9:6, 10, 17-19, 31 See also chromium diopside; veins diorite petrology, A1:13-14; B6:11 veins, B8:9-10 See also gabbrodiorite; leucodiorite; oxide diorite; veins dip faults, A3:60-61, 198 foliation, A3:180, 244; B5:30 igneous contacts, A3:55-58 veins, A3:244 vs. depth, A3:182-183 downhole measurements density, B5:9-12 shore-based interprestion, A3:92-96 Site 735, A1:25-26; A3:81-96, 314 drilling photomosaic of hard rock base, B(narrative):20

VOLUME 176 SUBJECT INDEX drilling (continued) • Formation Microscanner imaging

Site 735, B(narrative):6-9

E

East Pacific Rise, lower oceanic crust, B(synthesis):23 edenite geochemistry, B4:11; B9:9-10 veins, B9:30 electrofacies fractures, A3:246 resistivity, A3:247-251 enstatite, mineral chemistry, B10:36-37 epidote alteration, B6:3-5 alteration vs. depth, A3:138 chemical composition, B9:52 greenschist facies, B9:18-19 magmatic structures, A3:60 moderate-temperature minerals, A3:37 veins, A3:45; B9:12 See also veins eruptions lower oceanic crust, B(synthesis):18-22 melts, B10:26-27 euhedral crystals, lithologic units, A3:19-20 exsolution gabbro magnetic susceptibility, B11:23 photomicrograph, A3:116; B11:66-67 exsolution textures lithologic units, A3:20-21 photomicrograph, A3:116

F

fabric correlation between magmatic and crystal-plastic fabrics, A3:181, 208 correlation with oxides, A3:210 gabbro, A1:18-22 intensity, A3:179 intensity vs. depth, A3:180-181 magmatic structures, A3:56-58, 179; B10:22 microscopic vs. macroscopic observations, A3:64-65 photomicrograph, A3:205-207 See also deformation fabric fault zones, oceanic crust, B5:13 faulting, asymmetric, structure, B(narrative):9-12 faults dip, A3:60-61, 198 dip vs. depth, A3:196 Formation Microscanner imaging, A1:25-26; A3:240 intensity vs. depth, A3:196, 211, 235 magmatic structures, A3:59-61 magnetic susceptibility, B11:17, 69 shear zones, A1:4-5 spreadsheets, A1:39 stereographs, A3:197 See also cataclastic faults; detachment faults; microfaults; reverse faults; transform faults feeder pipes, lower oceanic crust, B(synthesis):20-22 feldspar

electron microprobe data, B1:23-24; B9:39-42 gabbro, B10:32 mineral texture, A3:19 sulfides, B7:6 veins, B9:8-9 See also albite; anorthite; anorthite/(anorthite+albite) ratio; augite/plagioclase ratio; plagioclase; potassium feldspar; quartz-microcline; quartzplagioclase feldspar, sodic, moderate-temperature minerals, A3:36 felsic rocks chemical composition, A1:70 petrology, A1:13-14 See also veins ferrichromite, photomicrograph, A3:130 ferro-actinolite, photomicrograph, B9:66 ferrobasalt lower oceanic crust, B(synthesis):18–22 plutons, B(synthesis):53 ferrobasalt magma, lower oceanic crust, B(synthesis):18–22 ferrogabbro chemical composition, B8:13-14; B12:3-5 differentiation, B10:16-21 titanophile elements, B12:13 ferromagnesians mineral chemistry, B10:15 vs. plagioclase, B10:15 ferrosilite, mineral chemistry, B10:36-37 fissures, lower oceanic crust, B(synthesis):20-22 fluid circulation hydrothermal reactions, B9:21-22 shear zones, A1:16 fluid circulation, high-temperature, Oceanic Layer 3 gabbros, B4:1-56 fluid flow, microcracks, B10:17 fluid inclusions, magma chambers, B4:14 fluids deformation, B4:13–14 high-temperature microscopic veins, B4:12-13 origin, B4:13–14 foliation dip, A3:244; B5:30 dip vs. depth, A3:180, 184 intensity vs. depth, A3:180 magmatic structures, A3:54-58, 65-69; B10:22 metamorphism, A3:45-47 olivine gabbro, A1:12, 18-22; B6:4-7 photograph, A3:160, 209; B5:30 photomicrograph, A3:191 structure, A1:6-8 See also crystal-plastic foliation; gabbro foliation, magmatic igneous layering, A3:29-30 photomicrograph, A1:65; A3:205 foliation, mylonitic, dip vs. depth, A3:188 foliation intensity, crystal-plastic, vs. depth, A1:64 foliation intensity, magmatic, vs. depth, A1:64 foliation, retrograde, dip vs. depth, A3:188 Formation Microscanner imaging faults, A3:240

VOLUME 176 SUBJECT INDEX Formation Microscanner imaging (continued) • grain size

structures, A3:240-243 vs. depth, B5:32 Formation Microscanner logs Site 735, A3:92, 237–239 structure, A1:25-26 vs. depth, A3:234, 236 forsterite composition vs. depth, B(synthesis):52, 61; B8:12-13, 28 - 30crystal mush, B10:23-25 gabbro, B10:14, 55 olivine gabbro host vs. microgabbro, B8:22 vs. anorthite, B10:54 vs. clinopyroxene magnesium number, B10:43 vs. depth, B10:53 vs. magnetic susceptibility, B11:24-25, 69 vs. nickel oxide, B10:40 vs. orthopyroxene magnesium number, B10:43 forsterite magnesium number, vs. hornblende magnesium number, B10:44 fractional crystallization gabbro, B3:4-5; B10:8-12 gabbroic rocks, B8:5-14 fracture zones lower oceanic crust, B5:1-71 shear zones, A1:3-5 structure, B(narrative):9-11 fractures electrofacies, A3:246 intergrowths, B4:13-14 magmatic structures, A3:61; B10:22 olivine, A3:39 orientation, A3:61 well-logs, A3:245 See also microfractures

G

gabbro abundance and composition, A3:256-259 alteration, A1:14-16; B1:3-6 chemical composition, A1:70; A3:268-280; B(synthesis):46, 68 chemical stratigraphy, B(synthesis):14-17, 33-45; B10:16-21 clinopyroxene, B10:11-12 correlation, Site 735; B(synthesis):43-45 dredge hauls, B(narrative):18 fluid flow, B4:1-56 foliation, B5:30 geochemistry, B(synthesis):1-69; B12:1-18 grain size vs. depth, A3:114 lithologic units, A3:14; B6:6, 10–11 locations and composition, B(synthesis):67 magnetic susceptibility, B11:1-69 mineralogy, B(synthesis):17-18 model composition, B8:60 petrology, A1:12-14 photograph, A3:111, 209 scan, A3:123-125 stratigraphy and composition, B(synthesis):1-69

structure, A1:3-5; B(synthesis):25-26 tectonics, A1:6-8; B10:25-27 textures, A3:109 See also ferrogabbro; microgabbro; olivine gabbro; oxide gabbro; oxide-olivine gabbro gabbro, foliated, photograph, A1:54 gabbro, gneissic, magnetic susceptibility, B11:61, 63 gabbro, iron-titanium, alteration photograph, A3:142 gabbro, mylonitized, photograph, A3:147 gabbro, oceanic, empirical velocity relations, B2:4 gabbro, orthopyroxene-bearing, abundance and composition, A3:256-259 gabbro, pegmatitic, magnetic susceptibility, B11:16 gabbro, troctolitic abundance and composition, A3:256-259 chemical composition, A1:70 lithologic units, A3:13-15; B6:9-10 olivine, B10:14 gabbro, trondhjemitic, photograph, A3:147 gabbrodiorite, petrology, A3:31-33 gabbroic rocks composition, B3:1-13; B6:82; B8:1-60 mineral chemistry, B4:45; B8:1-60 petrogenesis, B8:5-14 structures, A3:67-69 sulfides, B7:1-29 gabbronorite abundance and composition, A3:256-259; B8:13-14 alteration photograph, A3:143 chemical composition, B3:4 clinopyroxene, B10:11-12 lithologic units, A3:14; B(synthesis):11; B6:5-6, 11 olivine, B10:14 orthopyroxene, B10:13-14 petrology, A1:12-14 plagioclase, B10:9-11 shear zones, A1:8-10 See also oxide gabbronorite galena, gabbroic rocks, B7:5-7 gallium gabbro, B8:4-14 veins, B9:16 gamma-ray logs A3:81-84 vs. depth, A3:233 geochemistry database, B6:80 gabbros, B(synthesis):1-69; B6:14-20; B7:27-29; B8:1-60; B11:1-18 Site 735, A1:16-18; A3:21-22, 47-54; B3:1-13 geothermometry, veins, B9:17-19, 37 globules photomicrograph, B7:15 sulfides, A3:27; B7:4-5, 8-9 gneiss. See amphibole gneiss; amphibolite gneissic texture, deformation, B11:18-20, 61 gradational contacts, lithologic units, A3:16 grain size igneous layering, A3:29-30 lithologic units, A3:16-17 olivine gabbro, A1:12

VOLUME 176 SUBJECT INDEX grain size (continued) • iron-titanium oxide

photograph, A3:133 grains, photomicrograph, B7:16 granite petrology, A1:13 veins, A3:29; B8:9–10 granulite facies metamorphism, A3:45–47 petrology, A1:15 shear zones, A1:5 veins, B9:17–19 greenschist facies, veins, B9:18–19

Η

halos, veins, A3:29, 42 hematite alteration vs. depth, A3:138 low-temperature minerals, A3:38 See also ilmenite-hematite-magnetite solid solution high-temperature minerals, secondary minerals, A3:34-35 Hole 735B geology, A1:1-70 narrative history, B(narrative):1-20 hornblende alteration, A3:40 alteration vs. depth, A3:138 gabbro, B10:14-15 geochemistry, B10:60 mineral chemistry, B10:15 vs. depth, B10:46 See also magnesiohornblende hornblende magnesium number vs. clinopyroxene magnesium number, B10:44 vs. forsterite magnesium number, B10:44 hydrothermal alteration gabbro, A1:14-16 titanium, A3:25-26 veins, B9:19-22 vs. depth, A3:135-141 vs. vein abundance, A3:137 See also alteration; magmatic-hydrothermal transition hydrothermal alteration, low-grade, uplifted lower oceanic crust, B1:1-24 hydrothermal reactions fluid circulation, B9:21-22 metamorphism, A3:45-47

iddingsite, low-temperature minerals, A3:38 igneous contacts lithologic units, A3:15–16, 264 magmatic structures, A3:56 photograph, A3:132 schematic representation, A3:112 igneous layering lithologic units, A3:29–30, 32–33 magmatic structures, A3:55 photograph, A3:133

igneous petrology, Site 735, A1:11-14; A3:12-33 igneous rocks chemical composition, A3:268-280 lithostratigraphy, A3:12–16 photomosaic, A3:101 primary modes, A3:265 spreadsheets, A1:31-34 igneous seams, gabbro, B(synthesis):9 igneous series, chemical stratigraphy, B(synthesis):17 ilmenite chemical composition, B9:54 melts, B8:8-9 modal composition, A3:18; B6:79 photomicrograph, A3:127-130 thin sections, A3:23-28 veins, B9:12-13 vs. gabbro magnetic susceptibility, B11:20-29 ilmenite-hematite-magnetite solid solution, melts, B8:8-9 inclusions magnetite, B11:23 sulfides, B7:4-5 See also mineral inclusions index properties data summary, B5:42-69 igneous rocks, A3:79-80 Indian Ridge SW fluid flow, B4:1-56 gabbros, B(synthesis):1-69 geology, A1:1-70; B(narrative):9-12 lithology, B6:1-82 silicates, B10:1-60 sulfides, B7:1-29 veins, B9:1-66 intergranular textures, photograph, A3:106 intergrowths deformation, B4:13-14 photomicrograph, B4:29-32, 39-40 sulfides, B7:5-7 temperature, B4:11–12 textures, B4:8-9, 55 vs. depth, B4:22 intergrowths, myrmekitic, plagioclase veins, B9:4 intrusions petrology, A1:12-14 photograph, A3:209 stratigraphy, B10:20-23 structure, A1:3-5, 8-10; A3:65-66 See also layered intrusions intrusive contacts, lithologic units, A3:15-16 iron enrichment, B10:18 gabbroic rocks, B6:16; B8:3-4 ilmenite, B9:13 sulfides, B7:5-9 iron, in pyrrhotite, vs. depth, B7:17 iron-titanium oxide clinopyroxene, B4:10 gabbro, B3:3-5; B6:4; B8:3-14 geochemistry, B8:50-51 modal composition, A3:18

VOLUME 176 SUBJECT INDEX iron-titanium oxide (continued) • magnesium

olivine gabbro, B4:6-7 iron/magnesium ratio, diopside, B9:10, 65 iron oxide amphibole, B9:10 biotite, B9:11 chlorite, B9:11 epidote, B9:12 gabbroic rocks, B6:16-17; B8:4-14; B11:3 ilmenite, B9:13 mica, B9:11 titanite, B9:14 veins, B9:15 vs. aluminum oxide, B9:32 vs. anorthite, B10:35; B11:68 vs. depth, B6:37 vs. gabbro magnetic susceptibility, B11:20, 23 vs. modal oxide abundance, A3:21 vs. titanium oxide, B12:9 vs. zinc, A3:49, 170 iron oxide/aluminum oxide ratio, epidote, B9:12 iron oxide/titanium oxide ratio, gabbro, B12:3 iron ratio amphibole, B4:20 vs. magnesium number, B4:42 vs. silicon, B4:20, 42 isotopes hydrothermal alteration, B1:1-24 veins, B1:14 See also carbon isotopes; oxygen isotopes; strontium isotopes

J

joints, orientation, A3:61-63

K

Koenigsberger ratio logarithm distribution, A3:219 magnetic intensity, A3:73 vs. depth, A3:218

L

lamination, igneous, igneous layering, A3:29-30 lanthanum/ytterbium ratio gabbroic rocks, B6:20 vs. depth, B6:58 vs. ytterbium, B6:60 lanthanum oxide, titanite, B9:14 laterologs, vs. depth, A3:232 Layer 3, lower oceanic crust, B5:3-4 layered intrusions lithologic units, B(synthesis):11, 36-45; B10:20-21 lower oceanic crust, B(synthesis):18-22 petrology, A3:30-33 lenses, sheared, scan, A3:124 leucodiorite petrology, A1:13-14 photograph, A3:132 veins, A3:29; B8:9-10

Ligurian gabbros, differentiation, B10:26 liquids, crystallization, B8:5-14 liquidus temperature vs. magnesium number, B8:19 vs. silica, B8:21 vs. titanium oxide, B8:21 lithium, gabbro, B8:4-14 lithologic units chemical stratigraphy, B(synthesis):14-17 igneous rocks, A1:52; A3:261-263; B6:65 Site 735, A3:13-15 Unit I, B6:3 Unit II, B6:3 Unit III, B6:4 Unit IV, B6:4 Unit IX, A3:14; B6:6 Unit V, B6:5 Unit VI, A3:13-14; B6:5 Unit VII, A3:14; B6:5 Unit VIII, A3:14; B6:5 Unit X, A3:14; B6:6 Unit XI, A3:14-15; B6:6 Unit XII, A3:15; B6:6-7 lithology index, magnetic susceptibility, B11:1-69 lithostratigraphy igneous rocks, A3:12–16; B(synthesis):7–11, 49; B5:24; B6:2-7, 29; B10:20-21 vs. depth, A3:102 low-temperature minerals, secondary minerals, A3:37-38

Μ

magma chambers fluid inclusions, B4:14 lower oceanic crust, B(synthesis):20-22 models, B(synthesis):4-6, 37-38, 48; B6:22 magma injection lower oceanic crust, B(synthesis):22-23 magnetic susceptibility, B11:10 magmas crystallization, B10:24-25 injection, B(synthesis):12-14 lithologic units, A3:15-16 petrology, A3:31-33 structure, A1:2-5 veins, B9:19-22 magmas, mafic, sulfides, B7:7-9 magmatic foliation. See foliation, magmatic magmatic structures, textures, A3:54-58, 65-69 magmatic-hydrothermal transition, fluid flow, B4:1-56 magmatic-metamorphic transition, fluid migration, B4:4-5 magnesiohornblende geochemistry, B4:11; B9:9-10 photomicrograph, B9:66 veins, B9:30 magnesium biotite, B9:11 gabbroic rocks, B8:3-4 veins, B9:33-34

VOLUME 176 SUBJECT INDEX magnesium (continued) • manganese oxide

See also iron/magnesium ratio magnesium number amphibole, B4:20 basalt glasses, Atlantic II Fracture Zone, B10:27 chemical stratigraphy, A3:51-53; B(synthesis):16, 33-45; B6:22-23 clinopyroxene, B8:18-19; B10:12 correlation with clinopyroxene, B8:24 crystal mush, B10:23-25 diopside, B9:10 gabbro, A3:53; B(synthesis):17-18; B3:3; B6:16-17, 21; B8:5-14; B12:3 hornblende, B10:14 igneous rocks, A1:17-18; A3:49-50 intrusions, B10:18-19 olivine, B8:18-19 olivine gabbro, A3:21 olivine gabbro host vs. microgabbro, B8:22 orthopyroxene, B8:18-19; B10:14 silicates, B10:42 vs. aluminum, B4:11, 37 vs. aluminum oxide, B4:34; B10:39, 41 vs. anorthite, B8:18 vs. basalt liquidus temperature, B8:19 vs. calcium number, A3:21, 120; B3:8; B8:20 vs. calcium oxide, B10:41 vs. calcium oxide/aluminum oxide ratio, B8:20 vs. chromium, B8:25 vs. chromium oxide, B10:39, 41 vs. clinopyroxene number, B8:24 vs. depth, A1:62; A3:48-50, 52, 166, 175-176; B(synthesis):51, 57-60, 64-66; B3:9; B4:22; B6:31, 40-41; B7:14; B8:12-13, 27-30; B10:45-51; B12:8 vs. forsterite, B10:43-44 vs. gabbro magnetic susceptibility, B11:22-23, 27-28 vs. iron ratio, B4:42 vs. magnetic susceptibility, B11:65 vs. nickel, B8:25 vs. niobium, B8:26 vs. potassium oxide, B10:41 vs. sodium number, B3:8 vs. sodium oxide, B10:39, 41 vs. strontium, B8:26 vs. titanium oxide, B4:34; B8:25; B10:39, 41; B11:64 vs. vanadium, B8:25 vs. yttrium, B8:26 vs. zirconium, B8:26 See also forsterite magnesium number; hornblende magnesium number; orthopyroxene magnesium number magnesium oxide carbonates, B9:14 chlorite, B9:11 gabbro, A3:53 gabbroic rocks, B6:17; B8:4-14 mica, B9:11 phlogopite, B9:11 veins, B9:15 vs. chromium, A3:49, 169 vs. depth, B6:39

vs. nickel, A3:49, 168 See also aluminum oxide/magnesium oxide ratio magnetic anomalies gabbro, B(synthesis):25-26 maps, A1:47 structure, A1:7-8, 22-23 magnetic declination gabbro, A3:71-72 vs. depth, A3:214-215, 217 magnetic inclination gabbro, A1:22-23; A3:71-72 logarithm distribution, A3:219 vs. depth, A1:67; A3:214-215, 217, 222 magnetic intensity gabbro, A3:71-77 vs. depth, A3:214, 217 magnetic properties, discrete samples, A3:282-287 magnetic susceptibility anisotropy, A3:75, 222, 288-299 igneous rocks, A1:24; A3:70-77 lithology index, B11:1-69 physical properties, A3:77-78 response functions of sensor, A3:224 vs. deformation grades, B11:63 vs. deformation intensity, B11:60 vs. depth, A1:67; A3:213, 225-226, 300; B11:8-10, 33-34, 36-54, 56, 58, 60, 62 vs. forsterite, A11:24-25, 69 vs. gabbro mineral composition, B11:20-29 vs. magnesium number, B11:65 vs. titanium oxide, B11:65 vs. vein numbers, B11:57 magnetic susceptibility, minicore, vs. sensor magnetic susceptibility, B11:35 magnetic susceptibility, sensor, vs. minicore magnetic susceptibility, B11:35 magnetic susceptibility, volume logarithm distribution, A3:219 vs. depth, A3:218 magnetic susceptibility logs gabbros, B11:10-11 vs. depth, A1:68 magnetite deformation, A3:22-23, 124 high-temperature minerals, A3:35 inclusions, B11:23 magnetic susceptibility, A3:70-71 modal composition, A3:18 photomicrograph, A3:127; B11:66-67 thin sections, A3:23-28 vs. gabbro magnetic susceptibility, B11:20-29 See also ilmenite-hematite-magnetite solid solution major elements clinopyroxene, B10:11-12, 39 gabbroic rocks, B3:1-13; B6:16-18, 81; B8:3-8, 10-14, 54-59; B12:1-18 igneous rocks, A1:17-18 veins, B9:60-61 manganese, gabbroic rocks, B8:3-4 manganese oxide chlorite, B9:11

VOLUME 176 SUBJECT INDEX manganese oxide (continued) • nickel

diopside, B9:10 gabbroic rocks, B6:17; B8:4-14 ilmenite, B9:13 vs. depth, B6:38 mantle structure, A1:3 thermal boundary layer, B8:8 See also crust-mantle transition marcasite, low-temperature minerals, A3:38 mean destructive field, vs. depth, A3:218 megamullions, structure, B(narrative):9-12 melts crystallization, B8:5-14; B10:27 layered intrusions, A3:30-33; B10:19-22 model composition, B8:60 shear zones, A1:5; B6:22-25 tectonic controls of migration, B10:22 metagabbro foliation, B5:30 lithologic units, B6:3, 8 photomicrograph, B5:30 metamorphic petrology, A1:14-16; A3:33-47; B1:3-6 metamorphic rocks, spreadsheets, A1:35-38 metamorphism neoblasts, B9:17-19 shear zones, A1:5; B6:20-23 temperature, A3:45-47 See also magmatic-metamorphic transition metamorphism, high-temperature, gabbro, A1:15 mica chemical composition, B9:48 veins, B9:11 microcline. See quartz-microcline microcracks attenuation, B5:8-9 differentiation, B10:17 microfaults, magmatic structures, A3:59-61 microfractures intensity vs. depth, A3:204 orientation, A3:63 photograph, A3:189 microgabbro abundance and composition, A3:258-259; B8:13-14 composition vs. that of olivine gabbro, B8:22 intrusions, B10:20 lithologic units, A3:15, 65-66 origin, B8:10 petrology, A1:12-14; A3:32-33 photograph, A3:108, 209 See also olivine microgabbro; oxide microgabbro; oxide olivine microgabbro microgabbro, troctolitic photograph, A3:107 shear zones, A1:8-10 microstructures gabbros, A3:63-64 textures, A3:63 See also brittle microstructures; crystal-plastic microstructures; semi-brittle microstructures; structures

microstructures, high-temperature, recrystallization, A3:63-64 mid-ocean ridges, magmatic-hydrothermal transition, B4:1-56 mineral chemistry gabbroic rocks, B4:45; B8:1-60 silicates, B10:1-60 sulfides, B7:5-7, 26 mineral composition, vs. gabbro magnetic susceptibility, B11:20-29 mineral inclusions, lithologic units, A3:20-21 mineral integrowths, lithologic units, A3:21 mineral textures, lithologic units, A3:19-20 mineralogy data summary, B5:42-69 downhole variations, B6:13-14 gabbro, B(synthesis):17-18 modal composition igneous layering, A3:29-30; B8:10-11 lithologic units, A3:17-18; B6:7-14, 61-64 modal oxide abundance vs. iron oxide, A3:21 vs. titanium oxide, A3:21 moderate-temperature minerals, secondary minerals, A3:36-37 montmorillonite, magnesium alteration, B1:5 chemical composition, B1:10 mullions. See megamullions mylonite amphibolite, A1:14-16 differentiation, B10:18-19 lithologic units, A3:15 magnetic susceptibility, B11:18-20, 63 photograph, A3:187 photomicrograph, A1:65 See also gabbro mylonitic foliation. See foliation, mylonitic mylonitic texture lithologic units, A3:18-19; B6:3 microscopic vs. macroscopic observations, A3:64-65 photomicrograph, A3:207 myrmekitic texture, felsic veins, B9:33

Ν

natrolite alteration, B1:5 photomicrograph, B9:65–66 veins, B9:13 natrolite, vein-forming, X-ray diffraction data, A3:145 neoblasts gabbro magnetic susceptibility, B11:23 veins, B9:17–19 nickel gabbro, A3:53; B(synthesis):43; B3:3; B12:5 gabbroic rocks, B6:19; B8:3–14 olivine, B10:14 sulfides, B7:5–9 veins, B9:16 vs. clinopyroxene number, B8:25

VOLUME 176 SUBJECT INDEX nickel (continued) • orthopyroxene

vs. copper, B7:22 vs. depth, B(synthesis):58-59, 64-66; B3:9; B6:50; B7:21; B8:12–13, 27, 29–30 vs. magnesium number, B8:25 vs. magnesium oxide, A3:49, 168 vs. scandium, B3:11 vs. titanium oxide, B12:10 nickel, in pentlandite, vs. depth, B7:19 nickel, in pyrrhotite, vs. depth, B7:18 nickel oxide, vs. forsterite, B10:40 niobium gabbro, A3:50; B6:16; B8:4-14 vs. clinopyroxene number, B8:26 vs. magnesium number, B8:26 vs. zirconium, B3:7 See also zirconium/niobium ratio nontronite, chemical composition, B1:10 norite. See gabbronorite; oxide gabbronorite nuclear logs, A3:88-89

0

Oceanic Layer 3, fluid flow, B4:1-56 oikocrysts lithologic units, A3:19 photomicrograph, B4:29-30 oligoclase, veins, B9:20 olivine alteration, A3:39; B6:4-6 alteration vs. depth, A3:136 composition vs. depth, B(synthesis):52, 61; B6:21 downhole variations, B6:13-14 exsolution, A3:20 gabbro, B(synthesis):40; B6:66-68; B8:3-14; B10:14 geochemistry, B8:31-35; B10:58 grain size, A3:16-17, 113 grain size vs. depth, A3:114 high-temperature microscopic veins, B4:25-26 igneous rocks, A1:11 lithologic units, A3:15; B6:3-9 magnetic susceptibility, B11:25-26 mineral chemistry, B10:15 modal composition, A3:17–18 modal percent vs. modal percent clinopyroxene, A3:115 olivine gabbro, B(synthesis):12-14 olivine gabbro analysis, B4:48 photograph, A1:61; A3:148 photomicrograph, A3:117, 127, 129, 206-207; B4:23-24, 28-30, 39-40 pseudomorphs, A3:37 reaction textures, A3:21 relative abundance, A3:103 scan, A3:125 sulfides, B7:6-9 textures, A3:63 vs. depth, B6:30; B10:45-51 olivine, altered, alteration vs. depth, A3:139 olivine gabbro abundance and composition, A3:256-259 chemical composition, A1:70; B3:2-13; B8:13-14

chemical stratigraphy, B(synthesis):35-37, 41-45 clinopyroxene, B10:11-12 composition vs. that of microgabbro, B8:22 differentiation, B10:16-21 grain size, B(synthesis):12-14 high-temperature microscopic veins, B4:6-7 hornblende, B10:14 lithologic units, A3:14–15; B(synthesis):7–14; B6:3-7,9 lower oceanic crust, B(synthesis):18-22; B10:22-25 magnetic susceptibility, B11:8, 18-20, 47, 53 olivine, B10:14 petrology, A1:12-14 photograph, A1:53-56; A3:105-108, 110, 148 photomicrograph, B4:23-24, 28-32, 39-40; B11: 66-67 plagioclase, B10:9–11 scan, A3:125 structure, A1:3-5, 8-10 thickness vs. cumulative thickness at sequence centers, B(synthesis):50, 54-56 See also oxide olivine microgabbro; oxide-olivine gabbro; veins olivine gabbro, compound, lithologic units, A3:13-14 olivine gabbro, pegmatoidal, photograph, A1:55 olivine gabbro, varietextured, photograph, A1:55 olivine microgabbro petrography, B6:9 photograph, A1:53 Oman ophiolite, lower oceanic crust, B(synthesis):22-23; B10:25-27 opaque minerals lithologic units, A3:22-23 modal composition, A3:18 ophiolite, structure, A1:2-5 ophiolite model, petrology, A3:31-33; B10:25-27 ophitic texture lithologic units, A3:19 olivine gabbro, B4:6-7 photograph, A3:105 orthoclase, gabbro, B10:9-11 orthopyroxene alteration, A3:39-40; B4:7-8 chemical composition, B4:10 composition, B4:35; B6:69-70 formation temperature, B4:11–12 gabbro, B8:3-14; B10:13-14 geochemistry, B8:49; B10:59 high-temperature microscopic veins, B4:25-26 igneous rocks, A1:11 lithologic units, A3:14; B6:4-14 mineral chemistry, B10:15 mineral texture, A3:19 modal composition, A3:18 neoblasts, B9:17-19 olivine gabbro, B4:6-7 olivine gabbro analysis, B4:51–52 photomicrograph, B4:31-32, 39-40 relative abundance, A3:104 selvage, B10:13-14 textures, B4:8-9

VOLUME 176 SUBJECT INDEX orthopyroxene (continued) • plagioclase

vs. depth, B6:31; B10:46-51 See also gabbro orthopyroxene magnesium number vs. clinopyroxene magnesium number, B10:43 vs. forsterite, B10:43 outcrops, maps, A1:48 overpressure, lower oceanic crust, B(synthesis):22-23 overprinting fabric, A3:58, 65 lithologic units, A3:19 magnetic intensity, A3:74-75 oxide-olivine gabbro chemical composition, B3:2-13 clinopyroxene, B10:11-12 differentiation, B10:16-21 olivine, B10:14 plagioclase, B10:9–11 oxide-olivine microgabbro, chemical composition, B3:2-13 oxide diorite, chemical composition, B3:2-13 oxide gabbro abundance and composition, A3:258-259 chemical composition, A1:70; B3:2-13; B8:13-14; B12:3-5 chemical stratigraphy, B(synthesis):39-43 clinopyroxene, B10:11-12 deformation, B11:18-20 differentiation, B(synthesis):23-24 Formation Microscanner imaging, A3:238–239 lithologic units, A3:14–15; B(synthesis):7–11; B6:4, 11 - 12magnetic susceptibility, B11:12-13, 45, 47-49, 51, 54 melts, B8:8-9; B10:22 olivine, B10:14 petrology, A1:12-14; A3:31-33 plagioclase, B10:9–11 relationship to deformation, B11:18-20 relationship to felsic veins, B11:17 See also oxide microgabbro; oxide–olivine gabbro oxide gabbro, porphyroblastic, magnetic susceptibility, B11:61 oxide gabbronorite lithologic units, A3:14; B6:5, 12–13 magnetic susceptibility, B11:11-12 oxide microgabbro, petrography, B6:11-12 oxide troctolite, chemical composition, B3:2-13 oxides crystal-plastic deformation, A3:67, 210 gabbroic rocks, B6:16-18 high-temperature minerals, A3:35 igneous rocks, A1:11; A3:260 lithologic units, A3:22-23, 124 magnetic susceptibility, B11:17 photograph, A3:148 photomicrograph, A3:128 scan, A3:123 thin sections, A3:23-28 veins, A3:29 vs. depth, A3:122, 126 vs. gabbro magnetic susceptibility, B11:20-29 vs. titanium oxide, A3:119

See also hematite; iron–titanium oxide; magnetite oxygen isotopes, phyllosilicates, B1:5–6 oxyhydroxides, low-temperature minerals, A3:38

Ρ

paleomagnetism, Site 735, A1:22-23; A3:69-77 paragenesis, sulfides, B7:5-9 pargasite, geochemistry, B4:11, 20 pegmatite lithologic units, A3:14 olivine gabbro, A1:12 pentlandite gabbroic rocks, B7:5-9 photomicrograph, B7:15, 23 textures, A3:27 peridotite, serpentinized dredge hauls, B(narrative):18 tectonics, A1:6-8 petrogenesis, gabbroic rocks, B8:5-14 petrography high-temperature microscopic veins, B4:6-9 lithologic units, A3:17-21; B6:7-14 sulfides, B7:4-5, 24-25 veins, B9:3-8 phase equilibria gabbro, B8:5-14 modal composition, A3:18 petrology, A1:14 phenocrysts, lower oceanic crust, B(synthesis):18-22, 39 phlogopite alteration, B1:4-5 chemical composition, B1:10 veins, B9:11 phosphorus, gabbroic rocks, B8:3-4 phosphorus oxide gabbro, B3:4 gabbroic rocks, B6:18; B8:4–14 vs. depth, B(synthesis):60; B6:45 zircon, B9:13-14 photoelectric effect logs, vs. depth, A3:233-234 phyllosilicates alteration, B1:4-5 chemical composition, B1:10 electron microprobe data, B1:15-22 physical properties, Site 735, A1:24-25; A3:77-81, 302; B2:1-19 pigeonite, gabbro, B10:13-14 plagioclase alteration, A1:14; A3:40-41; B4:7-8; B6:3-7 alteration vs. depth, A3:136 composition vs. depth, B(synthesis):52, 61 downhole variations, B6:13-14 gabbro, B(synthesis):40; B6:74-78; B8:3-14; B10:9-11 geochemistry, B3:3-5; B8:36-42; B10:56 grain size, A3:16-17, 113 grain size vs. depth, A3:114 high-temperature microscopic veins, B4:25-26 high-temperature minerals, A3:35 igneous rocks, A1:11 intrusions, B10:18-19 lithologic units, B6:3-14

VOLUME 176 SUBJECT INDEX plagioclase (continued) • rare earths

magmatic structures, A3:60 mineral chemistry, B10:15, 32-34 mineral inclusions, A3:20 mineral texture, A3:19 modal composition, A3:18 modal percent vs. modal percent clinopyroxene, A3:115 olivine gabbro, B4:6–7 olivine gabbro analysis, B4:46-47 photograph, A1:61; B4:23-24 photomicrograph, A3:118, 127-130, 190-191, 206-207; B4:28-30, 39-40; B9:63 relative abundance, A3:103-104 scan, A3:125 sulfides, B7:5 textures, A3:63 veins, A3:41-43; B9:3-6, 8-9, 17-19, 29 vs. depth, B6:33; B10:45-52 vs. ferromagnesians, B10:15 vs. gabbro magnetic susceptibility, B11:22-23 zoning, B9:17; B10:10 See also albite; anorthite; augite/plagioclase ratio; quartz-plagioclase; quartz-plagioclase, granophyric; veins plagioclase, altered, alteration vs. depth, A3:141 plagioclase, neoblastic, metagabbro, B6:3, 12 plagioclase, secondary alteration vs. depth, A3:141 photograph, A3:161 vs. depth, A3:135 plastic deformation, magnetic susceptibility, B11:16 platinum group, gabbroic rocks, B7:1-29 plutons chemical stratigraphy, B(synthesis):14-17 ferrobasalt, B(synthesis):53 lower oceanic crust, B(synthesis):20-22; B11:28-29 poikilitic texture lithologic units, A3:19; B6:4 olivine gabbro, B4:6-7 porosity chemical stratigraphy, B(synthesis):14-17 downhole measurements, B5:9-10 igneous rocks, B2:2-3, 7-11 oceanic crust, B5:13 vs. compressional wave velocity, B2:12; B5:28 vs. shear wave velocity, B5:28 porosity logs electrofacies, A3:247-251 vs. depth, A3:233-235; B5:26 porphyroblastic texture, lithologic units, A3:18-19 porphyroclastic texture deformation, B11:18-20, 61, 63 lithologic units, B6:3, 8 microscopic vs. macroscopic observations, A3:64-65 porphyroclasts photomicrograph, A3:190-191, 207 scan, A3:123

potassium alteration, A3:51 amphibole, B4:11 See also sodium+potassiumhornblende, B10:14 potassium feldspar, alteration, B1:5 potassium oxide gabbroic rocks, B6:18; B4-14 mica, B9:11 plagioclase, B9:8 veins, B9:15 vs. depth, B6:44 vs. magnesium number, B10:41 preferred orientation, igneous layering, A3:29-30 prehnite alteration vs. depth, A3:138 chemical composition, B9:53 electron microprobe data, B1:23-24 magmatic structures, A3:60 moderate-temperature minerals, A3:37 veins, A3:44-45; B9:6-7, 12 See also veins prehnite, vein-forming, X-ray diffraction data, A3:144 pressure-temperature conditions crystallization, B8:5-14 hydrothermal alteration, B1:5-6 protoliths, lithologic units, B6:3, 8 pumpellyite, vein-forming, X-ray diffraction data, A3:144 pyrite gabbroic rocks, B7:5-9 low-temperature minerals, A3:38 moderate-temperature minerals, A3:37 pyroxene composition, B10:36-38 downhole variations, B6:13-14 sulfides, B7:5 See also augite; clinopyroxene; diopside; enstatite; ferrosilite; orthopyroxene pyrrhotite gabbroic rocks, B7:5-9 low-temperature minerals, A3:38 moderate-temperature minerals, A3:37 photomicrograph, A3:128; B7:15-16, 23

Q

quartz alteration vs. depth, A3:138 chemical composition, B9:51 mineral texture, A3:19 moderate-temperature minerals, A3:36 veins, A3:45; B9:3–4, 7–8, 11–12 quartz–microcline, lithologic units, A3:21 quartz–plagioclase, granophyric, lithologic units, A3:21 quench effect, microgabbro, B8:10

R

rare earths gabbroic rocks, B6:19–20 vs. depth, A3:53, 178

VOLUME 176 SUBJECT INDEX rare earths, chondrite-normalized, gabbroic rocks • Site 735

rare earths, chondrite-normalized, gabbroic rocks, B6:59 reaction textures, lithologic units, A3:21 recrystallization downhole distribution, A3:33-34 gabbro, A1:14-16; B6:6-7 lithologic units, A3:19 microstructures, A3:63-64 photomicrograph, A3:207 remanent magnetization, natural average declination, A3:216 gabbro, A1:22-23; A3:71-77 logarithm distribution, A3:219 vs. depth, A3:218 remanent magnetization, thermal, vs. depth, A1:67 resistivity electrofacies, A3:246-251, 313 igneous rocks, A3:81 resistivity logs Site 735, A3:90-92 vs. depth, A3:234-235 retrograde foliation. See foliation, retrograde reverse faults, photograph, A1:66 rifting cross sections, A1:49-50 lower oceanic crust, B(synthesis):18-23; B9:22 rock textures, lithologic units, A3:18-19 rubidium alteration, A3:51 gabbroic rocks, B6:16; B8:4-14

S

samarium gabbroic rocks, B6:19 vs. depth, B6:57 saponite, chemical composition, B1:10 saponite, vein-forming, X-ray diffraction data, A3:163 scandium gabbro, B3:3-5; B8:4-14; B12:4 vs. aluminum oxide, B8:23 vs. calcium oxide, B8:23 vs. calcium oxide/aluminum oxide ratio, B8:23 vs. clinopyroxene number, B8:23 vs. nickel, B3:11 vs. sodium number, B3:11 vs. strontium, B3:11 vs. titanium oxide, B12:12 See also vanadium/scandium ratio scolecite, vein-forming, X-ray diffraction data, A3:145 sea-floor spreading, magmatic-hydrothermal transition, B4:1-56 secondary minerals alteration, A3:34-38 vs. depth, A1:57 seismic Layer 3, structure, A1:3; B5:3-4 seismic reflection, seismic Layer 3, B5:3-4 seismic reflectors, vertical incidence profiles, A1:25 seismic thickness, crust, A1:8 selvage, orthopyroxene, B10:13-14 semi-brittle deformation, magmatic structures, A3:61

semi-brittle microstructures, photomicrograph, A3:190-191 serpentine alteration, B1:4–5 chemical composition, B1:10 octahedral cation total vs. interlayer cations, B1:12 shear wave velocity caliper logs, B5:41 crust, B5:8 data summary, B5:42-69 downhole measurements, B5:10-12 igneous rocks, B2:2-4, 7-11, 19 oceanic crust, B5:14–15 synthetic seismograms, B5:34-35 vs. bulk density, B5:29 vs. compressional wave velocity, B2:14 vs. depth, B5:27 vs. porosity, B5:28 shear zones alteration, A3:38 discontinuities, B10:18-21 igneous contacts, A3:55-58 magnetic susceptibility, B11:53 magnetite, A3:23 oceanic crust, B5:14-15; B8:12; B9:21-22 photograph, A3:187 photomicrograph, A3:190-191 shear zones, retrograde, gabbro, A1:18-22 shear zones, reverse, photograph, A3:192 sheared contacts, lithologic units, A3:15-16 silica apatite, B9:13 epidote, B9:12 gabbroic rocks, B6:16; B8:4-14 magmatic structures, A3:60 mica, B9:11 natrolite, B9:13 thomsonite, B9:13 veins, B9:15 vs. depth, B(synthesis):60; B6:34 vs. gabbro magnetic susceptibility, B11:20 vs. liquidus temperature, B8:21 silicate melts, high-temperature microscopic veins, B4:12-13 silicates mineral chemistry, B10:1–60 modal composition, A3:17-18 See also calc-silicates silicates, mafic, mineral chemistry, B10:15 silicon gabbroic rocks, B8:3-4 veins, B9:16, 33-34 vs. iron ratio, B4:20, 42 Site 735, A1:1-26; A3:1-314 coring summary, A3:252–253 downhole measurements, A1:25-26; A3:81-96 fluid flow, B4:1-56 geochemistry, A1:16-18; A3:21-22, 47-55; B3:1-13; B12:1-18 igneous petrology, A1:11-14; A3:12-33 lithology, B6:1-82

VOLUME 176 SUBJECT INDEX Site 735 (continued) • tectonic controls, late-stage melt migration

magnetic susceptibility, B11:1-69 metamorphic petrology, A1:14-16; A3:33-47 mineral chemistry, B8:1-60 narrative history, B(narrative):1-20 operations, A3:1-11, 254-255 paleomagnetism, A1:22-23; A3:69-77 physical properties, A1:24-25; A3:77-81; B2:1-19 silicates, B10:1-60 site description, A1:1-26; A3:1-255 structural geology, A1:18-22; A3:54-69 sulfides, B7:1–29 veins, B9:1-66 Skaergaard Intrusion, petrology, B10:26 slickensides, magmatic structures, A3:60 smectite alteration, A1:16; A3:138; B1:4-5; B6:3-7 alteration vs. depth, A3:139, 141 chemical composition, B1:10 interlayer cation contents, B1:11 low-temperature minerals, A3:37 octahedral cation total vs. interlayer cations, B1:12 photograph, A3:146 photomicrograph, B9:66 veins, A3:44; B9:6-7, 14 See also chlorite/smectite composition; veins smectite, secondary, vs. depth, A3:135 smectite, vein-forming, X-ray diffraction data, A3:144, 163 sodium amphibole, B4:11 clinopyroxene, B10:12 gabbroic rocks, B8:3-4 orthopyroxene, B10:14 veins, B9:34-35 sodium+potassium, vs. aluminum, B4:11, 20, 37, 41 sodium number igneous rocks, B3:3-5 vs. calcium number, B3:8 vs. depth, B3:9 vs. magnesium number, B3:8 vs. scandium, B3:11 vs. titanium oxide, B3:10 vs. vanadium/scandium ratio, B3:10 sodium oxide apatite, B9:13 gabbroic rocks, B6:18; B8:4-14 igneous rocks, A1:17-18 natrolite, B9:13 thomsonite, B9:13 vs. depth, B6:43 vs. magnesium number, B10:39, 41 See also calcium oxide/sodium oxide ratio solid solution, melts, B8:8-9 sonic logs, A3:89 sphalerite, gabbroic rocks, B7:5-7 spinel. See chrome-spinel; ulvospinel spreading ridges lower oceanic crust, B(synthesis):18-22, 25-26; B10:25-27 magma chambers, B(synthesis):4-6 shear zones, A1:5

structure, B(narrative):9-11 stratigraphy, intrusions, B10:20-21 stress, microstructures, A3:64 strontium gabbro, A3:51; B3:4; B6:19; B8:4-14 veins, B9:16 vs. aluminum oxide/magnesium oxide ratio, A3:51, 173 vs. clinopyroxene number, B8:26 vs. depth, B6:56; B8:12-13, 27, 29-30 vs. magnesium number, B8:26 vs. scandium, B3:11 strontium/aluminum ratio, vs. anorthite/(anorthite+albite) ratio, A3:51, 174 strontium isotopes, phyllosilicates, B1:6 structural geology, Site 735, A1:18-22; A3:54-69 structures gabbro, B(synthesis):25-26; B11:28-29 spreadsheets, A1:39-43 stereoplots, A1:64-65 See also microstructures subophitic texture, lithologic units, A3:15 sulfides alteration, B6:4 alteration vs. depth, A3:138 gabbroic rocks, B7:1-29 low-temperature minerals, A3:38 mineral chemistry, B7:4–9, 26 mineral inclusions, A3:21 modal composition, A3:18 moderate-temperature minerals, A3:37 olivine gabbro, B4:6-7 petrography, B7:4-7, 24-25 photomicrograph, A3:128 thin sections, A3:23-28 vs. gabbro magnetic susceptibility, B11:20-29 See also chalcopyrite; marcasite; pentlandite; pyrite; pyrrhotite sulfur gabbroic rocks, B6:18 vs. depth, B(synthesis):64; B6:48 sutured contacts, lithologic units, A3:15-16 symplectite, photomicrograph, A3:129 synthetic seismograms core-log integration, B5:12-13 depth vs. time, B5:34-35 well-logs, B5:38

Т

talc alteration, B1:4–5; B6:9 alteration vs. depth, A3:139 chemical composition, B1:10 high-temperature minerals, A3:35 lithologic units, B6:3 octahedral cation total vs. interlayer cations, B1:12 tectonic contacts lithologic units, A3:15–16 magmatic structures, A3:56 tectonic controls, late-stage melt migration, B10:22

VOLUME 176 SUBJECT INDEX tectonics • trondhjemite

tectonics cross sections, A1:49-50 transform faults, A1:6-8 temperature crystallization, B4:11-12, 38, 56 logging, A3:88 for pyroxenes and amphibole-plagioclase, B4:38 veins, B9:17-19, 37 vs. depth, B4:22 vs. magnesium number, B8:19 textures gabbro, A3:109 lithologic units, A3:18-21; B6:7-14 microstructures, A3:63 photomicrograph, A3:205-207 See also chadacrysts; crescumulate texture; exsolution textures; intergranular textures; intergrowths; mineral textures; mylonitic texture; myrmekitic texture; oikocrysts; ophitic texture; poikilitic texture; porphyroblastic texture; porphyroclastic texture; reaction textures; subophitic texture; ultramylonitic texture textures, high-temperature, petrography, B4:6-9 thermal boundary layer, lower crust, B8:8 thermal conductivity igneous rocks, A3:80, 303-306 vs. depth, A3:230 tholeiite, gabbroic rocks, B8:5-14 thompsonite, alteration, B1:5 thomsonite, veins, B9:13 titanite chemical composition, B9:57 mineral texture, A3:19 moderate-temperature minerals, A3:36 photograph, A3:153 thin sections, A3:24–25 veins, B9:14 titanium clinopyroxene, B4:10; B10:12 gabbroic rocks, B8:3-4 high-temperature microscopic veins, B4:12-13 hornblende, B10:14 hydrothermal alteration, A3:25-26 orthopyroxene, B10:14 vs. aluminum, B4:37 See also gabbro titanium/zirconium ratio, olivine gabbro, B3:5 titanium oxide amphibole, B9:9-10 biotite, B9:11 chemical stratigraphy, A3:51-53; B(synthesis):16, 34 - 45clinopyroxene, B4:10 differentiation, B10:16-21 diopside, B9:10 gabbro, A3:53; B3:3-4; B8:4-14; B12:3-4 hornblende, B10:14 igneous rocks, A1:17-18 ilmenite, B9:13 mica, B9:11 orthopyroxene, B4:10

phlogopite, B9:11 veins, B9:15; B11:15 vs. aluminum oxide, B4:34-35 vs. anorthite/(anorthite+albite) ratio, A3:49, 167 vs. calcium number, A3:21, 121 vs. calcium oxide, B4:35 vs. clinopyroxene number, B8:25 vs. depth, A3:52, 177; B(synthesis):51, 60; B6:36; B8:12-13, 27, 29-30 vs. gabbro magnetic susceptibility, B11:20, 21, 26-27, 29 vs. iron oxide, B12:9 vs. liquidus temperature, B8:21 vs. magnesium number, B4:34; B8:25; B10:39, 41; B11:64 vs. magnetic susceptibility, B11:65 vs. modal oxide abundance, A3:21 vs. nickel, B12:10 vs. oxides, A3:119 vs. scandium, B12:12 vs. sodium number, B3:10 vs. vanadium, A3:50, 171-172; B12:11 vs. zirconium, B3:7 See also iron oxide/titanium oxide ratio titanium oxide, log weight percent, vs. depth, A1:63 titanophile elements ferrogabbro, B12:13 See also vanadium; yttrium; zirconium tonalite petrology, A1:13-14 veins, B8:9–10 trace elements gabbroic rocks, B3:1-13; B6:18-19, 81; B8:3-5, 54-59; B12:1-18 igneous rocks, A1:17-18 veins, B9:60-61 vs. depth, A3:53, 178 transform faults structure, B(narrative):9-11 tectonics, A1:6-8 tremolite, geochemistry, B4:20 troctolite abundance and composition, A3:256-259 chemical composition, A1:70; B3:2-13; B8:13-14 chemical stratigraphy, B(synthesis):38-45 clinopyroxene, B10:11-12 lithologic units, A3:13–14; B(synthesis):11; B6:5, 9–10 magnetic susceptibility, B11:8, 15, 29, 52 petrology, A1:12-14 photograph, A1:56 photomicrograph, A3:127, 129 plagioclase, B10:9-11 shear zones, A1:4-5, 8-10 See also gabbro; microgabbro; oxide troctolite troilite gabbroic rocks, B7:5-9 photomicrograph, B7:15-16 trondhjemite age, A1:7-8 petrology, A1:13-14 veins, B8:9-10

VOLUME 176 SUBJECT INDEX trondhjemite (continued) • veins, plagioclase

See also gabbro

U

ultramylonite, magnetic susceptibility, B11:18–20, 63 ultramylonitic texture, photomicrograph, A3:207 ulvospinel, thin sections, A3:24–25 uplifts cross sections, A1:49–50 lower oceanic crust, B(synthesis):20–22; B9:22 oceanic crust, B1:1–24

V

vanadium ferrogabbro, B12:13 gabbroic rocks, B6:18-19; B8:4-14; B12:4-5, 14 vs. clinopyroxene number, B8:25 vs. depth, B6:49 vs. magnesium number, B8:25 vs. titanium oxide, A3:50, 171-172; B12:11 vanadium/scandium ratio gabbro, B3:3-5 vs. sodium number, B3:10 vein abundance, vs. hydrothermal alteration, A3:137 vein intensity, vs. depth, A1:64; A3:200 vein nets, magnetic susceptibility, B11:15-16, 55 vein number vs. depth, B11:59 vs. magnetic susceptibility, B11:57 veins abundance as volume percent of core, B1:9 alteration, B1:3-6; B6:6 amphibole, A1:15 dip, A3:244 dip vs. depth, A3:201-203 geochemistry, B9:60-61 isotopes, B1:14 mineral texture, A3:19 orientation, A3:61 origin and models, B9:19-22 petrography, B9:3-8 spreadsheets, A1:38 temperature, B9:17-19 types, A3:267; B9:27, 38 vs. depth, A1:58; A3:149; B9:28 X-ray diffraction data, A3:144-145 zeolite and prehnite, A1:16 veins, amphibole abundance as volume percent of core, B1:9 chemical composition, B9:43 crystal-plastic deformation, A3:67, 212 dip vs. depth, A3:201 petrography, B9:4–5 photograph, A1:60; A3:158-161, 164, 189 photomicrograph, A3:194 proportion vs. total veins, A3:150 Site 735, A3:43 vs. depth, A1:58; A3:149, 211 veins, breccia, magnetic susceptibility, B11:15-16 veins, calcite, A3:43

veins, carbonate abundance as volume percent of core, B1:9 dip vs. depth, A3:202 petrography, B9:7 petrology, A3:43; B1:4 photograph, A3:162 proportion vs. total veins, A3:150 vs. depth, A1:58; B9:28 veins, chlorite abundance as volume percent of core, B1:9 petrography, B9:7-8 photograph, A3:164 vs. depth, A1:58; A3:149; B9:28 veins, chlorite/smectite abundance as volume percent of core, B1:9 petrology, B1:4 veins, diopside petrography, B9:6 proportion vs. total veins, A3:150 titanite photograph, A3:153 vs. depth, A3:149; B9:28 veins, diopside + amphibole, A3:42-43 veins, dioritic, photograph, A3:154 veins, epidote petrography, B9:7-8 photograph, A3:165 veins, felsic alteration photograph, A3:151-152 chemical composition, B8:13-14; B9:33 deformation, B11:18-20 gabbroic rocks, B8:7 intensity vs. depth, A3:131 lithologic units, A3:21, 28-29, 41-42; B(synthesis):10-11 magmatic structures, A3:59 magnetic susceptibility, A3:226; B11:11-15, 48, 50-51 origin, B8:9-10 petrography, B9:3-4 photograph, A1:59; A3:132 photomicrograph, A3:194; B9:62-63 plagioclase, B10:9-11 proportion vs. total veins, A3:150 relationship to oxide gabbro, B11:17 vs. depth, A3:149; B9:28 zoning photograph, A3:152 veins, high-temperature microscopic occurrence, B4:25, 43-44 origin, B4:12-13 petrography, B4:6-9 photomicrograph, B4:28-30, 39-40 vs. depth, B4:22 veins, hydrothermal, alteration, A3:41-45 veins, igneous and hydrothermal, composition and origin, B9:1-66 veins, magmatic alteration, A3:41-45 dip vs. depth, A3:201 veins, olivine gabbro, photograph, A1:54 veins, plagioclase composition, A3:42; B9:35-36 petrography, B9:3-4

VOLUME 176 SUBJECT INDEX veins, plagioclase (continued) • zoning

proportion vs. total veins, A3:150 vs. depth, A3:149 veins, plagioclase + amphibole formation, A3:42; B9:18-19, 37 petrography, B9:5 photograph, A3:155-156 photomicrograph, B9:62-64 proportion vs. total veins, A3:150 vs. depth, A1:58; A3:149; B9:28 veins, plagioclase + diopside chemical composition, B9:34 petrography, B9:6, 18-19 photograph, A1:59; A3:157 photomicrograph, B9:62, 64 Site 735, A3:42-43 vs. depth, A1:58; B9:28 veins, plagioclase + quartz, photomicrograph, B9:62 veins, prehnite, petrology, A3:44-45; B1:4 veins, quartz, petrography, B9:7-8 veins, smectite abundance as volume percent of core, B1:9 dip vs. depth, A3:202 petrology, A3:44; B1:4 photograph, A1:61; A3:146, 160, 164 proportion vs. total veins, A3:150 vs. depth, A1:58; A3:149; B9:28 veins, smectite + prehnite + carbonate, petrography, B9:6-7 veins, zeolite dip vs. depth, A3:202 petrology, A3:44-45; B1:4 vs. depth, A1:58; A3:149; B9:28 veins, zeolite + prehnite, abundance as volume percent of core, B1:9 veins, zeolite + prehnite + carbonate, petrography, B9:7 velocity attenuation, B2:3-4, 15-17 oceanic crust, B5:14-15 structure, A1:51 vs. depth, A1:69 See also anisotropy; attenuation; compressional wave velocity; shear wave velocity velocity logs Site 735, A3:84-87 vs. depth, A3:236; B5:26 velocity structure, lower oceanic crust, B5:1-71 vertical incidence profiles, seismic reflectors, A1:25 volatiles, chemical composition, A3:281 vugs, photograph, A3:162

W

water content gabbroic rocks, B6:18 volatiles, A3:281 vs. depth, B6:46 well-logs compressional wave velocity, B5:36–37 fractures, A3:245 synthetic seismograms, B5:38 *See also* core-log integration wollastonite chemical composition, B4:9–10 gabbro, B10:13–14

X

X-ray diffraction data, modal composition, B6:62–63 xenoliths, core photograph, A3:195

Y

ytterbium vs. lanthanum/ytterbium ratio, B6:60 *See also* lanthanum/ytterbium ratio yttrium ferrogabbro, B12:13 gabbro, A3:50; B8:4–14; B12:4, 14 gabbroic rocks, B6:19 veins, B9:16 vs. clinopyroxene number, B8:26 vs. depth, A3:53, 178; B(synthesis):62; B6:54; B8:12– 13, 27, 29–30 vs. magnesium number, B8:26

Z

zeolites alteration vs. depth, A3:138 chemical composition, B9:55 electron microprobe data, B1:23-24 moderate-temperature minerals, A3:37 veins, A3:44-45; B9:13 See also veins zeolites, vein-forming, X-ray diffraction data, A3:145 zinc gabbroic rocks, B6:19; B8:4-14 sulfides, B7:6-9 veins, B9:16 vs. depth, B6:52; B8:12-13, 27, 29-30 vs. iron oxide, A3:49, 170 zircon chemical composition, B9:56 veins. B9:13-14 zirconium ferrogabbro, B12:13 gabbro, A3:50; B3:4-5; B6:19; B8:4-14; B12:4-5, 14 veins, B9:16; B11:15 vs. clinopyroxene number, B8:26 vs. depth, B(synthesis):63; B6:55; B8:12-13, 27, 29-30 vs. magnesium number, B8:26 vs. niobium, B3:7 vs. titanium oxide, B3:7 See also titanium/zirconium ratio zirconium/niobium ratio, gabbro, B3:5 Zone 3a, olivine gabbro, B(synthesis):41-42 Zone 3b, olivine gabbro, B(synthesis):42-43 Zone 3c, olivine gabbro, B(synthesis):43 zoning chemical stratigraphy, B(synthesis):17 clinopyroxene, B10:12 plagioclase, B9:17; B10:10