

INDEX

- Acoustic properties, volcanoclastic sediments, 519
- Active-arc volcanism, 621
- Active convergent boundary, 803
- Active island arcs, origin and evolution of, 111
- Active margin volcanics, 750
main HYG element, features of, 750
- Active volcanic arc, 407
- AFM diagram, 744; 745, Fig. 2
- Age spectrum, disturbed, 729
- Alteration, 634, 682, 737
basal sediments, 615
basalt, 757, 769, 780
high-temperature, 735
hydrothermal, 600, 739
low-temperature, 673, 735, 739, 747
submarine, 678
- Anchitectectonic crystallization, 677
- "Anchored-slab" model, 794
- Andesite, pyroxene analysis of, 699
- ⁴⁰Ar/³⁹Ar isochron geochronology, 729, 730
- Arc evolution, summary of, 812
- Arc magmatic activity, 737
- Arc tholeiites, 681, 682
fractionation of, 689
phase relations in, 688
- Arc tholeiite series, 692
Japan, 750
- Arc-trench system, formation of, 5
- Arc volcanism, 5, 621
- Ash layer, 325
- Asian plate boundary, 803
- Augite, 690
- Augite phenocrysts, description of, 696
- Authorship, responsibility for, 5
- Back-arc basin, formation of, 753
origin of, 5
tectonic evolution of, 613
- Back-arc extrusives, 606
- Back arcs, origin and evolution, 111
- Back-arc spreading, 321, 621
origin of, 806
- Back-arc spreading centers, 649
- Back-arc tectonics, 37
- Basal sediments, alteration of, 615
- Basalt, 515, 685, 686, 692
age of, 730
alteration of, 757, 780
chemistry of basement, 806
enrichment factors of mobile elements in, 748
Hole 447A, 760-761, Table 4
Hole 449, 672
Hole 450, 672
Hole 459B, 719
low-temperature alteration of, 33, 46, 747
pyroxene analyses of, 695
secondary minerals in, 747
Site 448, 739
Sr-isotopic composition of, 724
trace elements, 724
- Basaltic glass, analyses of, 695
microprobe analyses of, 759, Table 3
- Basalt phenocrysts, flow differentiation of, 136
- Basalts, alteration of, 721
Hole 447A, 670
Leg 59, classification of, 705
major elements in, 721
Site 458, 719
temperatures of, 677
- Basalt vesicles, flow differentiation of, 136
- Basement, age of, Hole 447A, 37
nature of, 757
- Basement ages, 591
- Basement rocks, trace-element chemistry of, 743
- Basins, 681
back-arc, 5
inter-arc, 111
marginal, 111
- Basin sites, HYG element chemistry of, 747
magma types of, 749
mantle source compositions of, 749
- Benham Rise, 612
- Benioff zone, 753, 792
- Biologic productivity, 601
- Biostratigraphy, Leg 59, 16
Site 447, 28
- Bioturbation, 119
- Bitumen, carbon isotopic composition of, 642
- Bitumen content, 641
- Block faulting, 46
- Boninites, origin of, 723
- Bramletteius? duoalatus*, new nannofossil species, 559
- Bronzite phenocrysts, description of, 696
- Calc-alkalic basalt, 692
- Calciosolenia compacta*, new nannofossil species, 559
- Calcium, dissolved, 627
- Carbon, isotopic composition of, 631
- Carbonates, 619
- Catinaster*, evolutionary trends in, 557
- CCD (carbonate compensation depth), 568, 592, 609
mid-Miocene deepening of, 611
- Central Basin Ridge, 22, 614
- Cerium depletion, 664
- Chemical evolution of island-arc volcanism, 787
- Chemical variation, arc tholeiites, 782
- Chilean subduction, 792
- Chilled contact, 329
- Chlorite, 600
- Clay-mineral stratigraphy, Cenozoic, 597
Site 447, 597
Site 449, 598
Site 450, 599
- Cooling units, 669
- Copper, native, 135, 148, 737, 739; 740, Tables 3 and 4
- Cores, handling of, 8
- Crust, generation of new, 803
- Crystal fractionation processes, 747
- Curie temperatures, 539, 703
- Density and velocity depth relations, 520
- Depositional history, Site 290, 29
Site 447, 29
- Diapirlike intrusions, 372
- Diatom assemblages, 591
- Diatoms, Site 449, 327
Site 451, 415
- Dikes, 682
- Diorite, 687
- Environments, deep bathyal-abyssal, 569
- Epilastic turbidity currents, 605
- Ethmodiscus* ooze, 591
- Eurasian plate, 621
- Extensional faulting, 511
- Fault drag, 510
- Faulting, transform, 5, 803
- Faults, 113
normal, 503
- Fe-hydroxides, 600
- Fe-Mn micronodules, 24, 46, 662
- Foraminifers, lysocline of, 567, 568, 569
arenaceous species, 569
benthic, Site 448, 572-573, Table 3
Site 451, 579, Table 7
biostratigraphy and paleoenvironment, 567
larger, 591
shallow-water, 577
Site 447, 567
Site 448, 568; 570-571, Table 2
Site 449, 327, 569; 575-576, Table 4
Site 450, 363, 574
Site 451, 414, 577; 578, Table 6
zonation used, 567
- Fractional crystallization, 776; 777, Table 16
- Fractionation, 689
- Geophysics, Parece Vela Basin, 331
Site 448, 141
Site 451, 419
- Geothermal gradient, 682, 740
- Gouge, 504
- Hakone Volcano, 701, 703
- Halmyrolysis, 615, 619, 665, 747, 749
- Hematite, 619
- High-temperature alteration, 735
- Hole 447A, age of basement, 37
basalts, 67
nature of basement, 755
paleomagnetism, 523; 524, Table 1
paleomagnetism of basalt, 533; 537-539, Table 3
petrochemical units, 671
pillow lavas at, 37
- Hole 448, operations, 114
paleomagnetism, 524; 528, Table 3
- Hole 448A, operations, 118
- Holes 448 and 448A, foraminifers, 124
- Hole 449, basalt from, 672
geologic events recorded at, 810
- Hole 450, age of basalt emplacement, 607
basalt, 672
geologic events recorded at, 811
paleomagnetism, 525
- Hole 459B, basalt, 719
- Hyaloclastites, 605
- Hydrocarbons, 647
- Hydrothermal activity, 737
- Hydrothermal alteration, 600, 682, 739
basal volcanoclastic sediments, 621
- Hydrothermal alteration zone, 634
- Hydrothermal breccias, 134
- Hydrothermal facies, 739
- Hydrothermal fluids, 666, 739
- Hydrothermalism, 615, 619
- Hydrothermally altered zone, 372
- Hydrothermal metamorphism, 129, 681, 735
- Hydrothermal processes, 651
- HYG element discrimination diagrams, 745

- HYG elements, 749
 estimated primordial mantle concentrations of, 749
- Ichthyoliths, Site 447, 28
- Igneous petrography, 127, 329, 366, 418
 Site 447, 31
- Igneous/sediment contact, 36
- Illite, 600
- "Immobile" elements, 724, 747
- Incipient arc volcanism, 681
- Induration, deformation as related to degree of, 504
- Inorganic geochemical measurements, methods of measuring, 10
- Interstitial water, inorganic chemistry of, 31, 126, 329, 365, 418, 627
- IPOD Trough, 649
- Island-arc formation, entrapment of old oceanic crust during, 5
- Island arcs, active, 111
- Island-arc volcanism, chemical evolution of, 787
- Japan, arc tholeiite series of, 750
 calc-alkaline series of, 744, 750
 island-arc tholeiite series of, 744
- Juan de Fuca basalt, comparison to Leg 59, 721
- Kaolinite, 600
- K/Ar isotopic age, 730
- Kerogen, carbon isotopic composition of, 642
- Lanthanide concentrations, 655, 664
- Lavas, pillow, 756, 757
- Leg 59 basalts, alteration chemistry of, 769
- Leg 59 sites, paleolatitudes of, 527
 regional setting of, 487
- Lipid analysis, 647
- Lithologic classification of sediments, 14
- Low-density flow, 516
- Low-temperature alteration, 673
 basalt, 33
 sea water, 769
 secondary, 670
- Magma chamber, 46, 693
- Magma types, 749
- Magma, temperature of, 702, 703
- Magmatic history, Site 447, 779
- Magmatic processes, 746
 Site 447, 773
- Magnetic lineations, 21, 23
- Major-element chemistry, basalt, 686
- Manganese nodules, 326
- Mantle, enrichment of, 750
- Mantle source, 785
- Mantle wedge, metasomatism of, 750
- Marginal basin complexes, 111
- Marginal basin evolution, summary of, 812
- Marginal basins, 147, 681
 formation of, 793
 origin of, 803
- Mariana Archipelago, 358
- Mariana arc-trench system, 5
- Mariana-Bonin island-arc system, 754
- Mariana island-arc system, formation of, 657
- Mariana Ridge, summary of, 811
- Mariana Trough, opening of, 753
- Mariana-type subduction, 793
- Metalliferous basal sediments, composition of, 650
- Metalliferous deposits, formation of, 666
- Metallogenesis, 111, 113, 322, 649
- Metamorphic petrography, 129, 330, 367, 419
 Site 447, 36
- Metamorphism, 735
 hydrothermal, 129
- Metasomatism, 750
- Microfaults, reverse, 509
 syndepositional, 510
- Microfractures, 503, 510
- Micronodules, 662
- Microstructures, 509
- Mid-ocean ridge basalt (MORB), 685
 E-type, 746
 N-type, 746
- n-Alkane count, 642
- Nannofossils, 589
Bramletteius? duoalatus, new species, 559
Calcosolenia compacta, new species, 559
 list of species used, 560
 preservation of, 553, 554
 Site 447, 28, 547
 Site 448, 551; 552-553, Table 2
 Site 449, 326, 554
 Site 450, 363, 554; 555, Table 3
 Site 451, 414, 555; 556-557, Table 4
 zonation of, 547
- Neomorphic minerals, 615
- Neutron activation analysis, 743
- Normal faults, 503
- North Equatorial Counter Current, 602
- Oceanic boundary currents, 601
- Oceanic crust, entrapment of during island-arc formation, 5
- Oceanic Layer 3, 141
- Olivine, 690
 chemistry of, 763
- Ophiolite complexes, 747
- Organic carbon content, (TOC), 641
- Organic chemical properties, average values for in open marine sediments, 645
- Organic geochemical measurements, method of measuring, 10
- Organic geochemical studies, 647
- Organic geochemistry, 30, 126, 328
 363, 416
- Organic nitrogen, 644
- Orthopyroxene phenocrysts, description of, 696
- Orthopyroxenes, 690
- Oxidation, low-temperature, 703
- Oxygen, isotopic composition of, 631
- Pacific plate, motion of, 806
 subduction of, 753
- Pagan Island, 358
- Palagonitization, 605
- Palau-Kyushu remnant arc, 112, 147
- Palau-Kyushu Ridge, description of, 779
 formation of, 808
 seismic profiles, 516
 summary of, 806
- Palau-Kyushu volcanism, 807
- Paleocirculation, 601
- Paleoenvironment, 592, 703
 Site 447, 29
 Site 448, 125, 569
 Site 449, 327, 574
 Site 450, 363, 574
 Site 451, 416, 577
- Paleogene/Neogene boundary, 587
- Paleolatitudes, 539
 Leg 59 sites, 527
 Site 447, 46, 540
 Site 448, 137, 540
- Paleomagnetic measurements, methods of, 18
- Paleomagnetic study of sediments, 523
- Paleomagnetism, Hole 447A, 523; 524, Table 1; 533
 Hole 448, 524; 528, Table 3
 Site 447, 39
 Site 448, 137, 535
 Site 450, 367, 525
 Site 451, 419
- Paleomagnetism of sediments, Site 447, 38
 Site 448, 137
- Paleotemperature curves, 601
- Parece Vela Basin, 147
- Parece Vela Basin, back-arc spreading of, 621
 description of, 755
 formation of, 129, 321
 geophysics, 331
 summary of data from, 808
- Parece Vela Rift, spreading of, 372, 607
- Partial melting, 776
- Petrochemical units, Hole 447A, 671
- Phenocrysts, plagioclase, 761
- Philippine Sea plate, basement formation of, 679
- Physical properties, methods of measuring, 10
 Site 447, 39; 42-44, Table 8
 Site 449, 331
- Pigeonitic pyroxenes, 690
- Pillow lavas, 37, 46, 330, 669, 756, 757
- Pillow structures, 329
- Pillows, altered, 769
- Plagioclase, 618, 690
 chemistry of phenocrysts, 761
- Plate stratigraphy, 609
- Plate-tectonic reconstruction, Site 447, 36
- Pristane to phytane ratio, 642
- Primordial mantle concentrations, 749
- Productivity, equatorial belt of, 612
- Productivity decrease, middle Miocene, 613
- Pyrite mineralization, 637; 740, Table 4
- Pyroxenes, chemistry of, 766
 crystallization temperatures of, 700
- Radiolarians, 591
 biostratigraphy of, 581
 Site 447, 581
 Site 448, 581; 582, Table 2; 583, Table 3
 Site 449, 327, 583
 Site 450, 363, 583
 Site 451, 415, 583
- Rare-earth elements, 687
- Remnant arcs, 112, 147, 681
 origin and evolution, 111
 debris, alteration of, 737
- "Retreating-trench" model, 794
- Reverse microfault, 509
- Ridge sites, HYG element chemistry of, 749
 magma types of, 749
- Ridge subsidence, 621
- Rock chemistry, 702, 758, 761
- Ryukyu Arc, 803
- Sanidine, 619
- Sapinite, 738
- Scyphosphaera* species, Oligocene, 557
- Secondary alteration, low-temperature, 670
- Secondary minerals, 735
- Sediment accumulation rates, 591
 Site 447, 29
 Site 448, 125, 147
 Site 449, 327
 Site 450, 363
 Site 451, 416

- Sedimentary structures, 416
 Sedimentologic analyses, 13
 Sedimentologic modes, 605
 Sediments, paleomagnetic study of, 523
 submerged island-arc environment, 122
 Seismic profiles, Palau-Kyushu Ridge, 516
 Seismic velocities, 515
 Shallow-water foraminifers, 577
 Shear zones, 503
 Shipboard scientific procedures, 7
 Sills, 682
 Site 290, depositional history, 29
 Site 447, east side of West Philippine Basin, 21–110
 background and objectives, 21
 bathymetry and sediment thickness near, 23
 biostratigraphy, 28
 clay mineral stratigraphy, 597
 depositional history, 29
 drilling results correlated with seismic-reflection profiles, 41
 foraminifers, 567
 geophysical survey, 497
 geophysics, 41
 ichthyoliths, 28
 igneous petrography, 31
 lithology of sediments, 25
 mean paleolatitude of, 540
 metamorphic petrography, 36
 nanofossils, 28, 547
 operations, 24
 organic geochemistry, 30
 paleoenvironment, 29
 paleolatitude, 46
 paleomagnetism of basalt, 39
 paleomagnetism of sediments, 38
 physical properties, 39
 plate-tectonic reconstruction, 36
 radiolarians, 581
 regional stratigraphic synthesis, 29
 sediment accumulation rates, 29, 46
 sonobuoy profile, 24
 summary and conclusions, 45, 805
 Site 448, Palau-Kyushu Ridge, 111
 background and objectives, 111
 basalt, 719, 739
 basalt paleomagnetism, 137
 bathymetry, 491
 biostratigraphy, 123
 foraminifers, 568; 570–571, Table 2
 foraminifers, benthic, 572–573, Table 3
 geophysical survey, 141, 491
 igneous petrography, 127
 inorganic geochemistry of IW, 126
 mean paleolatitude of, 540
 metamorphic petrography, 129
 microstructures, 509
 nanofossils, 123, 551, 552–553, Table 2
 operations, 113
 organic geochemistry, 126
 paleoenvironment of, 125
 paleolatitudes, 137
 paleomagnetism of basalt, 535
 paleomagnetism of sediments, 137
 physical properties, 138; 139–141, Table 7; 142–144, Table 8
 radiolarians, 124, 581; 582, Table 2; 583, Table 3
 rock units, 693
 sediment accumulation rates, 125, 147
 sediment lithology, 118
 seismic-reflection profile, 115, Fig. 5
 summary and conclusions, 144, 807
 Site 449, west side of the Parece Vela Basin, 321–354
 background and objectives, 321
 biostratigraphy, 326
 clay mineral stratigraphy, 598
 depositional history, 611
 diatoms, 327
 foraminifers, 327, 569; 575–576, Table 4
 geophysical survey, 495
 igneous petrography, 329
 inorganic chemistry of IW, 329
 metamorphic petrography, 330
 mid-Miocene uplift of, 613
 nanofossils, 326, 554
 operations, 322
 organic geochemistry, 328
 paleoenvironment, 327, 574
 physical properties, 331
 radiolarians, 327, 583
 sediment accumulation rates, 327
 sedimentary lithology, 324, 609
 sequence of geologic events, 335
 summary and conclusions, 333, 808
 Site 450, east side of Parece Vela Basin, 355–404
 background and objectives, 355
 biostratigraphy, 362
 clay mineral stratigraphy, 599
 foraminifers, 363, 574
 geophysics, 368, 493
 igneous petrography, 366
 inorganic geochemistry of IW, 365
 metamorphic petrography, 367
 microstructures, 509
 nanofossils, 363, 554; 555, Table 3
 operations, 358
 organic geochemistry, 363
 paleoenvironment, 363, 574
 paleomagnetism, 367
 physical properties, 368
 radiolarians, 363, 583
 sediment accumulation rates, 363
 sedimentary lithology, 360
 sequence of probable geologic events, 373
 stratigraphic column, 616
 summary and conclusions, 370, 810
 Site 451, east edge of West Mariana Ridge, 405–486
 background and objectives, 405
 bathymetry, 487
 biostratigraphy, 413
 depositional history of sediments 416
 diatoms, 415
 foraminifers, 414, 577; 578, Table 6
 foraminifers, benthic, 579, Table 7
 geophysics, 419, 487
 igneous petrography, 418
 inorganic geochemistry of IW, 418
 metamorphic petrography, 419
 nanofossils, 414, 555; 556–557, Table 4
 operations, 407
 organic geochemistry, 416
 paleoenvironment, 416, 577
 paleomagnetism, 419
 petrologic types, 418
 physical properties, 419; 420–422, Table 4
 radiolarians, 415, 583
 rock units, 694
 sediment accumulation rate, 416
 sedimentary lithology, 409, 489
 sequence of geologic events, 425
 sonobuoy results, 406
 summary, 812
 Slumping, 605
 Smectite, 600, 619
 crystallinity of, 615
 Soft-sediment structures, 504
 South Philippine Sea, formation of, 812
 Spinel, chemistry of, 767; 772, Table 10
 Spreading centers, back-arc, 649
 Sr-isotope ratios, volcanic arcs, 725
 Sr-isotopic composition, basalt, 724
 Subaerial explosion products, 605
 Subduction, 112, 753, 793
 Submarine alteration, 678
 tuffs, 618
 Submarine hydrothermal metalliferous deposits, rapid accumulation of, 666
 Submarine slumps, 605
 Subsidence, 5, 511
 Sulfides, distribution of in sediments, 635
 Sulfur, isotopic composition of, 631, 633
 Survey and drilling data, Leg 59, 7
 SVC mixed-layer silicate, 737
 Syndepositional microfaults, 510
 Tectonic event, 613
 Tectonic evolution, back-arc basins, 613
 Tectonism, vertical, 613
 Tensional stress regime, 753
 Tholeiite magmas, genesis of island arc, 783
 Tholeiites, 681, 682
 Tholeiitic basalt, major-element composition of, 707
 pyroxene analyses of, 698, Table 5
 Tholeiitic volcanism, model of, 674
 Thorium, 659
 Titanium mineral phase, 746
 Titanomagnetite, magnetic properties of, 703
 Todorokite, 619
 Total organic carbon content, (TOC), 641
 Trace-element analyses, 743
 Trace elements, basalt, 724
 sedimentary rocks, 661
 tuffs, 653
 Transcurrent faults, 113
 Transform faults, 5, 803
 Transport mechanisms, volcanoclastic sediments, 605
 Tropical climate, mid-Oligocene–mid-Miocene, 569
 Tuffs, submarine alteration of, 618
 trace elements in, 653
 Turbidity currents, 605
 Uplift, 5, 613
 Velocity anisotropy, 519
 Vermiculite, 600
 Vertical tectonism, 613
 Vitric tuffs, 519
 Volcanic activity, 812
 Volcanic arcs, Sr-isotope ratios, 725
 Volcanic breccias, 515
 Volcanic glass, 360
 alteration of, 602
 refractive-index data for, 604
 Volcanic peaks, 406
 Volcanic rocks from Legs 59, 60, and Juan de Fuca Ridge, comparison of, 722, Table 1
 Volcanoclastic breccia, 747
 Volcanoclastic debris, source of, 28
 Volcanoclastic sediments, acoustic properties, 519
 alteration of, 621
 Volcanism, active margin, 750
 Volcanism, 425, 607, 621, 681, 807

arc, 5
West Mariana and Palau-Kyushu ridges,
geologic evolution of compared, 418
West Mariana remnant arc, 112, 113
West Mariana Ridge, description of, 780
sequence of events, 811
summary of data from, 811
sundering of, 622

volcanism on, 607
West Philippine Basin, 21-110, 803
age of, 41, 806
description of, 754
formation of, 754
magnetic-anomaly patterns, 40, Fig. 13
origin of, 753
Whole-rock chemistry, 683-685, Table 2

Wollastonite, 690
Xenocrysts, 778
Xenoliths, 778
X-ray diffraction studies, 597
X-ray fluorescence (XRF), 743
Yttrium, 659
Zeolites, 619