

# Index

Page numbers in *italic* refer to Figures. Page numbers in **bold** refer to Tables.

- accretion 2, 15, 64, 69, 150–152, 183, 259, 291  
accretionary melange *see* Patuki Melange  
accretionary orogen, construction 331–363  
  accretionary complexes 356–360  
  active continental margin 333–336  
  forearc, distal 347–349  
  forearc, proximal 349–353  
  incipient oceanic arc emplacement 344–346  
  magmatic and tectonic development 361–362  
  magmatic arc 336–340  
  ophiolite genesis and emplacement 340–344  
  subduction–accretion 353–356  
  subduction–accretion/erosion 346–347  
accretionary prism 120, 355  
accretionary wedge 7, 31, 149, 151  
Acheron Lakes Formation 192, 201–203, 297, 299, 306, 308  
  depositional setting 218  
  felsic tuff 303  
  petrography 213, 214, 216  
active continental margin 10, 43, 65  
  geochemical field (ACM) 236–237, 241, 312, 338–339  
  SE Gondwana 60, 67–69  
age correlation, Permian/Triassic 31, 33  
age, conglomerate clasts 287–291  
age, major events and terranes 7, 220, 291, 333  
albite 280, 300, 304, 314, 316  
alkali basalt 143–145, 149, 281  
Alpine Fault *vii*, 1, 2–3, 18, 231  
  review 21–25  
alteration 308, 336  
  mudrock 272–273, 275  
alteration indices 279–280  
ammonite genera 192, 193  
Amuri 1888 Earthquake 22  
andesite 56–57, 81, 83, 84, 88, 143, 316  
  age 289, 290, 291, 306  
andesitic island-arc 238–239, 241, 244, 248, 254  
ankaramite 338–339  
Annear Creek, Upukerora Formation 163  
anorthosite dyke 78, 82, 83, 84, 85  
Antarctica 291, 360–362  
  correlation 334, 358  
  sediment provenance 281–282, 359  
Ar/Ar age 328, 358  
arc development and comparison 62–66  
arc magmatism 183, 223, 231, 338–339  
  age 345–346  
  Brook Street Terrane 43–69  
  igneous rocks and ophiolites 148–149  
  volcanism 10, 315–316  
argillite 124, 128, 131, 133, 236, 268, 269  
arid conditions 220, 281  
Arthurton area 141, 199, 200  
  faulting 142–143  
  petrography 210, 211  
ash 300, 316, 351  
Aspiring Terrane 356, 358  
Atomodesmatinae fossils [bivalve] 34–35  
  *Atomodesma* 295–296, 297  
atomodesmatinid fragments 235–236, 240, 242, 248, 257  
  Early Permian 160, 163–164, 169  
  in melange 138–139, 143, 146–147, 268  
  Mid Permian–Mid Triassic 189–196, 199, 203–208, 216–217  
  photomicrograph 47, 51, 173  
atomodesmatinid limestone 291, 302–303, 356  
  setting and age 348–349  
Australia 2, 45, 282  
  correlation 334  
  Gondwana active margin 360–362  
  sediment provenance 359  
back-arc setting 62, 64–67, 87, 341, 346, 350  
Bald Hill 146, 171, 214  
  Upukerora Formation 164–166, 174, 175–176  
  Patuki Melange 130, 133–135  
  red mudrock 269, 271–273, 275–276, 278, 281  
  semi-schist 353–354  
banding 96–99, 106  
Bare Hill Tuff Zone 298, 301, 303, 305, 306, 308, 316  
Bare Peak 296–297  
Barretts Formation 50, 51, 61, 64  
basalt 56–58, 81, 82–89, 130, 174–177  
  forearc 342, 343  
  subduction-influenced 130, 132, 135, 146, 149  
basalt andesite 56–57, 58, 143, 174, 235  
basaltic lava 122–125  
basement geology 1, 3, 22, 27  
basement terrane 31, 32  
  North Island 357  
batholith *see* Median Batholith  
Bhatia-type diagram 237  
biostratigraphic age review 31–39  
  Permian 37–38  
  terranes and lithostratigraphy 32–37  
  Triassic 38–39  
bioturbation 55, 202, 211, 351  
bivalves 34–37, 39, 45, 49–50, 53, 62 *see also*  
  Atomodesmatinae  
Black Ridge Quarry, melange 136  
Bluff Peninsula, volcanogenic rocks 45, 57, 60, 63  
boninite 79, 82, 84, 87–89, 338, 342, 343  
  melting 109, 110, 114  
brachiopod 34–35, 37–39, 49, 52, 193  
breccia 139, 163, 164, 166, 176  
  dilatational 142, 150  
breccia-conglomerate 134, 135, 136, 146, 148  
  Upukerora Formation 162–171, 176–181, 184, 194, 225  
Brook Street Supergroup 43, 53  
Brook Street Terrane 5, 7, 9–11, 25, 233, 257, 351  
  age and setting 43–44, 290  
  biostratigraphy 32–35  
  correlation/stratigraphy 45, 61–62, 291, 333  
  felsic tuff 293, 294–297  
  geochemistry 56–60, 237, 248, 254–255, 260, 307, 308, 312  
  rare earth elements 310–311  
  geochronology 287–291  
  magmatic arc 223, 336–340  
  petrography 219, 301–303  
  and sedimentology 44–56  
Brook Street Volcanics Group 16, 17, 21, 34  
Brunel Formation 47, 48, 56–61, 295, 297, 301, 315  
  palaeontology 34, 37  
Bryneira Range 78, 83, 86  
bryozoans 35, 36, 49–50, 51  
Buller Terrane 4, 7, 231–232, 333–334, 360, 362–363  
burial 278, 315, 349, 352  
burrows 165, 179, 204, 205, 213, 214, 218  
calc-alkali basalt field 145, 175–176, 312, 313  
calc-alkaline chemistry 81, 84, 87  
calc-alkaline magmatism 280, 338, 343, 345, 360–361  
calci-turbidite 195, 214, 216–217, 297  
Cape Jackson, zircon age 328  
Caples Terrane 7, 11, 25, 86, 89, 120, 140, 148, 150–151  
  Croisilles Melange 136–138  
  geochemistry 240–241, 249–252, 254, 256–257  
  lithostratigraphy 231, 233, 235–236  
  metamorphism/protolith 323–325, 359  
  plate tectonic model 258, 259–260, 333, 355  
  subduction–accretion complex 353–356  
Caravan Formation 49–50, 51, 56–60, 62–63, 295  
  palaeontology 34  
carbonate 305, 309, 348–349  
carbonate platform 62–65, 218, 220, 224–225, 347  
Cascade continental arc basalt, reference 338  
Cerberus Formation 202, 203, 218, 304, 308  
  felsic tuff 297, 299, 303  
  mudrock 271, 276, 279, 281, 282  
  petrography 213, 214, 216  
chemical index of alteration 273, 275, 308, 309  
Chrome Creek Formation 202–204, 214, 218, 303  
  felsic tuff 297, 299  
  petrography 213, 216  
chromite 76–77, 106  
  mineralization 16–18, 341  
clastic sediments 236  
  Upukerora Formation 157–184  
  Maitai Group 195, 195–204  
clay minerals 271–272, 276–277, 279, 280, 305, 314–315  
cleavage 124, 131, 142, 202  
climate 220, 281, 316  
clinopyroxene-phyric dykes 83  
Coal Hill Inclusion 146, 148  
  Patuki Melange 135, 136–137, 248  
collision tectonics 189  
  Early Cretaceous 349, 360, 362  
conglomerate 148, 214, 298  
  channellized 223–224  
  clast, zircon dating 287–291  
  Dun Mountain sequence 84  
  glacial dropstone 232  
  Maitai Group 194–196, 198–204

- conglomerate (*Continued*)  
 provenance 253, 267  
 Upukerora Formation 161–162, 168–170, 179, 180
- conodont 38, 346, 352, 356, 357
- Consolation Formation 52, 63, 302, 306, 315  
 volcanoclastic rocks 295–296
- continental island-arc field (CIA)  
 sandstone 236–238, 241, 243, 246, 248, 252  
 tuff 313, 315, 338–339, 354  
 volcanoclastic sediments 58–59, 64
- continental magmatic arc 281–282
- continental margin forearc 6, 157, 158, 223, 316, 350
- continental margin-arc 293, 315, 317–318
- contourite 216, 217, 224
- convergence, age 360–362
- Cook Strait, zircon age patterns 323–329
- Cook, James 16
- cooling age pattern 326
- copper mineralization 125, 341
- coral 45, 49
- Cordilleran-type arc magmatism 28, 66, 334
- Cordilleran-type ophiolite 184, 342
- Croisilles Melange 76, 86, 127, 136–138, 143, 236  
 accretion 260, 346  
 age 146–148  
 geochemistry 143–146, 247–248, 249, 259  
 metamorphism 149  
 mudrock 272, 278  
 provenance 257  
 tectonic model 149–150  
 type area 120
- crustal evolution 87–88
- crustal lithologies 77, 82–85
- crustal thickening 359–360
- crystallization age 146–148
- crystallographic preferred orientation 99–102, 106–108, 112, 114
- D'Urville Island 78, 84, 85  
 Croisilles Melange 138  
 Upukerora Formation 160–162  
 Patuki Melange 120–124, 125
- Darran Suite 334–336, 347, 358
- Davies, Edward H., geologist 19
- debris-flow deposit 140, 150, 151, 179  
 Maitai forearc basin 196–203, 216–218, 221
- decompression melting 86–87, 88
- deformation 104, 124, 142
- deformation and melt migration, Dun Mountain ophiolite  
 compositional units and fabric 95–99  
 geochronology 104  
 geothermobarometry 101–104  
 microstructures and crystallography 99–101  
 subduction initiation 109–111
- deltaic sediments 350–353
- dendrites 218
- depositional setting 350–353, 351, 352  
 Brook Street Terrane 62  
 Maitai forearc basin 216–218, 220–221, 222  
 sediments within melanges 148  
 Upukerora Formation 178–180
- detrital zircon *see* zircon, detrital
- dextral displacement 24
- diagenesis 218, 278, 314, 352
- diorite clast, age 289
- Divide Formation 52, 63, 296, 302, 303, 306, 315
- dolerite 144–145, 146, 147, 148–149, 173, 174
- Drumduan Group 17, 25, 28  
 Drumduan Terrane 4, 7, 27, 51, 333, 335–336, 349, 360  
 ductile shear zone 111  
 Dun Mountain area, Patuki Melange 89, 125–132  
 Dun Mountain ophiolite vii, 9–10, 16–17, 104, 106  
 age 146–148  
 chromite 76–77, 106  
 deformation and melt migration 93–115  
 faulting 142–143  
 genesis 340–344  
 geochemistry 145, 237, 248, 254–257, 274  
*see also* MORB  
 geology, summary 93–95  
 metamorphism 149, 349  
 stratigraphy/sedimentary logs 77, 86, 159–160  
 subduction model 149–150, 184, 225, 342–344, 346  
 tectonic boundary 355
- Dun Mountain ultramafic, mantle lithologies 77–78
- Dun Mountain–Maitai Terrane 5–6, 7, 10–11, 132, 158, 267  
 biostratigraphy 33, 35–36, 38–39  
 geochronology 287–291  
 lithology 233–235  
 tectonics 157, 281, 355
- dunite 16, 17, 75–79, 82–83, 130–131  
 composition and fabric 94–101, 106–108, 111  
 type locality 106
- Dunton Range 51, 63
- dyke 80–85, 87, 344  
 swarm 46, 148–149, 341–342, 360
- East Eglinton–Hollyford 63, 68, 295–297, 303, 315–316  
 Upukerora Formation 163  
 volcanogenic rocks 51–52
- Eastern Province 3–7, 15, 17, 44, 267, 335–336  
 biostratigraphic age review 31–39  
 lithostratigraphy 233–236  
 terranes 323, 324, 363
- Eglinton Subgroup 34, 51
- Elaine Bay 146  
 Croisilles Melange 137–138
- Elbow Formation 49, 56–59, 61–62  
 geochemistry 306, 309, 315  
 palaeontology 37  
 volcanoclastic rocks 295, 297, 301, 302
- Eldon Formation 192, 204  
 depositional setting 218  
 petrography 214, 216
- Ellis Stream Complex 97–98  
 crystal orientation and fabric 100–101, 102  
 deformation 109, 111–112  
 geobarometry 103–104  
 supra-subduction ophiolite 114
- erosion–subduction 151, 184, 256, 317
- Eu anomaly (Europium) 58, 143, 175, 237, 244, 251–253  
 Maitai Group 238, 247, 248, 275, 280, 309
- Eu/Eu\* in sandstone 59
- eustatic sea-level change 220, 224
- exhumation 150–151, 184, 218, 357, 359  
 Red Hills 110, 112
- exotic blocks 235, 296–297, 347
- exotic terrane 231, 259, 294, 317, 351, 353
- extensional faulting 66, 68  
 growth 180–181, 182, 184, 221, 347–348
- extinction event 281
- Eyre Creek Melange 121, 138, 143  
 oceanic crust 346–347
- fabric 110, 111, 114, 141, 152  
 phacoidal 124, 142
- fabric and compositional units 106, 112  
 Dun Mountain ophiolite 95–99
- facies classification, Maitai Group 216, 217
- fault scarp denudation 220
- faulting 8, 151–152, 180–181, 221  
 forearc basins 224–225  
 Maitai Basin initiation 347–348  
 in ophiolite melange 142–143
- faunal assemblages 9–10
- felsic island-arc source field 238, 241, 244, 248, 254, 257, 274
- felsic rocks 139–141, 149  
 clasts 182, 184, 232  
 volcanic 219, 221, 225, 235, 237
- felsic tuff 293–294  
 arc volcanism/age 315–318  
 chemical analysis 306–313, 314–315  
 petrography 300–304  
 sedimentology/stratigraphy 294–300  
 tectonic environment 316–318  
 X-ray diffraction 304–306
- Fergus Formation 52, 63, 303, 315
- ferruginous mudrock, geochemistry 276
- field photographs 165, 288  
 Maitai Group 195, 197, 200, 202–203  
 melange 123, 131  
 mudrock 270  
 volcanogenic rocks 297, 299
- Fighting Bay, zircon age 328
- Fisherman's Rock, zircon age 328
- Flinn diagram, strain ellipsoid 101, 113
- flood basalt, intra-plate 37
- foliation 80, 82, 96, 98, 101, 106, 112
- forearc basin 10, 68, 87, 93, 112, 113  
 global comparisons 223–226  
 tectonic model 88, 89, 182–184, 347–348
- forearc–seamount collision 181
- fossil 51, 295–296, 329, 352–353, 356, 357  
 micro- 34, 35, 38  
 Permian 339–340  
 record gap 31, 35, 39  
 Triassic 299, 300
- Four Mile Maps 25, 28
- fractionation 68, 252
- gabbro 82–84
- gastropods 34–35, 49, 62  
 genera 147, 193
- Gavenwood Tuffs 298, 299, 301, 316, 317  
 geochemistry 306, 308  
 petrography 303, 305
- geobarometry 103–104  
 methods 114–115
- geochemical discrimination *see* tectonic discrimination
- geochemistry 335, 350, 352, 357  
 analysis 236–237  
 Brook Street Terrane 56–60  
 Caples Terrane 353–354  
 clastic rocks 237–254, 255–256  
 Dun Mountain ophiolites 84–85  
 felsic tuffs 306–313, 314–315  
 Gympie Terrane 338, 339  
 ophiolite melanges 143–146, 147  
 plate tectonic model 258, 259–261  
 Teremba Terrane, New Caledonia 338, 339  
 Upukerora Formation 174–176, 177–178

- geochemistry, mudrock 267–282  
 alteration indices 279–280  
 analytical method 270  
 clay mineral content 276–278  
 major elements 272–273, 278–279  
 rare earth elements 274–275, 277, 280–281  
 XRD semi-quantitative analysis 271–272
- geochronology  
 Dun Mountain ophiolite 85, 104  
 methods 287  
 Stephens Subgroup clast 287–288  
 Weetwood sill 289, 290, 291
- geology map vii, 6, 28, 31, 94  
 historic 17–25
- geothermobarometry 101–104, 108–109
- geothermometry 111  
 methods 114–115
- ghost texture 146, 303, 304
- glacial dropstones 232
- Glendale Formation 49–50, 51, 297
- global-scale change 220–221, 281
- gold field 19, 328–329
- gold rush 17
- Gondor Formation 52, 63, 302  
 geochemistry 56, 306  
 palaeontology 34  
 volcaniclastic rocks 295–296
- Gondwana  
 accretion 64–65, 150–151  
 break-up 2, 3, 5, 8–9, 15  
 margin/trench 113–114, 157, 291  
 South Pole 31  
 subduction 1–11, 28, 31, 348
- Gondwana (SE) active continental margin 60,  
 66–69, 119, 158  
 geochemistry of clastic sediments 231–261, 293  
 tectonic development 183, 184, 223, 225,  
 315–318, 360–362, 361
- Grampian Formation 53–65, 67–69  
 felsic tuff 296, 297, 317  
 geochemistry 305, 315–316  
 palaeontology 34  
 petrography 302, 303
- granite 5, 84, 85, 87, 89, 360  
 trend 275, 308, 309  
 within-plate 147
- granitoid terrane, Australia 358
- gravity flow 296–297, 299, 316, 349, 353, 355  
 deposit 123, 216–218, 221, 235, 303
- gravity modelling/survey 77, 78, 126
- Greenstone Melange 120, 121, 138, 149–150,  
 346–347
- Greville Formation 86, 192, 199, 200, 269  
 biostratigraphy 36, 38  
 depositional setting 218–219, 221, 225,  
 259–260  
 geochemistry 247  
 palaeontology 36, 38  
 petrography 209–211, 216
- greywacke 15, 21, 356–357
- Groom Creek Formation 53  
 geochemistry 55–59, 306  
 petrography 296, 303, 304  
 tectonic setting 64–65, 67, 68–69
- Gympie Goldfield 19
- Gympie Terrane, Queensland 64–65, 67,  
 337–338, 339
- gypsum 277, 305
- Gyzeh 168–169, 171
- Haast, Julius von 16
- Hackett, T. R., geologist 16–19
- harzburgite 76–78, 86–87, 94–104, 106–108
- Hector, James, geologist 17–19, 20, 21, 25
- hematite mudrock 271–273, 278, 279, 281
- Heu Member 163, 171, 180
- Hilton Limestone 50, 62, 63, 68
- historical review, central terranes 15–28
- Hochstetter, F. von 19, 20, 25
- Hokonui Facies 25
- Hokonui Hills 298
- Humboldt petrofacies 215–216, 221, 223, 242,  
 255, 316
- hyaloclastite 46, 47, 49, 63, 64, 69, 125  
 Dun Mountain ophiolite 162–163, 165–166,  
 168, 176–177  
 petrography 214, 301, 302, 303
- hydrothermal alteration 336
- icehouse 220, 281
- igneous rocks, geochemistry 56–58, 61,  
 174–178
- index of chemical variation 273, 275, 279–280,  
 308, 309
- International Geological Timescale 9, 31,  
 33, 38, 39
- island-arc tholeiite 77, 122, 125  
 geochemistry 80, 81, 84–89, 144, 145,  
 175–176, 312
- isoclinal folds 143, 345, 355
- isotope age 39, 146, 328, 358 *see also* U–Pb
- isotope ratio 80–82, 84–86, 326, 328, 358
- Izu–Bonin arc 257, 293, 313, 315  
 geochemistry comparison 274, 335  
 reference basalt 338  
 tectonic development 338–339, 342–344, 348
- Izu–Bonin–Mariana 65–66  
 forearc 66, 86, 149, 257, 345–346  
 subduction zone 150
- Junction Magnetic Anomaly 75, 76, 344
- Kaka Formation 53, 55–57, 62–63, 67, 69  
 palaeontology 34  
 petrography 302, 303
- Kaka Point Structural Belt 6–7, 240–241, 294,  
 299, 351
- Kapiti Island, zircon age 328–329
- Kaweka Terrane 332, 356–357
- keratophyre 139, 140, 168, 170
- Key Summit 198, 208
- Kirwans Dolerite 37
- Kiwi Burn Formation 192, 201, 202, 203, 309  
 depositional setting 218–221  
 felsic tuff 296–297, 298–299  
 palaeontology 36  
 petrography 211, 303, 304  
 tectonic setting 316–317
- L-tectonite 79, 110, 111–114
- Lachlan Orogen, Australia 231, 259, 334, 358
- lagoonal deposition 348
- landslip 167, 168
- Large Igneous Province 37, 346, 349, 363
- lattice preferred orientation 80
- lawsonite 349, 355, 359
- Lea River, Patuki Melange 132
- lherzolite 80, 95–989, 100, 111
- limestone 47, 49–54, 216, 288  
 blocks 201, 202, 203, 211, 221, 225  
 Maitai Group 191–197, 199–203, 217
- Lincoln Hill–Oreti River, Patuki Melange 135,  
 136–137
- lineations 77, 79, 80
- Dun Mountain ophiolite 96–99, 101, 106,  
 111–113
- Lintley Hills 208  
 geochemistry 174, 175–176  
 Maitai Group 169–171, 197–198  
 Otama Complex 139–140
- Little Ben 205, 207
- Little Ben Formation 192, 198, 234, 234, 269  
 depositional setting 217–219  
 geochemistry 240–241, 243–245  
 petrography 208, 209, 216  
 provenance 255–257, 259, 260
- Livingstone Fault 120, 139, 140, 170
- Livingstone Mountains 78, 83–85, 86
- Livingstone Volcanic Group 177
- Longwood Suite 66, 255  
 age/correlation 257, 259, 290–291, 317, 340  
 geochemistry 334–335, 347
- mafic–felsic intrusions, crustal lithologies 83,  
 317, 362–363
- magmatism 59, 176–178, 184, 359–360  
 geochronology 220, 361–362  
 subduction-related 67–68  
 supra-subduction ophiolite 149, 158, 181–182
- magnetic anomaly 75, 76, 344
- Maitai Controversy 19–21
- Maitai forearc basin 221–226, 316, 347–349
- Maitai Group 89, 157–158, 167, 169, 333, 352  
 biostratigraphy 27, 36, 38, 39  
 depositional processes 216–218, 220–221  
 early mapping 5–6, 8, 10–11, 16–17,  
 21–22, 25  
 felsic volcanics 294, 295, 307, 318  
 field observations 193–204  
 forearc basin model 182–184, 223–226  
 geochemistry 238–248, 254–255, 307  
 mudrock 267–282  
 rare earth elements 310–311  
 sandstone 252–253  
 geochronology 85, 287–291  
 metamorphism 149  
 petrography 143, 204–216, 303  
 provenance 231–234, 253–258, 260  
 sandstone composition 222  
 stratigraphy/lithology 76, 140–141, 189–193,  
 243, 296
- Maitai River 205, 209, 211  
 Greville Formation 199  
 Tramway Formation 197
- Maitai Series 21, 23, 25
- Mana Island, detrital zircon age 328–329
- Mangarewa Formation 49, 50, 63  
 palaeontology 34, 37
- mantle 109, 237, 337–338  
 forearc setting 108–109  
 melt migration, deformation 112  
 source 252–253, 254, 360  
 wedge 93, 110, 111–112, 114
- mantle and crustal growth, Dun Mountain  
 ophiolite 75–89  
 crustal evolution 87–88  
 crustal lithologies 82–85  
 mantle evolution 86–87  
 mantle lithologies 76–82
- mantle trend 239, 241, 243–244, 246,  
 248, 274
- Mantle Volcanics Formation 52–53, 63
- Maori quarries 128, 279
- Maori tools 15, 124, 150, 236, 280
- Marlborough Schist 323–326  
 zircon age patterns 326–329

- Martins Olistoliths 193, 201, 203, 213, 234, 246, 297  
 emplacement 218, 220–221, 225
- mass wasting, supra-subduction zone 157, 181
- mass-flow deposits 63, 68, 148, 298, 316  
 Maitai foreland basin 200, 216, 218, 221  
 Upukerora Formation 178–180, 184
- McKay, Alexander, geologist 21–23
- McKellar petrofacies 215–216, 221, 223, 242, 316
- Median Batholith 3–4, 15, 28, 290–291, 317  
 Brook Street Terrane 44, 64, 66–67, 231, 232  
 geochemistry 59–60, 274–275, 280, 282, 309, 312–313, 354  
 XRF data 237, 256  
 Maitai foreland basin 347, 350–351  
 tectonic setting 260, 334–336
- Median Tectonic Line 25–26, 28  
 melange 121–141, 340, 357  
 age 146–148  
 genesis and deformation 146–152  
 geochemistry 143–146  
 metamorphism 85, 149, 269  
 petrography 143  
 provenance 257, 260  
 structure/fabric 141–143  
 tectonic setting 119–120, 150–152
- melt migration, Dun Mountain ophiolite 93–115
- melting stages, mantle lithologies 79–80, 82, 86–88
- metamorphic grade, Caples Terrane 120, 236
- metamorphic paired belts 25–26
- metamorphism 171, 333–334, 352–356, 359, 360  
 Cook Strait 324, 326  
 Dun Mountain sequence 84  
 Maitai basin 189, 215, 349  
 melange 85, 149, 269  
 tuffaceous rocks 300, 307, 314–315
- metasedimentary rocks 249–253, 274–275, 278
- microstructures 99–101, 106–108, 114, 142
- mid-ocean ridge basalt *see* MORB
- mineralization 16–18, 56, 341
- mineralogy 106–107, 267, 305, 306, 314–315  
 Maitai forearc basin 189, 206–207, 209–210, 212–213  
 mudrock 276–278
- Momas Sandstone 236, 250–252, 257
- MORB (mid-ocean ridge basalt) 57, 60, 66, 89, 238, 252, 353–354  
 Dun Mountain ophiolite 81, 84–88, 108  
 field plots 254, 255, 275, 277, 309, 331, 335, 338–339  
 melange 138, 144–146, 149, 152  
 Upukerora Formation 174–177
- Mossburn Quarry 193, 204, 287, 288, 347, 349
- Mount Mistake 198, 208
- mudrock 10–11  
 geochemistry 267–282  
 sedimentology 268–270
- Murchison 1929 Earthquake 22
- Murihiku Supergroup 25–26, 35, 333  
 Willsher Group comparison 352
- Murihiku Terrane 5, 7, 8, 316  
 biostratigraphy 10, 33, 35, 38, 65  
 geochemistry 231, 240–241, 256–260, 307, 314, 318  
 rare earth elements 310–311  
 sandstone 248–249, 250, 251–254, 255–256  
 lithostratigraphy 11, 51, 233, 235, 291, 294–295, 300  
 petrography 257, 303  
 proximal forearc basin 349–351  
 tuffaceous rocks 298–299, 300–301
- mylonite 328
- NASC North Atlantic Shale 277, 313, 315  
 element comparison 242, 248, 272
- Nelson area 18, 48, 212  
 biostratigraphy/stratigraphy 34, 77  
 geochemistry 84, 87, 89, 174, 176  
 Maitai Group 160–171, 191–199  
 Patuki Melange 130  
 volcanogenic rocks 53–55, 296  
 Waiua Formation 199–200
- Neogene deformation 152
- nephrite 15, 85
- New England Orogen, Australia 358, 360
- New Zealand Geological Timescale 31, 33, 38, 43
- New Zealand geosyncline 24–25
- nomenclature  
 Brook Street Terrane 56  
 historic 25  
 Red Hill ultramafics 96  
 terrane 331–333
- Norian–Rhaetian boundary 38, 39
- North Mavora Lake, semi-schist 353–354
- oblique divergence 112, 113, 114  
 oblique subduction 224, 226, 318, 341, 343–345, 358–359, 361
- ocean island basalt field (OIB) 86, 122, 138, 269  
 melange 89, 144, 145–146, 150, 152
- ocean-floor basalt 57, 145
- oceanic arc 1–3, 64, 69, 293, 295, 337  
 geochemistry 219, 255, 315  
 supra-subduction zone 157, 169, 181–182, 184, 344
- oceanic crust 67–68
- oceanic island-arc field (OIA) 58–59, 312, 354  
 analysis 236–237  
 Gympie Terrane 338–339  
 Maitai Group 238, 239, 241, 244, 246, 248  
 Murihiku Terrane 249, 252
- oceanic lithosphere 119, 152, 233, 337, 339, 344–345
- olistolith 203, 213, 216, 221, 234
- olistostrome 36, 119, 201, 297, 340, 345
- olivine grains, harzburgite 99–101, 103–104
- ophiolite 2, 10, 331  
 genesis and emplacement 340–344
- ophiolite-related melanges 5, 7, 119–152
- oroclinal bending 169, 360
- Orongorongo, zircon age 328–329
- Otama Complex 121, 130, 138–141, 157, 158, 218  
 faulting 142–143  
 geochemistry 143–146, 147, 247–248, 249  
 magmatism 184  
 melange 182, 235  
 metamorphism 149  
 subduction/ emplacement 150, 343, 344–346
- Otu Ultramafics 56, 68
- oxygen conditions 216–218, 281
- PAAS *see* Post-Archean Australian Shale
- Pahau Terrane 332, 356–359
- pakohe 15, 17, 123, 124, 269  
 geochemistry 279–280  
 Patuki Melange 128, 130, 131, 137, 149, 150
- palaeoflow 196, 221, 259
- palaeogeography interpretation 27, 28
- palaeontology 10, 17, 19, 21, 26–27
- palaeoslope 348, 352
- Pangaea 2
- Panthalassa Ocean 2–3, 5, 27, 75, 158, 183, 332  
 subduction 149, 150, 259, 267, 293, 318, 334  
 age 67, 339, 358, 360–362
- Parapara Group 36
- Parapara Peak 232, 238
- passive margin 236–237, 241, 312, 313
- Patuki Melange 6, 10, 11, 16, 27, 231, 346–347  
 age 86, 146–148  
 geochemistry 81, 143–147, 247–248, 249  
 mudrock 267–282  
 lithology 76, 77, 78, 121–136, 233, 235–236  
 metamorphism 85, 149  
 provenance 257, 259, 267  
 subduction/accretion/erosion 260, 340, 342  
 supra-subduction zone ophiolite 89  
 tectonic setting 119–120, 149–150, 343, 345
- Peak Fault 131, 142
- peridotite 76, 86–87, 94, 130–132
- Permian age fossils 32–38
- Permian trench restoration 113–114
- Permian–Triassic boundary 36, 160, 268, 281
- petrofacies 215–216, 221, 223, 242, 255, 316  
 petrography 84, 87  
 Brook Street Terrane 45–56  
 Caples Terrane 354–355  
 clasts 289–290  
 Maitai Group 171–174, 204–216, 218–220  
 quantitative 143, 174, 214–216  
 sandstone 231–233, 237, 239, 242, 246, 249, 254–255  
 tuff and tuffaceous rocks 300–304
- photomicrograph  
 Caples Terrane, volcanogenic rocks 126  
 Dun Mountain ophiolite 100, 106–107  
 extrusive rocks 173  
 felsic tuff 302, 304–305  
 Maitai Group 206–207, 209–210, 212–213  
 melange 127, 128  
 sedimentary rocks 126, 172  
 volcanogenic rocks 47, 51
- Pig Valley Quarry 297, 304, 309, 313, 316
- pillow basalt/lava 122–125, 132–135, 137, 170
- pillow breccia 165, 167
- Plagioclase Zone 104, 112  
 deformation 109, 111  
 Dun Mountain ophiolite 96, 98  
 geothermobarometry 101, 103  
 microstructures 99
- plagiogranite 80, 82–87, 94, 104, 109, 158, 346  
 age 146  
 dykes 148–149
- plant fossil debris 56, 169, 235, 299, 351, 356  
 Jurassic 17, 25, 28  
 leaf 34, 169  
 tree stump 35
- plant fossil, *Glossopteris* 50
- plate tectonic model 258–260, 268, 332, 333, 355  
 Brook Street Terranes 67–68  
 Dun Mountain ophiolite 183–184
- plate tectonic reconstruction 1–8, 9, 10, 27, 361
- Plateau Complex 99, 112  
 deformation 109, 111  
 geothermobarometry 101, 103
- Plinian-type eruption 315–318
- pluton 60, 67–68, 291  
 age 334, 340
- porcellanite 300, 302, 316
- Porter Fault 77, 78, 87, 97, 98–99  
 deformation 109, 111

- Porter's Knob 96  
 Post-Archean Australian Shale 149, 279, 313, 315  
   element comparison 272–273, 274  
 Princhester Creek 48, 49  
 Productus Creek Group  
   age 62, 291, 348  
   arc association 339–340  
   biostratigraphy 33–34, 38  
   lithostratigraphy 49, 63, 68, 289, 295, 297  
 protolith 124, 128, 137, 148, 174, 358  
   Marlborough Schist 323–325  
 provenance 10–11, 268, 278, 287, 291, 293, 309  
   chemical discrimination 309, 312, 316, 335, 336  
   continental margin-arc 354–355  
   detrital zircon 350–351  
   Eastern Province 335–336  
   Maitai Group 181, 205, 243, 253–258  
   sediments 148, 274  
     clastic 217, 218, 236  
     volcaniclastic 58, 61  
   Waipapa Terrane 358  
   Zealandia 359  
 provinces of New Zealand 17  
 pseudo-bedded fabric 124  
 pseudostratigraphy 119, 135, 146, 149, 158, 340–341  
 Pukerua Bay, zircon age 328–329  
 pyroxene thermometry 101–103  
 pyroxenite banding 9, 96–97, 106
- QMAP, 1:250 000 scale 28, 31  
 Queensland 281, 291
- radiolarian 38, 49, 301, 352, 357–358  
 radiometric dating 27, 28, 38, 51, 340  
 Rakaia Terrane 8, 151–152, 329, 332, 354–358  
   zircon age 323, 325, 328  
 rare earth elements 289  
   Brook Street Terrane 56–58, 60, 65, 69  
   Dun Mountain ophiolite 79–80, 84  
   felsic tuff 306, 308–309, 310–311, 313, 315, 353  
   melange 143–145  
   mudrock 270, 274–275, 277–278, 280–281  
   sandstones 236–238, 240–244, 247–248, 251–253, 257  
   Upukerora Formation 159, 174–175, 177
- Red Hills ultramafic massif  
 deformation 104, 109–112  
 geology 94–95, 96  
 geothermobarometry 102, 108–109, 111  
 mantle lithologies 78–82
- Red Mountain–North Mavora Lake 132–133  
 red mudrock 269, 271–276, 278, 281–282  
 Redcliff Creek 48  
 REE *see* rare earth elements  
 rheology 104, 108  
 rhyolite 55, 64, 65, 83, 87, 139, 141, 168, 170, 295  
   flow-banded 303  
   geochemistry 306, 316
- Richmond area, felsic tuff 300  
 Richmond Group 235, 237, 256, 260, 298, 303, 316  
   bivalves 17  
   geochemistry 305, 306
- rifting, Tasman Sea 360, 362  
 Riverton Peninsula, volcanogenic rocks 45–46  
 Roaring Bay, tuffaceous rocks 298  
 rock fall, submarine 178, 184
- Roding River 205, 208, 209, 211  
   Greville Formation 199  
   Tramway Formation 196–197  
 rodingite 75, 85, 123, 124–125, 130, 133  
   banding 97, 111  
 rutile 271, 272, 305, 314
- sandstone, source discrimination plot 238–239, 242, 243, 244–247, 248  
 Saxton Conglomerate 253  
 sea-level change 63, 220, 224  
 sea-surface temperature 220  
 seafloor spreading 93  
 seamount 138, 149, 150, 257, 281  
   accretion 354–355, 357–359, 362  
 seamount–trench collision 181  
 sediment accommodation, Maitai forearc 221  
 sediment, rate of supply 224  
 sedimentary geochemistry 231–261  
   Eastern Province 233–236  
   methods 236–237  
   provenance 254–258  
   Western Province 231–232, 234, 237–254  
 sedimentary rocks 136–137  
   Dun Mountain ophiolite 160  
   Otama Complex 139–140  
   Patuki Melange 123–124  
   Upukerora Formation 178, 179, 180  
 sedimentology 193–204  
   Brook Street Terrane 45–56  
   Maitai forearc basin 189–226  
     logs 190, 193, 204, 234, 269  
   mudrock 268–270  
 seismic profile, offshore, Stewart Islands 191  
 semi-schist 236, 251–252, 257, 260, 326, 353–354  
 serpentinite 16–17, 27, 123, 124–138, 152  
 serpentized fault 87  
 shear 84, 111, 112, 113, 328  
 sill 56, 83, 87, 289, 290, 291  
 Skippers Range, volcanogenic rocks 52–53, 63, 68  
 slab 112–114, 183, 184, 345  
 slab roll-back 67, 68, 87, 224, 344, 360–362  
 Slabby Peak Schist 63  
 slickenside 142, 167  
 slide 178, 180  
 slump 198, 203, 204, 217–218, 221, 224, 351–352  
 Snowden Formation 192, 204, 214, 218, 297  
   petrography 212  
 soft-sediment deformation 198, 299, 351  
 South Pole, Gondwana 31  
 Southland area 77, 212  
   geochemistry 84, 87, 89  
   Upukerora Formation 162–163  
 Southland Syncline 152, 300  
 spinel 77–80, 82, 86–87, 96–101, 106  
 spreading, rate of 88  
 St Arnaud–Lake Rotoiti, volcanogenic rocks 53  
 Stephens Subgroup 192–193, 200–204, 223, 234–235  
   biostratigraphy 38  
   clast analysis 289–290  
   depositional setting 218–219  
   geochemistry 240–241, 246–247, 253–254, 256, 306  
   mudrock 269  
   palaeontology 36  
   petrography 211–214, 216, 304  
   provenance 257–260
- tectonic setting 225  
 tuffaceous rocks 296–297, 298–299  
 strain 101, 142  
   rate of 104, 108, 114  
 stratigraphy 33, 45, 233, 291, 333  
   Dun Mountain ophiolite 77, 86, 159  
 stress estimate 104, 108  
 strike-slip faulting 231  
 structures, South Island 8  
 subduction–accretion, melange 119–152  
 subduction-influenced basalt 146, 148–150, 152  
 subduction, SE Gondwana 1–11, 31, 66  
   age of cessation 359–360  
   initiation 87, 89, 109–111, 342–344  
   magmatic rocks 60  
   polarity 182, 342  
   sediment proxy 66–67  
 supra-subduction terrane 75, 317, 362–363  
 supra-subduction zone 157, 159, 169, 184, 344  
   accretion 346–347, 353–356  
   magmatism 86–87, 89  
   ophiolite 150, 181–182, 225  
 Swamp Bay 124
- Taipare Bay, Patuki Melange 124–125, 129  
 Takaka Terrane 4, 7, 231–232  
   geochemistry 237, 238  
   tectonic setting 333, 334, 360, 362  
 Takitimu Mountains 65–66, 301, 315  
   arc development 62–63  
   volcanogenic rocks 46–49, 295  
 Takitimu Subgroup, volcanism age 35  
 talus 178, 180, 225  
 Taringatura Group 298, 299, 301, 305  
 Tasman Sea Basin 8, 68, 119  
   rifting 360, 362  
 Tasman, Abel 16  
 Tasmin Metamorphic Belt 26  
 Te Anua Series 17, 25  
 tectonic discrimination plot 81, 85, 175, 177, 219, 249, 307, 335  
   Brook Street Terrane 56, 58–59, 312  
   Caples Terrane 251, 354  
   Maitai Group 178, 238–239, 242, 244–247, 253, 276, 279, 289, 313  
   mudrock 274  
   Murihiku Terrane 250, 256, 314, 351  
   ophiolite melange 144, 147  
 tectonic geochronology 7, 220, 361–362  
 tectonic magmatic model 88, 355–356, 361–362  
   Brook Street Terrane 67–68, 317, 337  
   Maitai forearc 182–184, 221–226, 258, 347, 348  
   melange 149, 151, 345, 346  
   Murihiku Terrane 350, 351  
 tephra 293, 299, 303, 305, 312, 317  
 Terawhiti, goldfield 328–329  
 Teremba Terrane, New Caledonia 65–66, 68, 259, 337–339  
   fauna 351  
   geochemistry 350  
 terrane 2–89, 16, 27, 226, 325, 332  
   biostratigraphy 31–36  
   boundary, zircon age 328  
   Eastern Province 323, 324, 363  
   Western Province 317, 362–363  
 terrigenous sediments 257, 343, 350–351, 355  
 Tethyan, subduction 150, 341–342  
 thermometry/temperature 77, 80, 111  
   two-pyroxene 79, 101–103, 108–109  
 tholeiite 62, 87 *see also* island-arc  
 tholeiitic andesite 290

- thrusting 143, 151, 152, 347  
 timescale 9–10  
 Torlesse Composite Terrane 7–8, 25, 323, 325, 333  
   accretionary complex 332, 356–359  
   age 328–329  
   geochemistry 354–355  
 Torlesse Terrane/ Rakaia Terrane 138  
 trace element 85, 143, 147, 159, 289  
   felsic tuff 306, 308–309, 312–314  
   mudrock 270, 280–281  
   sandstone 236, 237, 238  
 trace fossil 36, 50, 179, 197, 217  
 Tramway Formation 86, 140, 169, 269  
   geochemistry 240–241, 242–225, 247, 346  
   lithostratigraphy 192, 196–198, 217, 233–234  
   palaeontology 36, 38  
   petrography 205, 207, 208, 215, 219  
   provenance 255, 257, 260, 267  
 transtensional deformation 110, 111–114, 152  
 Trechmann, Charles T. 21  
 trench 120, 345, 346, 358  
   accretion/subduction 150, 152  
   obliquity 110, 111, 113–114  
 Triassic fossils 33, 35–39  
 tuffaceous sediments 293, 300–317, 336–337, 349, 352  
 Tuhua Intrusives 59, 333–336, 350–351  
 turbidites 268, 296–298, 351, 352  
   Maitai Group 179–180, 197, 216–217, 221  
   melange related 135–136, 148, 150, 152  
   provenance 259, 281  
 Turkey, ophiolite subduction 150  
 Two Tarns Harzburgite 95–99, 104  
   deformation 109–112  
   geothermobarometry 102–103, 111–112  
   melting, deformation 108–112  
  
 U–Pb isotope age 11, 158–160, 182, 193, 199, 233, 236  
 U–Pb zircon age 62, 86, 146, 148, 326, 336–337, 358  
   Maitai Group clast 287, 289–291  
   plagiogranite 104, 105  
 ultramafic rocks 27, 77, 82–85  
 unconformity 177  
   Upukerora Formation 161, 164, 166, 167–169  
   Maitai Group 194–196, 347  
   underplating 151, 152, 340, 346, 357  
 upper continental crust field (UCC) 252  
   felsic tuff 306, 309, 313, 315  
   Maitai Group 238, 241, 243–245, 247–248  
   mudrock/melange 275, 279–280  
  
 Upukerora Formation 134, 136, 193–195, 225, 269  
   age 85, 159  
   conglomerate and breccia 84  
   contact interpretation 347  
   depositional setting 151, 216, 221  
   faulting 180–181  
   geochemistry 174–178, 238–239, 240–241  
   Otama Complex, comparison 344–345  
   palaeontology 36, 37, 38  
   petrography 171–174, 205, 206, 215, 218–219, 233–234  
   provenance 223, 254, 255, 257  
   red beds 135, 140, 148  
   study method 158–159  
  
 volcanic arc source 290  
 volcanoclastic sediments 10, 235, 255, 258–259, 293–318, 344  
   geochemistry 57–59, 60, 61–62  
   microfacies 54–55  
 volcanogenic rocks 336–338, 340, 351–356  
   Brook Street Terrane 43–69  
 Von Hochstetter, F., geologist 16–18  
  
 Waioeka Terrane 358  
 Waipapa Composite Terrane 25, 323–326  
   accretionary complex 357–360  
   zircon age 323–329  
 Wairaki Breccia 50, 51, 62, 63  
 Wairaki Hills, cover succession 49–51, 65–66  
 Wairoa Olistoliths 221, 234  
 Wairoa River 208, 213, 214  
   Little Ben Formation 198  
   Stephens Subgroup 203  
 Wairoa–Lee River 211, 213, 215–216, 297, 303, 306  
   Stephens Subgroup 201–202  
 Waiua Formation 192, 199–200, 204, 234, 259  
   depositional setting 218, 260  
   geochemistry 240–241, 246–247  
   mudrock 269, 276, 281, 282  
   palaeontology 36, 38  
   petrography 211, 212, 216, 219  
 Wakatipu Metamorphic Belt 26  
 weathering 268, 273, 279, 281, 308  
 Weetwood andesite, age 289–290, 291  
 Wellman, H. W. 22–25  
 West D'Urville Island, succession 55–56  
 West Dome 171, 205, 208  
   geochemistry 174, 175–176  
   Maitai Group 166–168, 196–199  
   Patuki Melange 135–136  
   petrography 210, 211  
  
 Western Otago, Upukerora Formation 162–163  
 Western Province 3–7, 15, 17, 31, 32, 36, 44, 282  
   active continental margin 67, 333–336  
   geochemistry 59–60, 231, 232, 237, 238  
   metasediments 274–275, 278, 280–281, 309, 312–313  
   terrane 317, 362–363  
 Whangamo, Patuki Melange 125  
 white mica 328, 352  
 Willsher Group 30, 236, 304  
   arc volcanism 316  
   felsic tuff 294, 299–300, 301  
   geochemistry 240–241, 247, 252, 254, 307, 309, 313, 314, 352  
   rare earth elements 310–311  
   petrography 303–304  
   provenance 257–258  
   proximal forearc basin 351–353  
 Windley River–West Dome 166–168  
 within-plate basalt 122, 123–124, 127, 144–147  
 Wooded Peak Formation 157, 160, 165  
   depositional setting 180, 216–217, 221  
   geochemistry 239–242  
   lithostratigraphy 194–196, 233–234  
   mudrock 268, 269  
   palaeontology 36, 38  
   petrography 171, 173–174, 205, 206–207, 215, 219  
   provenance 254–255, 257, 260, 267  
   tectonic setting 223, 225  
 Worley, William F. 21  
  
 XRD data 279, 280, 353  
   semi-quantitative analysis 271–273  
   felsic tuff 304–306, 314  
 XRF data 237, 238, 249, 252  
  
 Zealandia 28, 331–333  
   Gondwana margin 287, 291  
   historical review, central terranes 15–28  
   plate tectonics 1–5  
   sediment provenance 359  
   timescale 9–10  
 zeolite 149, 298, 305, 315, 352  
 zircon 64, 85 *see also* U–Pb  
 zircon, detrital 64–65  
   geochronology 9, 11, 85, 86, 160, 183, 223, 236  
   accretionary orogenesis 334, 344, 347, 350–351, 355–359  
   Gondwana-derived 223, 257, 259, 315  
   Marlborough Schist 323–329  
   analysis and samples 326–329