

Index

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

- Abitibi–Opatica boundary *142*
Acadian orogeny 291, 297, 332, 345, *346*
 Newfoundland 311, 313, *314*, 315
Acadian Seaway 299, 301
Acadian Thrust *316*
Acadian–Grampian–Caledonian orogeny 211
Ackley Granite 299
acritarchs, and climate change *77*
Aegir Ridge *394*, 395, 397, 402, *403*, 404, *405*
Aegir Transform 383
Aegir–Mohns step 383, 384
Aether Ocean 337
Africa LLSVP 93, 94–95
AFRICA seismic array 141
Alabama–Oklahoma transform fault 338, 339,
 345, *346*
Albula Nappe *124–125*, 126–127
Alleghanian–Ouachita orogeny 345, *346*
Alpide Plate boundary zone *117*, *118*
Alpine collision 113, 213
Alpine plate cycle *208*, 212–213
Altyn Tagh Fault, mantle lithosphere 143–145
Amadeus Basin *464*, 472
Amasia supercontinent 89, *91*
Amazon Basin *464*, 467, 470
Amazonia 21, 22, 26
 Ganderia sediments 304
 transform motion with proto-Laurentia 344
Ancona–Anzio line 220
Annieopsquotch accretionary tract 290, 297, 299, 302
Apennine plate cycle *208*, 212–213
Apennines fold-and-thrust belt *see* Northern Apennines
Apennines Orogeny *207*, 228
Appalachian orogen, Atlantic versus Pacific fauna
 265–266
 see also Atlantic faunal realm
 formation 265–266
 Wilson Cycle 311
Appalachian–Caledonian orogen 256, 257–258, 259, 266,
 267, 289, 290, 291
 peri-Gondwanan terranes
 arrival time 292–296, 304
 Britain and Ireland 295, 296–297, 298
 major boundaries 302–304
 Maritime Canada and Gaspé 295, 298, 300–301
 New England 295, 298, 301–302
 Newfoundland 295, 297, 298, 299–300
 sutures 291–296
 transects 296–302
 plate tectonic evolution 267
 Taconian arc–continent collision 290, 292
Appalachian–Caledonian orogenesis 19, 21, 88
Appalachian–Ouachita orogenic belt 337, 338
Appalachian–Ouachita orogeny 345, *346*
Archaean Craton 259
Archiclimacograptus 320, *324*
Arctic Ocean *394*
 transforms 385–386
Arctica supercontinent 65
Argand, Émile (1879–1940), *La Tectonique de l'Asie*
 (1924) 3
Armorica 355, 357, 358, 367, 368
Armorican faunal provenance 357
Atlantean Unconformity 213, *214*
Atlantic faunal realm 1, 2, 265–266, 273, 279, 289, 312
Aurica supercontinent 89
Avalon Composite Terrane 269, 272, 274, 279
Avalon Platform 265, 266
Avalon Zone 268
Avalon–Meguma boundary 301
Avalonia 10, 211, 267–280, 290, 291
 basin development 272, 273
 boundary with Ganderia 301, 303, 304
 boundary with Meguma 301, 303, 304
 collision with Laurentia 32, 33, 291
 convergence on Laurentia 29, 30
 fauna 272, 273, 274, 275, 279
 Gondwana connection 274, 275, 277–279
 island arc model 267, 268, 270, 271–272, 279
 magmatism
 main phase arc 270, 271–272, 275, 279–280
 pre-main phase 269–271, 279
 transition to platform 270, 272–273, 279
 as peripheral orogenic belt 274–275
 platform 270, 273–274, 279
 pre-plate tectonic paradigm 265–267
 regional correlation 274
 subduction 271, 273
 as a terrane 269
 Wilson Cycle 265–266
Avalonia reconstruction 277, 278
Avalonian orogen 272, 273, 275
 isotope tracking 275–278, 279
Avalonian orogeny 269, 274–275
Avalonian–Cadomian belt 272, 273, 275
 active margin reconstruction 277, 278
 isotope tracking 275–278
Badger Group 299, 303, 304
Badwater turtleback 177, 187, *188*
Baffin Bay 377, **378**, 379, 381, *394*
Bahamas fracture zone transform 338, 339, 341, *342*
Baie Verte–Brompton Line 300, 301, 302
Ballantrae Ophiolite 292, 296
Baltic Shield, Precambrian suturing 400
Baltica 26, 29
 collision with Laurentia 21, 30, 35, 291
Bamford Brook Fault 300, 301, 303
banana split strength *138*, 139
Banda arc volcanism 419
Banda Embayment 416, *418*, 419
Banda Ridges 419
Banda slab 419–420
Banda subduction zone *418*, 419–420
Banda Trench *418*
Bangweulu craton 472

- Base Cretaceous Unconformity 207, 213, 214, 215, 219, 221
- Base Jurassic Unconformity 213, 214, 215
- Base Permian Unconformity 207, 212, 214, 215
- Base Upper Cretaceous Unconformity 213, 214
- Basin and Range Province
crustal thickness 174
geology 174, 175, 176, 177
- Bay of Biscay transform margin 376, 377, 378, **378**, 380, 382–383
- Bay of Islands ophiolite 33, 297, 313
- Bay of Islands region 313
- Berkshire Massif 314, 332
- Bertrab Nunatak 22
- Bight Fracture Zone 394, 401
- biotite, Monarch Canyon 181, 182, 184, 184, 185, 186, 196
- Birmingham frontal thrust ramp 347, 348
- Birmingham intracratonic rift-parallel graben system 342, 344, 347–349
- Black Mountains 174, 176, 177, 199
EBSD 190, 191, 193
field relations 187, 188
mineral chemistry/thermodynamic modelling 178
optical microstructures 189, 191
petrography/microstructure 177–178, 189, 190, 191
- Blosseville Kyst 383, 384, 402
- boninites 415, 433
- Botwood Group 299
- boudinage, crustal 174, 179, 180
- Boundary Canyon detachment 174, 176
- Bradore Formation 312, 313, 316, 320, 330, 331
- Brasiliano orogeny 465, 470, 471
- Brompton Line 300, 301, 302
- Bronson Hill Belt 302, 304
- Brunswick subduction complex 290
- Bullard, Sir Edward Crisp (1907–1980), Atlantic continental fit 6
- Buol Fault 429
- Burin Group 270, 271, 274
- Cabot strike-slip fault 32, 33
- Cadomian orogen 272, 273, 274, 275, 277
- Cadomian orogeny 274, 275
- Calcare Massiccio Formation 222, 224, 226
- Caledonian Orogen 211, 354, 404, 405
Scandinavian, Wilson Cycle 167–168
- Caledonian Orogeny 211–212, 217, 396, 400–401
- Cambrian
palaeogeographic reconstruction 24, 25, 26
transgression 26
- Cambrian explosion 77, 78
- Camerino Basin 219, 225, 226
- Canada Basin 377, **378**, 385–386
- Cape Cormorant Formation 312, 316, 330, 331
- carbon, platform sediments
Neoproterozoic 78, 79
supercontinents 69, 71, 78
- Carrick Thrust 359–360, 359
- Castner Marble 23
- Celebes Sea, subduction 416
Cotobato Trench 423, 425–427
North Sulawesi Trench 427–430
- Cenozoic, displacement, Europe 114
- Central Fjord 405
inherited structures 401
- Central Maine Belt 302, 303
- Centralian Basin 472
- Charlie Gibbs Fracture Zone 246, 257, 258, 377, 394, 401
- Charnwood terrane 297
- China National Digital Seismic Network 141
- Chloride Cliff shear zone 174, 176, 180
- chlorite, Monarch Canyon 196
- Choubert, Boris (1906–1983)
Paleozoic orogenic belt reconstruction 3
Precambrian cratonic convergence 19
- Chukchi Borderlands 377, 385
- Cimmeride plate boundary zone 118
- Clam Bank Formation 313, 314, 315, 316
- Clew Bay Line 302
- climate change, and supercontinents 68–69
Pannotia 77
- climatic cycles
glaciation 54, 55
sea-level change 53–55
- CO₂, atmospheric 71, 77
- Coats Land, Laurentia southern cone 22–23, 25
- Codroy Group 313, 316
- Colfiorito Basin 225, 226, 232
- Columbia/Nuna supercontinent 42, 56, 65, 337
kinematic evidence 45
orogens collision and LIPs 46
compression, and rifting 387–388
- Congo Basin 464, 467, 469, 470
- continent–continent collision 3, 4, 5, 31, 289
supercontinent formation 88–89
- continent–ocean boundary (COB)
Indonesia 416, 418
in plate kinematic models **247**, 249, 250, 253, 255
- continental drift 3, 6
- continental insulation 51, 67–68, 87–88, 89–91, 95, 96, 97
- cordierite, Monarch Canyon 195
- Cordilleran Ranges 119, 120
- core–mantle boundary
heat flow 53, 91, 93, 96, 97
LLSVPs 53, 93–95, 96
- Cornubian Batholith 356, 365, 366
- Cornubian terrane 358
- Cotobato Trench 416, 417, 420, 421, 422, 423, 425–427, 431–432
- Cow Head Group 313, 316, 317, 327
- cratonic basins 11–12, 464, 470–471
basal unconformity 465–466
characteristics 465–467, 468, 470
Gondwana and Laurentia 471–472
mechanisms of formation 467, 469, 473, 474
megasequence 465–467, 470, 472
Precambrian 472
shape 465
subsidence 466–467, 469, 472, 473
and Wilson Cycle 463, 465, 469–475, 474
- Crawford Group 300
- Crawford–Skipper Basin 215, 217, 221
- creep, diffusion to dislocation 440–441
- crème brûlée strength 138–139, 143
- crust, oceanic, subduction initiation 420–422

- Cuyania terrane 25, 27–29, 30–31
 collision with proto-Andean margin 33
 transfer to proto-Andean margin 27, 28–29, 30–31
 continent–continent collision 31
 Laurentia–Gondwana collision 31
 Ouachita embayment ridge crest jump 29
- cymatogen 106
- Cymru terrane 291, 297, 301
- Dalradian Supergroup 211
- Daniels Harbour Member 312, 317, 320–324, 330, 331
- Danmarkshavn Ridge 383, 386
- Dartmouth Group 357
- Dashwoods terrane 290, 297, 302, 304, 313
- Davidsville Group 299
- Davisville Arc 33
- De Geer Transform 375–376, 377, **378**, 383,
 385–386, 387
- Dead Sea Transform 382, 387
- Death Valley 174, 175
 extensional evolution 197–200, 198
- Declining Ocean stage 3, **4**, 5
- deformation
 Cenozoic, Black Mountains 177
 Europe 107, 108, 112–113, 114–116, 115, 117
 intra-plate 139, 140, 143, 144, 145, 147
 NE Atlantic 383
 Paleozoic, Newfoundland 311, 330
 progressive 106
 role of crustal structures 10, 173–174, 177–200
 US Rockies 119–124, 126, 127
 Variscan 358, 359
- Dense Array 141
- density anomalies, large-scale degree-2 8
- Devil's Bight Fault 318, 322, 323, 330
- Devonian
 Laurentia reconstruction 32
 orogenesis and faulting 32, 33
- Dewey, John, hot-spots and mantle plumes 6
- Dietz, Robert S (1914–1995), Wilson Cycle 6
- Digdeguash Formation 300, 301
- Dog Bay Line 299, 302, 303
- Doushantuo acritarch assemblage, extinction 77
- Dover Fault 299, 304
- downwelling 43, 87, 88–89, 92–93, 97, 98
- du Toit, Alexander Logie (1878–1948), supercontinents 3
- Duncans Brook Formation 300
- Durness succession, Olenellid trilobite fauna 28
- dyke swarms
 Newfoundland 329
 supercontinent breakup 67, 70
 Pannotia 76
- dykes
 Black Mountains 187, 188, 189
 Monarch Canyon 174, 179, 180
- Earth, magnetism, and supercontinents 52–53
- earthquakes
 and faults
 Europe 107, 108, 109–111, 117, 119
 UMAR 228
- East African Orogeny 73, 76
- East Avalonia 267, 277, 278, 279, 291, 297
- East Gondwana, assembly 73
- East Shetland Platform
 faults 215, 216, 217, 218, 221
 geology 206, 209
 palaeogeographical reconstructions 208
 plate cycles 210–213
 reactivation and inversion 228–229, 232
 controlling factors 231, 233, 234
 rifting 212–213
 seismic surveys 213, 215–217, 218
 tectonic events and stratigraphy 207
 well data 213, 214
- eclogite 400, 404, 422
- Eddystone Gneiss 356, 357, 358
- Ediacara biota 77, 78, 272–273
- Ela Nappe 124–125, 126
- Elalbula Nappe 124, 126
- Elf Canyon 176, 188
- Ellsworth terrane 304
- Elmtree Inlier 300, 303
- Embryonic Ocean stage 3, **4**, 5
- England, earthquakes 119
- epeirogeny 105
- episodicity, in Earth processes 7, 45–47, 55
- Err crystalline rocks 126
- Eurasia, as supercontinent? 41, 67, 470
- Eurasia Basin 376, 377, **378**, 386, 387, 394, 395
- Eurasian plate, as proxy for supercontinent 42
- Eurekan Orogen 377, 382, 387, 388
- Europe
 deformation 107, 108, 112–113, 114–116,
 115, 117
 faulting 107, 108–111, 112–113
 lithospheric strength 113–116
 magmatism 116–117
 plate boundaries 117, 118–119
 western, evolution 210–213
- extension
 ductile 341
 synrift 341–344
- extensional systems
 characteristics 158, 160–165
 Death Valley region 174, 177–200, 198
 hyperextension 158, 160, 166
 versus mature oceans and Wilson Cycle 166–168
 immature 157–158
 mantle exhumation 158, 160
 oceanization 160, 166
 orogenic collapse 158, 165–166
- extinction events 55, 68, 91, 92
- extroversion 43, 44, 51, 88–89, 91, 97
- Falkland/Malvinas Plateau 31
- Famatinian Arc 30, 33
 calc-alkaline volcanics 31
- faulting
 Europe 107, 108–111, 112–113
 Rocky Mountains 121, 123–124
 strike-slip, and orogenesis 33
- faults
 Northern Apennines 219
 synrift intracratonic 341–344
see also transforms
- Fiastrone Valley 222, 224
- Fladen Ground Spur 214, 215, 217, 218, 221

- Flannan Reflector 401
 Flemish Cap 254, 258, 376, 377, **378**,
 382–383
 transform margin 378–379, 380, 387
 Florida promontory 338, 341
 Flume Ridge Formation 301
 folding, posthumous 105–106
 forearc basins 294, 302
 Newfoundland 311
 foreland basins 300, 301
 retro-arc 297
 synorogenic flexural 345–347
 Forteau Formation 312, 316
 fossils
 Cambrian, Atlantic versus Pacific 265
 Neoproterozoic 77, 78
 Foxe Channel 376, 381, 383, 387
 fracture zones, North Atlantic 401
 Fram Strait 377, **378**, 388
 France, earthquakes 119
 Franklin Mountains 22, 23
 Fredericton Fault 301
 Fredericton Trough 300, 301, 302, 303
 Funeral Mountains 174, 176, 177–187
 mineral chemistry and thermodynamic
 modelling 178
 optical microscopy 179, 181, 182
 petrography and microstructure 177–178
see also Monarch Canyon
- Gander Group 299, 304
 Gander River Ultramafic Belt 299, 304
 Ganderia 10, 290, 291, 296, 297, 299–300, 301
 arrival time 304
 boundary with Avalonia 301, 303, 304
 boundary with Laurentia 303
 Garin Formation 300
 garnet, Monarch Canyon 174, 179, 180, 181, 182,
 184, 196
 Gaskiers glaciation 76–77
 Gaspé, peri-Gondwanan terrane 295, 300–301
 Gaspé–Connecticut Valley Trough 300, 303
 geomagnetic field 52
 geocentric axial dipole 52
 reversal 7, 53, 91, 92, 290, 292
 modelling 443, **444**, 449, 450, 451–455
 subduction zones 439, 455
 Georgia transform fault 345, 346
 geosynclines, pre-plate tectonic paradigm 6, 265
 Germany, earthquakes 119
 glacial rebound 7
 glaciation
 climatic cycles 53, 54, 55
 and orogenesis 33
 and supercontinents 55
 gneiss
 Black Mountains 188
 Death Valley region 174, 175, 176, 177, 180
 Monarch Canyon
 EBSD 187
 microstructure 179, 181, 182, 184
 mineral chemistry 184, 186
 Goban Spur 376, 377, **378**, 382–383
 transform margin 379, 380, 387
- Gondwana
 assembly 21, 24, 26, 73, 80, 471
 association with Pannotia 73
 collision with Laurasia 88
 collision with Laurentia 9, 20, 31, 304
 cratonic basins 471–472
 formation of Pangaea 88
 Hirnantian glaciation 33
 kinematic evidence 45
 and mantle convection 41
 Neoproterozoic–Cambrian reconstruction 268, 269
 orogens, collision and LIPs 46
 separation from Laurentia 26–27, 34
 as supercontinent? 41, 42, 45, 67, 68, 73, 79,
 80, 470
 Goose Tickle Group 312, 314, 316, 317, 320, 321, 322,
 323, 324
 Gorontalo Bay 428, 429
 GPlates 8
 GPS networks 8
 grain damage 142, 148
 Grampian orogeny 290, 292, 296, 297
 Gramscatho Basin 356, 357, 358, 361, 366, 367
 Grangegeeth terrane 297
 granite, SW England 356
 Granite–Rhyolite Province 25, 28, 339, 340
 graptolites, Maritime Canada 300
 Great Glen strike-slip fault 32, 33, 211
 Greater Ancestral Rocky Mountains 124
 Green Mountain Massif 314, 332
 Greenland, motion, and compression 387–388, 404
 Greenland–Iceland–Faroe Ridge (GIFR) 394, 395,
 396, 397
 Grenville Front 338, 339
 Grenville Mobile Belt 254, 258
 Grenville province
 Amazonian 344
 Laurentian 344
 Grenvillian orogen 21, 22, 23, 26, 27
 Grenvillian orogeny 25, 45, 88
 U–Pb zircon geochronology 48
 Grog Brook Group 300
- Haag Nunataks 23
 Halibut Horst 214, 215, 218
 Hawke Bay Formation 312, 316
 Hayes Brook Fault 300
 heat flow, core–mantle boundary 91, 93
 Hel Graben 383–384, 386
 Helvetic Nappes 113
 Hercynian orogeny 113, 117
 Hercynian System 128–129
 Hf isotopes
 Pannotia 74, 79
 supercontinent cycles 48, 49, 68, 69, 77
 high-velocity lower crustal bodies (HVLCBs) 400,
 401, 405
 Highland Border Complex 292, 296, 302
 Highland Boundary Fault 211
 Hirnantian glaciation 33
 Holmes, Arthur (1890–1965), mantle convection 3
 hotspots 50
 LLSVP edges 51–52
 Hudson Strait 376, 377, 381, 383, 387

- Humber Arm Allochthon 311, 312–313, 315, 317, 320, 322, 323–324, 325, 327–328, 330
 3D structure 328–329
 hyperextension 158, 160, 166
 North Atlantic 254, 256–259, 380
- Iapetus Ocean 1, 19, 20, 293
 Appalachian, reconstruction 31, 33
 closure 10, 30, 88, 211, 268, 290, 311, 338, 354
 evolution 19–33
 fracture zone 256
 opening 26, 211, 290
 along Grenvillian belt 22
 reconstruction 20–33
 width 31, 33
see also proto-Atlantic (Iapetus) Ocean
- Iapetus Suture 257, 258, 259, 290, 292, 299, 303, 353, 404, 406
- Iapetus–Caledonian plate cycle 207, 208, 211–212
- Icart gneiss 275, 277
- Iceland, and magmatic evolution 401–402
- Iceland Plateau 394, 395
 formation 402
- Iceland–Faroe accommodation zone 397, 401, 403, 405, 406
- Iceland–Faroe Fracture Zone 394, 395, 404
- Iceland–Faroe Ridge 394, 395, 397, 398, 404
- Illinois Basin 464, 471, 473
- India–Asia collision 107, 143, 144, 145
- Indian Head Inlier 314
- Indian Islands Group 299
- Indonesia
 geological background 416–419
 subduction initiation 416, 417, 418, 419–434
 Banda 416, 419–420
 model 420–422
 Sulawesi–Philippines 420
- insulation, continental 51, 67–68, 87–88, 89–91, 95, 96, 97
- introversion 43, 44, 51, 88–89, 91, 97
- Inuitian orogen 386
- inversion 106, 205
 ESP 212, 215, 216, 228–229
 controlling factors 231, 233, 234
 Northern Apennines 226–228, 229, 232
 controlling factors 231, 233, 234
- Ireland, peri-Gondwanan terranes 296, 297
- island arc, Avalonia 266, 267, 268, 270, 271–272
- Izu–Bonin–Marianas arc, subduction initiation 415, 433
- Jameson Land Basin 384
- Jan Mayen Fracture Zones 394, 395, 401
- Jan Mayen microcontinent 377, 384
- Jan Mayen microplate complex 11, 393–406, 398
 bathymetry 394, 395, 398
 crustal affinity 395, 397
 formation 395, 402, 403, 404
 magnetic anomalies 398
 separation 395, 397, 404, 405
 tectonic inheritance model 402–406, 403
- Java slab 419
- Java Trench 418
 subduction 416, 419, 420
- Jeanne d'Arc Basin 380
- jelly sandwich strength 138–139, 142
- K-bentonites 27, 29, 30, 31, 33
- Kangerlussuaq Basin 384
- Kenorland supercontinent 65, 68, 469
 kinematic evidence 45
- Ketilidian Orogen 396, 400
- Keweenawan large igneous province 22, 23, 467
- Khatanga Transform 377, 387
- kimberlites 50, 51–52
- Kings Trough transform fault 378
- Knoydart Formation 301
- Kolbeinsey Ridge 394, 395, 402, 403, 404–405, 405
- Kraken High 215, 217, 218, 221
- Kraken Oilfield 219, 220
- Kufra Basin 464, 465, 470
- Kuungan Orogeny 73, 76
- kyanite, Monarch Canyon 174, 178, 179, 180, 181, 195
- Labrador Group 312, 320, 321, 322, 323
- Labrador Sea 246, 378, 382–383
 opening, transform 376
 plate kinematic models 253
 tectonic inheritance 245–246, 254, 256–260
 transform margin 379, 380, 381–382, 387
- Labrador Sea–Baffin Bay spreading system 404
- Lacolle Breccia 314
- Laga Basin 222, 225, 226, 231
- Lakesman terrane 297, 304
- Lancaster Sound 377, 387
- Lapland–Kola mobile belt 396, 400
- Laptev Rift 387
- Laramide basement uplift 311, 332–333
- Laramide orogeny 119, 121, 174, 332–333
- large igneous provinces
 and super-plumes 50–51, 93, 97
 and supercontinents 51, 56, 91
- large low shear velocity provinces (LLSVPs) 8, 50–52, 53, 96
 and mantle dynamics 42, 97
 and supercontinent cycle 42, 51, 56, 93–95, 97
- Late Cimmerian Unconformity 213, 214
- Laurasia 88
- Laurentia
 active margin, peri-Gondwanan terranes 290
 association with Rodinia 88
 collision with Avalonia 33, 291
 collision with Baltica 21, 30, 291
 collision with Gondwana 9, 20, 31, 290, 304, 471
 cratonic basins 471–472
 evolution 9, 10, 21–33, 34, 35
 Cambrian rift–drift phase 26–27, 35
 Mid-Ordovician tectonic interaction with Gondwana 27–31
 Ordovician arcs and glaciation 31, 33, 35
 pre-rift palaeogeography 21–25
 Silurian–Devonian orogenesis and faulting 33, 35
- passive-margin thermal effects, transform faults 344–345
- rifted margin 341
 reconstruction 337, 338
 as semi-supercontinent 470
 separation and closure with Europe 19

- Laurentia (*Continued*)
 separation from Gondwana 26–27
 southern cone 19, 21, 23, 25, 35
 strike-slip motion relative to Gondwana 20, 31, 34, 35
- Laurentia–Ganderia boundary 303
- Laurussia 211
- Lazio–Abruzzo Carbonate Ridge 210, 222
- Leadhills Line 297, 299, 303
- leucosomes
 Black Mountains 187
 Monarch Canyon 178–179, 180, 182, 185, 196
- Lighthouse Cove Formation 313
- Ligurian–Piedmont Ocean 212, 213
- Lithoprobe project 141
- lithosphere
 deformation, measurement 8
 layering 97, 137, 139, 147
 rheology 97, 137, 138–139, 173–201
 strength 138–139
 banana split 138, 139
 crème brûlée 138–139, 143
 Europe 113–116, 127
 jelly sandwich 138–139, 142
 thinning 91, 97
see also mantle lithosphere
- Littlewood Nunatak 22
- Lizard Complex 355, 356, 357, 358
- Lizard ophiolite 367
- Llanoria 27
- Lloyd's River Fault Zone 297, 302
- Lomonosov Ridge 377, 386
- Lomonosov Transform 376, 377, **378**, 385, 386, 387
- London–Brabant Massif 108
- Long Point Group 313, 314, 316
- Long Range Complex, fossils 265
- Long Range Inlier 312, 314, 327
- Long Range precursor fault 320, 322, 323, 330
- Long Range Thrust 315, 318, 320, 322, 323, 327, 329–330
- Looe Basin 356, 357
- Lower Head Formation 313, 316, 317, 327
- Lower Rhine Rift 113, 116
- MAGIC seismic array 141
- magmatism
 Avalonian 267, 269, 276
 Europe 116–117
 evolution, North Atlantic 401–402
 HVLCBs 400, 401
 Permian, Rheic–Rhenohercynian Ocean suture 365
 Rheic–Rhenohercynian Ocean suture 356, 357
 subduction 422, 429
 supercontinent assembly 67
 Pannotia 76
 US Rockies 121, 123
- magnetic anomalies, ocean floor 7
- magnetism, and supercontinents 52–53
- Magog Group 301
- Makarov–Podnikov Basin 377, 386
- Malino Fault 429
- Malvern Plutonic Complex 271
- mantle convection 7–8, 96
 and supercontinents 41, 42, 80, 88–89, 91–93, 95, 97–98
- mantle downwelling 43, 87, 88–89, 92–93, 97, 98
- mantle dynamics 9
 seismic imaging 93–95
 and supercontinents 41–43, 42, 95, 97–98
- mantle exhumation 158, 160
 North Atlantic 258–259
- mantle lithosphere 137–148
 damage structures 141–145
 deformation 160
 ductile extension 341
 evolution 160–165
 fertilized mantle (type 2) **161**, **162**, 163, **164**, 165
 heterogeneous mantle 161–163, **164**
 homogeneous mantle **161**, **162**, 163, **164**, 165
 grain damage 142, 148
 heterogeneities 137–138, 141–142, 143–145, 146, 160
 imaging 140–141, 142, 145–147
 numerical modelling 142–145, 148
 scarring 10, 141–145, 146, 147–148
 seismic studies 145–148
 Wilson Cycle 168
- mantle plumes 88, 89, 91, 93, 94, 95, 96, 97–98, 473
see also super-plumes
- mantle viscosity 7, 97
- Marinoan glaciation 76, 77
- Marne a Fucoidi reflector 225, 226
- Mascarene Basin 301
- mass extinction *see* extinction events
- Matano fault 423, 425
- Matapedia belt 303, 304
- Mature Ocean stage 3, **4**, 5
- Meadfoot Group 357
- Meguma terrane 291, 301, 304
 boundary with Avalonia 301, 303, 304
- Meguma Zone 268
- Megumia 291
- melanosomes, Monarch Canyon 179, 182, 183, 184, 196
- Melville Basin 358, 365, 366
- Menai Straits Fault System 297, 304
- MERMAID project 141
- Merrimack Trough 302, 303
- metamorphism
 Avalonia 272, 301
 Death Valley region 174, 175, 176, 177, 179–200
 Indonesia 429
 supercontinent assembly 67, 68
 Pannotia 76
 Variscan 358
- metasomatism, Avalonia 267, 272
- Michigan Basin 464, 467, 469, 471, 472–473
- microcontinent, definition 397
- microplate
 definition 397
 formation model 397, 399
 Australia–Greater India 397, 399
 Jan Mayen 402–406, 403
- Mid-Atlantic Ridge 7
- Mid-Cimmerian Unconformity 207, 212, 213, 214, 221
- Mid-German Crystalline Rise 355, 358, 364, 368
 magmatic arc 366
- mid-ocean ridge 3, 7
- Midland Valley terrane 296
- migmatites, Monarch Canyon 179, 184, 187
- Minas Fault Zone 304

- Mindanao, volcanism 426–427, 430
 mineralization, supercontinent cycles 50
 Miramichi Highlands 290, 300, 302, 303, 304
 Mirovoi Ocean 276, 280
 Missisquoi transform fault 345, 346
 Mississippi Embayment 342, 343
 Mississippi Valley graben 341, 342, 343, 344
 Mistaken Point assemblage 272
 Mohns Ridge 395, 405
 Mohns Transform 383
 Monarch Canyon 174, 176
 EBSD 177–178, 185, 186–187
 evolution 197–199
 metamorphic phases
 electron microprobe analysis 178, **179**
 field relations 178–179, 180
 microstructure 179, 181, 182–184
 petrogenesis 191, 193, 194, 195–196
 retrograde reactions
 greenschist and metasomatic 196–197
 melt-consuming to subsolidus 194, 196
 mineral chemistry 184, 186
 Monarch Springs shear zone 174, 176, 180
 Monian orogeny 297
 Monian terrane 297, 304
 Møre Basin 376, 383, 384, 385
 Moretown terrane 301, 302, 304
 Mormon Point turtleback 176, 177, 187, 188
 Mporokoso Basin 464, 472
 Mt Igno Thrust 223
 Mt Igno–Valnerina Anticline 219, 222
 Mt Igno–Valnerina Thrust 222, 223, 225, 226
 Murzuq Basin 464, 465, 470
 muscovite, Monarch Canyon 174, 179, 181, 182, 196
 mylonite
 Black Mountains 177, 187, 188, 189, 190, 191,
 192, 193
 Monarch Canyon 174, 179, 182, 184, 185, 186,
 194, 196
- Någrind Syncline 383
 Nagssugtoqidian Orogen 396, 400
 nappes, Variscan, Rheic–Rhenohercynian Ocean
 suture 358
 Natal embayment 24, 25
 Navan–Silvermines Line 297, 299, 303
 Nd ratio, seawater, supercontinent cycles 48–49, 50, 77
 NE Atlantic conjugate margin 376, **378**, 395
 spreading 383, 395
 Neddy's Hole Fault 318, 322, 323, 330
 NeoNuna 337, 339
 assembly 340
 Neoproterozoic, global reconstruction 66, 75
 neotectonic regime 107
 New Jersey transform fault 345, 346
 New York–Alabama magnetic lineament 338, 342, 344
 Newfoundland
 aeromagnetic data 315, 319, 327
 correlations
 other orogens 332
 regional 332
 geological mapping 314, 315, 317, 322
 faults and folds 320, 323, 324, 327, 330–332
 outcrop-scale structures 323–325
 Laurentian margin 295, 297, 298, 299–300
 seismic data 315, 317, 320, 321, 327–328
 stratigraphy 312–313, 314, 316
 tectonic and structural history 313, 315
 Acadian deformation 313, 315
 basement and rifting 313
 Taconian deformation 313
 well data 317
 Wilson Cycle 311, 313
 Newfoundland Fracture Zone 246, 256
 Ngalia Basin 472
 non-Wilsonian break-up 378–382
 Normannian Nappe ('Normannia') 355, 358
 subduction 358, 365–366, 367, 368, 369
 North America, eastern, Wilson Cycles, and tectonic
 inheritance 337–350
 North Atlantic Craton 396, 400
 North Atlantic Ocean 246
 bathymetry 394, 398
 geological setting 393–395
 opening 88, 256–258, 394–395
 palinspastic plate model 250–256
 tectonic inheritance 254, 256–260
 pre-rift 254, 256, 257
 reactivation 256–257, 259
 reconstruction 1, 2, 252, 254, 256–257
 seafloor age 396
 structure and inheritance 399–402
 Caledonian orogeny 396, 400–401
 fracture and accommodation zones 401
 HVLCBs 400
 Iceland and magmatic evolution 401–402
 Precambrian orogenies 396, 400
 tectonic inheritance 245–246, 256–260
 North Banda Sea 419, 421, 425, 432
 subduction
 Sula deep 422, 424
 Tolo Trench 422–423
 north Barents Sea margin 376
 North German Basin 112, 114
 North Iberia Fault 377, 378, **378**
 North Pyrenean Fault 376
 North Sea, uplift/erosion 212
 North Sulawesi trench 416, 417, 420, 421, 428–429,
 430, 431–432
 North Sulawesi volcanic arc 416, 419
 Northern Apennines
 collision 213
 field geology 217–222
 geology 206, 209–210
 inversions 226–228
 palaeogeographical reconstructions 208
 plate cycles 211–213
 reactivation and inversion 229, 231, 232
 controlling factors 231, 233, 234
 rifting 212
 seismic interpretation 222–228
 subsurface geology 222–226, 230
 tectonic events and stratigraphy 207
 Northern Phyllite Zone 366
 Northwind Ridge 385–386
 Norumbega Fault System 303
 Norway Basin 395, 397, 398
 spreading 404

- Norwegian–Greenland Sea conjugate margin
377, 379
- Notre Dame Arc 33, 297
- Novantia 297
- Novopangaea supercontinent 89
- Nuna supercontinent 42, 56, 65, 68, 337, 469
continental insulation 90
kinematic evidence 45
margin transform 339–340
orogens collision and LIPs 46
- ocean basins 3, 4, 5
repeated opening and closing 2–3, 7, 11
work of Wilson 6, 19
size 157
- oceanization 160, 166
- oceans
opening along older orogens 21–22
wide, closure 166
- Oclroyic Orogeny 27, 31, 33
- Olenellid trilobite fauna 19, 20, 26, 27, 28, 29
- Olevano–Antrodoco–Mt Sibillini thrust system 210,
219–220
- Ollantaytambo–Umachiri Arc 33
- Oman ophiolite 415, 433
- ophiolites 8, 433
formation 415
Indonesia 416, 433
Laurentian margin 296, 297, 299, 300
Newfoundland 313, 314
obduction, Laurentia 33
- Ordovician, Laurentia reconstruction 27–31, 33
- Orlock Bridge Fault 303
- orogenesis
continent–continent collision 88
and glaciation 33
- orogenic collapse 158, 165–166
- orogens, older, and ocean opening 21–22
- Orphan Basin 254, 256, 257–258, 259, 378
- Orphan Basin rift 379, 380, 387
- orthoversion 43, 44, 89, 91, 97
- Ouachita embayment 25, 26, 27, 28, 29, 31, 338,
339, 346
- Ouachita Thrust Front 342
- oxygen
atmospheric, and supercontinents 77, 80
isotopes, Pannotia 74, 79
supercontinent cycles 48, 49, 68, 69, 71
- Pacific faunal realm 2, 265–266, 289, 312
- Pacific LLSVP 93, 94–95
- Pacific Ocean, opening 22
- Pacific Plate, as pseudo-supercontinent 95
- palaeogeography, early Palaeozoic 20, 21, 22
- palaeosomes 179, 182
- palaeotectonic regime 107
- Paleopangaea supercontinent, kinematic evidence 45
- Palombini shale 126
- Palu–Koro fault 428–429
- Pan-African belt 274
- Pan-African Orogeny 73, 76, 79, 80, 267, 269, 465,
470, 471
- Pan-African suture 21, 22, 26
- Panamint Mountains 174
- Pangaea 2, 3, 7, 39, 67, 68, 469
assembly 9, 52, 67, 71, 88, 211, 337, 338, 343, 470
breakup 9, 40, 67, 88, 212, 337, 338, 386–387, 470
circum-supercontinent subduction 90
conjectural hypotheses 44–45
continental insulation 91
and mantle convection 41
orogens, collision and LIPs 46
reconstruction, Permian 90
True Polar Wander 52
work of Wegener 39, 40
- Pannotia supercontinent 9, 22, 23, 25, 34, 56, 65, 73–80
assembly 66, 73
breakup 67, 73, 76
kinematic evidence 45
Pan-African Orogeny 76
reconstruction 24, 25
- Paraná Basin 464, 470
- Paris Basin Magnetic Anomaly 366
- Parnaíba Basin 464, 465, 466, 473, 475
characteristics 465–467, 468, 470
gravity anomaly 467, 472
- Parsons Pond precursor fault 320, 321, 322, 323, 330, 331
- Parsons Pond region 312, 313, 316, 318
3D structure 328–330
- Parsons Pond Thrust 314, 315, 317, 318, 321, 322, 323,
327, 329–330
- Parsons Pond Thrust Sheet 317, 324, 326, 327, 332
structure 329–330
- passive margins 3, 4, 5, 67, 68, 76
- Pelham Dome 302
- Pendower Formation 357
- Pennine Nappes 113
- Pennsylvania salient 346, 347
- Penobscot orogeny 290, 302, 304
- peri-Gondwanan terranes 277, 279
accretion 290
reconstruction 277, 278
see also Avalonia
- periodicity, in tectonic processes 43, 44
- Permian, displacement, Europe 114
- Philippine Trench 416, 417, 420, 422
subduction 430–431, 432
- Piper Shelf 214, 215, 218
- plate kinematic model classification 246–256
deformable models 247, 249–252
boundary 247, 249–250
margin
averaged 247, 250, 251, 252
palinspastic 247, 250, 251
retro-deformed beta grids 252–256
dynamic models 247, 249
North Atlantic Ocean 256–260
proxies 44–45
rigid models 247, 248–249
- Plate Tectonic Cycle 2, 87
see also Wilson Cycle
- plate tectonics 87
start of, and supercontinents 52
- PLATES project 21
- Plymouth Bay Basin 361–363, 364, 365, 366
- POLARIS seismic array 141
- polarity reversal *see* geomagnetic field, reversal
- Popelogan Inlier 300, 302, 303, 304

- Porcupine Basin 254, 256, 257–258, 259, 380
 Port au Port Group 312, 315, 316, 320, 321, 322, 323, 327
 Porto–Tomar Transform 377, **378**, 387
 post-Sauk unconformity 348, 349
 posthumous folding 105–106
 Precambrian, cratonic basins 472
 Precambrian orogenies, North Atlantic Ocean 396, 400
 Precordillera, early Palaeozoic 27–28
 proto-Andean margin, collision with Cuyania 33, 35
 proto-Atlantic (Iapetus) Ocean 1, 2, 3, 19, 266, 375
 closure 10
 see also Iapetus Ocean
 proto-Avalonia 269–270, 272, 276, 279–280
 proto-JMMC 404
 proto-NE Atlantic Transform 383, 385, 386, 387, 388
 Puna Arc 33
 Pyrenean collision 113
 Pyrenees, hyperextended rift system 166
- Quebec embayment 346
- radioactive decay, as source of heat 7
 Rae Craton 400
 reactivation structures 10, 105–107, 137, 205
 Europe 112
 ESP 212, 228–229, 231, 232, 233–234
 Northern Apennines 229–231, 232, 233, 234
 Swiss Alps 124–125, 126–127
 North Atlantic 256–257, 259
 Rheic–Rhenohercynian Ocean suture 353, 359–369, 359
- Red Indian Line 290, 299, 301–302, 303
 Red Island Road Formation 313, 316
 Redlichliid trilobite fauna 19, 20, 26, 29
 rejuvenation 105–107
 Europe 116–119
 Jan Mayen Microplate Complex 402–406
 Relic Suture Zone stage 3, 4, 5
 renegade structures 105–106
 replacement structures 106, 107
 resurrected structures 106
 revolutionary structures 106, 107
 Reykjanes Ridge 394, 395, 397, 403
 Reykjanes Transform 383
 Rheic Ocean 30, 208, 211, 353, 368, 369
 closure 88, 291, 354–355, 366, 367
 spreading 211, 291, 354
 Rheic–Rhenohercynian Ocean suture 11, 353, 354–355, 354, 367, 368–369
 extensional reactivation 353, 359–369, 367
 geophysical evidence 360–364, 365–366, 368
 Permian magmatism 365
 magmatic arc 358, 366
 SW England
 lower plate
 basement 355–357, 361–363
 sedimentation 357, 360–364
 upper plate 357–358, 361–363
 tectonic model 367, 368–369
 Variscan convergence 358
 structures 358
 extensional reactivation 359–369
- Rheic–Variscan plate cycle 207, 208, 211–212
 Rhenohercynian Ocean 353, 355, 366, 367, 368
 subduction beneath Normannia 358, 365–366, 368, 369
 rheology, lithosphere 97, 137, 138–139, 173–201
 inheritance 173, 197, 199–200
 fabric evolution 197–199
 ridge crest jump 29
 Rift Basin stage 3, 4, 5
 rift systems 157
 immature 157–158
 rifting
 continental margins
 and compression 387
 tectonic inheritance 340, 341, 343, 344
 ESP 207, 212–213
 Newfoundland 313, 330, 331
 North Atlantic Ocean 254, 256–258, 395
 supercontinent breakup 67, 70
 Pannotia 76
 Rinkian Orogen 396, 400
 Rockall Basin 254, 256, 257–258, 259, 380, 387
 Rockall Trough 377, **378**
 Rocky Harbour mélange 317, 318
 Rocky Mountains, US
 deformation 119–124, 126, 127
 fault systems 121, 123–124
 Rodinia supercontinent 21, 22, 42, 56, 65, 66, 68, 469
 assembly 88, 337, 338, 339, 344
 breakup 66, 79, 80, 88, 337, 338
 kinematic evidence 45
 and mantle convection 41
 orogens, collision and LIPs 46
 rollback
 Banda 416, 418, 419, 420
 North Sulawesi 421, 422
 Rome Trough 342, 344
 Roseland Breccia 357
 Rotliegend Group 212, 213, 214, 215, 216, 221
 Rough Creek graben 342, 344
 Round Head Thrust 314, 315, 330, 331–332
 Rowe Belt 301, 302
- sag basin stage 3, 4
 Saguenay–Montmorency transform fault 345
 St Croix terrane 301, 304
 St George Group 312, 316, 320, 321, 322, 323
 St George Unconformity 312
 St Paul's Inlet 318, 323
 Salinian orogeny 291, 304, 311
 salt diapirs, North German Basin 112
Salterella 28
 San Andreas Fault 147, 375
 Saxothuringian Zone 355, 366, 368
 Scandian orogen 30
 Scandian orogeny 21, 27, 33, 35, 400, 401
 Scandian subduction 402, 404
 schist
 Death Valley region 174, 175, 176, 177
 Monarch Canyon 174, 180
 microstructure 179, 181, 182
 mineral chemistry 184
Schollentektonik, Europe 113, 115, 127
 Sclavia supercraton 45
 Scythides, right-lateral shear 113, 114

- Sea of Exploits *see* Tetagouche–Exploits back-arc basin
- sea-level change
and supercontinents 53–55, 68–69, 70, 71
Pannotia 77
- seafloor spreading 3, 4, 5, 7, 39
and compression 387
Kolbeinsey Ridge 403, 404
- sedimentation, Rheic–Rhenohercynian Ocean suture 357
- seismic imaging, mantle lithosphere 141–142, 145–148
- seismic tomography
global 8, 9
North America 145
- seismographs, plate tectonic theory 7, 8, 9
- semi-supercontinents 41, 470–472, 473
- Senja Fracture Zone 394, 401
- Senja Ridge 383
- Sept Iles transform 338, 340, 345, 346
- Sevier Orogeny 174, 175
- shear zones, right-lateral, Europe 112–113
- shortening, US Rockies 121, 122
- Sibillini Mountains Anticline 219, 225
- Sibillini Mountains Thrust 219, 222, 224, 226
- Signal Hill Group 272
- sillimanite, Monarch Canyon 174, 181, 182, 195
- Silurian
Laurentia reconstruction 30, 33
orogenesis and faulting 32, 33
- Skird Rocks Fault 303
- slab avalanches 46, 51
- slab-pull 96, 97, 98, 421, 422
- Snowball Earth 55, 76–77
- Solway Line 290, 292, 297, 299, 303
- SOPALE modelling 142, 143
- Sormany Group 300
- South America, lower Palaeozoic carbonate platform 27
- South Banda Sea 419
- South Devon Basin 356, 357
- South Georgia Basin 341, 342
- South Grand Banks transform 340
- South Viking Graben 216
- Southern Oklahoma fault system 338, 339–340, 344
- Southern Uplands Fault Zone 296, 303
- Southern Uplands terrane 292, 293, 296–297, 299
- sphenochasms 112
- Sr ratio, seawater
Cambrian 28
supercontinent cycles 48–49, 50, 54, 68, 69, 71, 72, 77, 78
Pannotia 77
- Start Complex 356, 357, 366
- Start–Perranporth Zone 356, 368
- stromatolites, and climate change 77
- subduction
acceleration 46, 89
circum-supercontinent 42, 43, 51, 87, 88–89, 90, 95
HVLCBs and inherited structures 400–401
Indonesia 416, 417, 418, 419–434
initiation stage of Wilson Cycle 415–434
comparison with natural examples 457–458
interaction with slab geometry 455–457
model 420–422
slab polarity 439, 455
Laurentian 33, 290, 292, 303
Newfoundland 311
lithospheric 3, 4, 5
oceanic 3, 4, 5, 166
Rheic–Rhenohercynian Ocean suture 358, 365–366
seismic evidence 7
slab polarity, reversal modelling 443, 444, 449, 450, 451, 452, 453, 454, 455
subsidence, passive-margin, transform faults 344–345
Sula deep 416, 417, 420, 421, 424, 425, 432
subduction 422
Sula Spur 416, 419
Sulawesi–Philippines, subduction initiation 420
sulphur, platform sediments, supercontinent cycles 69, 71, 72
- Sunda Trench 416
- super-plumes 42, 43, 46, 93, 94, 95
and LIPs 50–51
see also mantle plumes
- superchrons 53
- Supercontinent Cycle 2, 7, 8, 9, 39–41, 42–44, 67–71
definition 9, 42, 470
difference from Wilson Cycle 7, 9, 43–44
extroversion 43, 44, 51, 88–89, 91, 97
Hf isotopes 48, 49, 68, 69, 77
hypothesis 42–43
introversion 43, 44, 51, 88–89, 91, 97
and mantle dynamics 41–43, 42, 93–95
and mass extinction 55, 79, 80
orthoversion 43, 44, 89, 91, 97
proxies 45–50
mineralization 50
plate kinematics 44–45
Sr ratio 48–49, 50, 54, 68, 69, 71, 72, 77, 78
U–Pb zircon geochronology 47–48, 69
stages 42, 43, 87–88, 89
True Polar Wander events 51, 52–53, 55, 56
- supercontinents 7, 39–56, 67
assembly processes 67–70
orogeny 80
breakup 67, 70–71, 96, 98
atmospheric oxygen increase 77
continental insulation 90
pre-existing suture zone 88
rifting 67, 80
and climate change 68–69
continental insulation 67–68, 87–88, 89–91, 95, 96, 97
definition 9, 41–42, 55–56, 67, 71, 79, 469–470
and Earth's magnetism 52–53
large igneous provinces 51, 56, 91
mantle convection 41, 42, 80, 88–89, 91–93, 95, 97–98
maximum close packing 43, 45, 67
pre-Pangaeon 45, 56, 65, 67, 79–80
proxies, plate kinematics 44–45
sea-level change 53–55, 68, 77, 80
and start of plate tectonics 52
subduction at margin 42, 43, 51, 87, 88–89, 90, 95
terrestrial deposition 69
uplift 68, 77, 80
- Superia supercraton 45
- superplate 41, 42
- Surt Lineament 383
- sutures
ambiguities 292
Appalachian–Caledonian orogen 291–296
remnant 1, 6, 88

- Suwannee suture zone 341, 342
 Suwannee terrane 341, 342
 Svecofennian–Karelian suture 401
 Sveconorwegian orogeny 400
 SW Barents Sea margin 375–376, 383
 Swiss Alps, structure reactivation 124–125, 126–127
- Table Head Group 312, 323, 330
 Table Point Formation 312, 316, 320, 321, 322, 323
 Taconian Frontal Thrust 314
 Taconic Orogeny 21, 27, 31, 268, 290, 291, 292, 297, 301, 302, 345, 346
 Newfoundland 311, 313, 330–332
 Tambarana fault 429
 Taoudeni Basin 464, 470
 taphrogenesis, northwestern Europe 113
 Tavy Basin 356, 357
 Tayvallich basalts 211
 tectonic inheritance 9–10, 105–129, 137, 139–140, 141–142
 eastern North America 337–350
 Paleozoic thrust-belt structures 347–349
 synrift intracratonic faults 341–344
 transform faults 339–341
 Europe 107, 108, 112–113
 Jan Mayen microplate complex 402–406
 North Atlantic 399–402
 North Atlantic and Labrador Sea 245–246, 254, 256–260
- tectonics
 bottom-up 52
 top-down 51
 Tennessee embayment 338, 342, 344, 346
 Terminal Ocean stage 3, 4, 5
 terrane accretion 67, 71
 Tetagouche–Exploits back-arc basin 290, 291, 300, 303, 304
 Tethyan Suture 292
 Tethyside superorogenic complex 118
 Texas Plateau 24, 25, 31, 35
 Texas Promontory 338, 339
 Texas transform fault 345, 346
 thermal insulation *see* continental insulation
 thrust-belt structures, Paleozoic, tectonic inheritance 347–349
 Timanide Orogen 279
 Tolo trough 416, 417, 420, 421, 425
 subduction 422–423
 Tomogonops Formation 300, 301
 Tonga–Vanuatu region, subduction slab polarity 439, 440, 457–458
 Tornquist seaway 207, 211, 354
 transforms
 continental breakup 375–389
 margins 375–376, 377, 378–383
 NE Atlantic 383
 passive-margin thermal subsidence 344–345
 tectonic inheritance 339–341
 Transscandinavian Igneous Belt 396, 400
 trilobite fauna 19, 20, 26, 27, 28, 29
 True Polar Wander 51, 52–53, 55, 56
 turbidites
 Ireland peri-Gondwanan terrane 297
 Maritime Canada 300, 303
 Southern Uplands 296, 303
 UMAR 226–227
 turtlebacks, Black Mountains 177, 187, 188
- U–Pb zircon geochronology, supercontinents 47–48, 69
 ultra-low velocity zones (ULVZs) 94, 96
 Umbria–Marche Apennine Ridge 206
 faults 223, 224, 225, 226–228
 geology and seismic data 206, 209–210, 210, 217–229, 222, 225, 227, 230
 seismic profile 222, 224–228
Umformung 106
 Umkondo province 22
 Uncompahgre Disturbance 121, 123, 126
 unconformities
 cratonic basins 465–466
 ESP 213, 214, 215
 Ungava Transform 376, 378, 380, 381–382, 387
 uplift
 epeirogenic 68, 77, 80
 NE Atlantic 383, 385
 Upper Rhine rift 113
 upwelling 43, 93, 97
 Ur supercraton 45, 65
 Uralian orogenesis 88
 Uranus Ocean 337, 339
 US Array 141, 145
- Vaalbara supercraton 45, 65
 Val Michaud Formation 300
 Variscan Orogen 11, 128–129, 208, 211–212
 incomplete Wilson Cycle 167–168, 212
 Variscan Orogeny 211–212, 358
 Variscan Unconformity 214, 215
 Variscides 128–129
 Vema–Nyk Anticline 383
 Verrucano facies 225, 226
 Veryan Nappe 357
 Veslemøy High 383
 Vigrid Syncline 383
 Viking Graben 214, 215, 218
 virgation, US Rockies 119, 121, 122
 Virginia–Tennessee transform fault 345, 346
 volcanism, Iapetus Ocean 33
 Vøring Basin 383, 384, 386
 Vøring Escarpment 383–384
- Wallaby–Zenith Fracture Zone 399
 Walls Boundary Fault 209
 Wegener, Alfred (1880–1930), *On the origin of continents* (1912) 3
 Wegener Transform 377, 387, 388
 West Avalonia 267, 276, 277, 278, 279, 291
 West Buru Fracture Zone 422, 423
 West Gondwana, assembly 73
 West Siberian Basin 464, 473
 West Spitzbergen orogeny 377, 383, 385, 388
 Williston Basin 464, 467, 471, 473
 Wilson Cycle 1, 139, 265–266, 375
 3D modelling
 subduction (slab polarity) 439–459
 boundary conditions 443–444, 446
 fluid flow modelling 442
 melt-related processes 442–443

- Wilson Cycle (*Continued*)
 model setup **444**, 446–449
 reference model 444–449, 451, 453, 455
 reversal model 443, **444**, 449, 450, 451–455
 rheology of rocks 440–442
 classic 167–168, 212, 213
 concept 2–3, 6–7, 19, 20, 97
 Jan Mayen Microplate Complex 404
 and cratonic basins 463, 465, 469–475
 difference from Supercontinent Cycle 7, 9,
 43–44
 incomplete 167–168, 212, 213
 and intra-plate deformation 139, 140, 143, 144,
 145, 147
 NeoNuna–Uranus 337, 338
 Newfoundland 311, 313
 Nuna–Aether 337, 338
 Pangaea–Atlantic 337, 338
 repeated, Europe 210–213
 Rodinia–Iapetus 337, 338
 stages 3, **4**, 5, 139, 140, 159
 subduction initiation 415–434, 455–459
 tectonic inheritance, eastern North America
 337–350, 338
- Wilson, John Tuzo (1908–1993)
 contribution to plate tectonics 1, 3
 ‘Did the Atlantic close and then re-open?’
 Nature (1966) 1, 19, 20, 205–206, 289,
 339, 375
 early opposition to continental drift 6
 opening and closing of oceans 6, 19, 20
 Plate Tectonic Revolution 6, 39, 265–266
 transform faults 6
- Windsor Point Group 297, 299
 Witch Ground Graben 218
 WOMBAT seismic array 141, 145
 Wrekin terrane 297
- Young/Juvenile Ocean stage 3, **4**, 5
- Zechstein evaporites 209, 212, 215, 216, 221
 zircon-forming events 47–48, 50