

Index

Page numbers in *italics*, e.g. 59, refer to figures. Page numbers in **bold**, e.g. 169, signify entries in tables.

- absolute plate motion (APM)
 - compared to relative plate motion (RPM) 58–60, 59
 - model 29–30, 29, 30
- Acapulco 118, 119
- Acatlán 119, 122
- Agua Blanca fault (ABF) 67, 172
- Aguilas 250
- Alborán Sea 250
- Alicante 250
- Almeria 250
- Alpine fault 96, 199, 200, 209
- Amami Sub-basin 300
- Amami–Kagoshima Tectonic Line (AKTL) 299
- Ammassalik orogenic belt (Am) 233
- Animal Basin 67
- Anita shear zone 200, 208
- Anorituup Kangerlua 233
- Arguello fault zone 67
- Arrollo Taibena Basin 255
- Arsuk 233, 235
- Arsuk Bræ 235
- Arsuk Fjord 233, 235
- Arthur River complex (ARC) 200
- Asemi, River 281, 283, 285, 287
- Aso, Mount 282
 - caldera 299
- Atenango 122
- attachment *see* coupling of lithospheric layers
- Avaqqat Kangerluat 233, 237
- Awatere fault 96

- Balsas Basin 122
- basal traction driven rotation 69
- Baza 250
- Beartooth Mountains (BT) 179
- Beppu Bay 299, 305
- Besshi nappe 281, 283, 285, 287
- Betic Cordillera, Internal–External boundary hanging wall deformation 249–250, 273–275
 - evolution of structures and implications for coupling and decoupling 273, 274
 - geological map 250, 255–256, 260
 - geological setting 250–253
 - External Zones cross-section 252
 - pattern of vertical-axis rotations 272–273
 - regional constraints 271–272
 - rock successions 253–259
 - stratigraphy 254
 - structures 259–271
 - cross-sections 257–258, 261, 270
 - poles of bedding 265
- Rambla Seca Basin 262
 - striations and fault planes 264
- Bitterroot extensional complex (BC) 184, 186–187
- Borgs Havn granite 235
- brittle–ductile arc-parallel extension 279, 293–294
- brittle deformation in Sambagawa 288
 - extreme ductile layer, normal thinning and arc-parallel stretching 288–290
 - exhumation scenario for Sambagawa 292–293, 293
 - normal fault development 289, 290
 - spacial distribution of recrystallized quartz grain sizes 291
 - strike-slip displacements 290
 - uniform shear sense and reversal by late-stage folding and faulting 290–291
 - variable strain geometry of exhuming rocks 292
- five possible exhumation mechanisms 280
- Butsuzo Tectonic Line (BTL) 282, 299

- Cádiz 250
- California
 - see also* San Andreas fault
 - absolute plate motion (APM) and relative plate motion (RPM) 50, 59
 - Continental Borderland 65–66, 79–80
 - bending fault termination 76–78, 76
 - Pacific–North America transform plate boundary 66–68, 67, 68
 - straight fault termination 69–76, 70
 - strike-slip fault termination styles 66, 68–78
 - vertical coupling and decoupling along WTR boundary 78–79
 - seismic anisotropy
 - applicability of models 36–37
 - comparison between north and south California 35–36
 - model results 36
 - northern California 35
 - shear wave splitting measurements 10
 - southern California 32–34
 - shear-wave splitting 50
- California, Gulf of 67
- Camp Oven Creek (CO) 200
- Capas Rojas Formation 266
- Cartagena 250
- Caswell Sound 199, 200, 209
 - paragneiss 208
 - P–T* data **201**
- Cauta 250
- Charles Sound 199, 200, 209

- Cheviot Hills 74
 Chichibu metamorphic belt 281, 282
 Chilapa 122
 Chilpancingo 118, 119, 122
 Chilpancingo Basin 122
 Chino Hills 68, 75
 Chugoku 143
 Clarence fault 96
 clutch tectonics 41–42, 51–52, 60
 bottom-driven systems 53
 implications 53
 convergence 54, 57
 divergence 54, 56–57
 strike-slip partitioning and homogeneous mantle deformation 58, 58
 transcurrent boundaries 53–56, 54
 relation between crustal and mantle deformation 52
 top-driven systems 52–53
 Coacoyula 122
 Coast Mountains–Cascades (CMC) batholith belt **169**, 170
 Coast shear zone (CSZ) 186–187
 Cocula 122
 Coeur d'Alene 184
 Collnet Basin 67
 Columbia River embayment (CRE) 179, 186–187
 continental crust 313–314, 323
 melting 314
 melt segregation mechanisms and scales 314–315
 P–*T* paths 315
 near-isothermal decompression paths and mechanisms 315–316, 317
 buoyancy/diapirism 317, 319
 crustal thinning/collapse 316, 317
 erosion 316, 317
 exhumation of ultrahigh-pressure rocks 317, 318–319, 318
 folding/buckling 316–318, 317
 low-angle normal faults 316
 partial melting in orogens 319
 buoyant return of subducted continental crust 322–323
 isothermal decompression and migmatite domes 320–322, 321, 322
 migmatite diapirs and gneiss domes 319–320
 continental tectonics 1
 Copalillo 122
 Copalillo Basin 122
 Córdoba 119, 250
 coupling of lithospheric layers 1, 2
 attachment formation during partitioning 231–232, 246
 development of attachment zone 245–246
 Psammite and Pelite Zones 244, 244
 analogue modelling
 model construction 124–126, 125, 126
 model results 129–132, 130, 131, 133, 134
 model rheological structure and analogue materials 126–127, 127
 scaling of models 127–129, **128**
 qualitative comparison of model results with geology 134–136, 135
 model limitations 132–134
 vertical coupling and decoupling 136
 Cuautla 119
 Cucamonga fault zone 68
 Cuernavaca 118, 119
 Cuevas del Ambrosio 268–269
 Danell Fjord 233, 237, 239
 Daniel, Mount (MD) 200
 P–*T* data **201**, **202**
 décollements 1–2
 displacement transfer 177–178, 191
 kinematic model 189–190, 189
 decoupling of lithospheric layers 1, 2
 diapirism 317, 319
 dip-slip fault systems 1
 Doubtful Sound 199
 Dozan, River 281, 283, 285, 287
 Eastern Gabar Basin 255
 Eastern Transverse Ranges, California 92–94, 93, **94**
 Edgar, Mount (ME) 200
 edge driven rotation 69
 Egger 233
 Elsinore fault 67
 Elysian Park 74
 Embalse de Valdeinferno 262
 fast direction polarization 9
 Ferrelo fault 67
 finite strain-controlled anisotropy 15–16
 Fiordland, crustal attachment zone evolution 197–198, 223–226, 225
 crustal structure and geochronology 207
 age of magmatism, crustal melting and high-grade metamorphism 210
 boundaries of high-grade metamorphic belt 207, 208, 209
 geochronological data **203–206**
 lithological divisions of magmatic arc 207–210
 structural relationships 210–212
 evolution stage 1 – mafic-intermediate magmatism and partial melting of lower crust 213–215, 214
 evolution stage 2 – melt segregation and transfer mechanisms 215–218
 (a) melt-induced fracture propagation 215–218, 217
 (b) melt accumulation in ductile shear zones 218, 219
 evolution stage 3 – evolving styles of deformation following magmatism and crustal melting 218

- (a) steeply dipping sinistral and dextral shear zones 218–219
- (b) gently dipping, layer-parallel shear zones 219, 221
- (c) steep Indecision Creek and George Sound shear zones 220–223, 222, 223
- geological map 200
- geological setting 198–207
- location map 199
- P–T* data 201–202
- space–time correlation of high-grade fabrics 212–213
- Foreland batholith belt 168
- Fraser–Straight Creek fault (FSC) 186–187
- Gabar 255–256
- Garlock fault 171
- George Sound 199, 200, 209
 - P–T* data 201
 - steep shear zone 220–223
- Geurrero Morelos Platform 122, 123
- Gibraltar 250
- Goto Islands 299
- Goto Sub-basin 299
- Grænseland 233, 235
- Granada 250
- Guadalquivir Basin 250
- Guadalupe fault zone 67
- Guadalupe Microplate 67
- Guadalupe Rift 67
- Guadix 250
- Hikimi 146, 150, 151
 - fault–slip data 155
- Hiroshima City 148, 150
- Hitoyoshi Basin 299, 305, 306
- Hokkaido 143
- Honshu 143, 299
- Hope fault 96
- Hosgri fault 67
- Huajuapán 119
- Huiziltepec 122
- Igutsaat Fjord 233, 237
- Ikermit 235
- Indecision Creek 199
 - steep shear zone 220–223, 222, 223
- Intermontane batholith belt 168
- Ippatit 233
- Ippatit Valley 239
- Itoigawa–Shizuoka Tectonic Line (ISTL) 143
- Izu Peninsula 143
- Izu–Bonin Arc 143
- Japan
 - see also* Sambagawa
 - block rotation and intracrustal vertical decoupling 141–142, 158, 160
 - fault kinematics 152
 - age of recent inversion of motion sense 155–156
 - fault–slip data 154, 155
 - Plio-Quaternary to present-day kinematics 152–153
 - pre-Plio-Quaternary kinematics 154, 156
 - general geology 142–145
 - tectonic framework 143
 - SW island arc 297, 310
 - diffuse extension across south Kyushu 301–307
 - geodynamical and geological outline 297–301, 299
 - Okinawa–Kyushu junction area evolution model 307–310
 - Western Chugoku fault system 145–146, 148
 - age 152
 - analogue model similarities 156–158, 157
 - earthquake focal spheres 153
 - field occurrence 150–151, 151
 - formation model 159–160, 159
 - geometry of fault system 147–150
 - Kake–Himimi area 150, 151
 - northern boundary 147, 146–147
 - Yamaguchi area 149, 151
 - Yoshiwa–Kake area 146
 - Julianehåb batholith 232–234, 233
 - Border Zone–Julianehåb batholith boundary 236, 237
 - construction and deformation 244
 - east coast structure 236–238
 - evolution 243
 - Julianehåb batholith–Psammite Zone boundary 238
 - west coast structure 236
 - Kake 146, 150, 151
 - fault–slip data 155
 - Kamio, River 281, 283, 285, 287
 - Kangerluaraq 233, 237
 - Kangerluk 233, 237
 - Kangerluluk 233, 237
 - Kanoya Plain 299
 - Kap Farvel 233, 237
 - Kap Ivar Huitfeldt 233, 237
 - Ketilidian orogen, oblique convergence and attachment
 - formation 231–232, 246
 - Border Zone structure
 - Border Zone–foreland boundary relationships 234, 235
 - history 234–236
 - development of attachment zone 245–246
 - Julianehåb batholith structure
 - Border Zone–Julianehåb batholith boundary 236, 237
 - east coast structure 236–238
 - west coast structure 236
 - major components 232, 233
 - Border Zone 232
 - Julianehåb batholith 232–234

- Psammite and Pelite Zones 234
- Psammite and Pelite Zones
 Julianeåb batholith–Psammite Zone boundary 238
 nature and timing of structural and metamorphic events 240
 rapakivi suite 240–241
 structure 238–240, 239
- tectonic evolution 241, 242
 construction and deformation of Julianeåb batholith 244
 development of mid-crustal attachment structure in Psammite and Pelite Zones 244, 244
 rapakivi granite intrusion 245
 structural histories 241, 243
- Kettle extensional complex (KC) 179
- Kikai Caldera 299
- Kobberminebugt 233, 235, 243
- Koshiki Islands 299
- Kumamoto 282
- Kyushu 143, 299
 diffuse extension across southern regions 301, 305–307
 Beppu region 305
 Hitoyoshi–Ichifusa region 305, 306
 Osumi region 301–305, 302, **303**, 304, 305
 geological structure 301
- Okinawa–Kyushu junction area evolution model
 accommodation of extension through reactivation of thrust faults 307
 cross-section model 307–310, 309
 perpendicular extension 308
 transtension in northern region 307
- Laramide shortening, vertical coupling controlled by crustal heterogeneity 117–121, 137
- lattice preferred orientation (LPO), olivine 3, 15
 deformation types 55
 mantle fabric observations 42–43, 44
- Lewis and Clark lineament (LCL) 179, 184, 186–187
- Lindenow Fjord 233, 237, 239
- lithosphere, idealized deformation diagrams 54
- Los Angeles 68
 faults and seismicity 75
- Los Angeles Basin 74
- Málaga 250
- Manapouri, Lake 199
- mantle-driven deformation of orogenic zones 41–42, 60
 crustal deformation and mantle fabric
 ancient orogens 48
 interpretation of data 49–51
 neotectonic orogens 49
 strain history 51
- lithosphere/asthenosphere connections
 continental settings 47–48
 cratons 46
 oceanic settings 46–47, 47
 lithospheric deformation 42
 mantle fabric
 laboratory experiments 43
 numerical experiments 43–45
 olivine LPO and shear-wave splitting 42–43, 44
 mantle viscosity and seismic attenuation 45–46
- Marbella 250
- María 255–256, 260
- Marlborough fault system, South Island, New Zealand 94–95, 96
- Masuda City 148
- Median Tectonic Line (MTL) 142, 143, 148, 282, 285, 299
- Mexico, Caribbean–North American transform boundary 117–120, 137
 analogue modelling of Late Cretaceous to Early Tertiary deformation
 model construction 124–126, 125, 126
 model results 129–132, 130, 131, 133, 134
 model rheological structure and analogue materials 126–127, 127
 scaling of models 127–129, **128**
- geological and tectonic setting
 crustal structure 120, 121
 Early Tertiary deformation 121–123, 122, 123
 Laramide deformation 120–121
 Tertiary deformation 124
- lithological units 119
- qualitative comparison of model results with geology 134–136, 135
 model limitations 132–134
 vertical coupling and decoupling 136
- terrane boundaries 118
- Midtømæs 233, 235
- Milford 200
- Milford Sound 199, 200, 209
P–T data **201**, **202**
- Missoula 184
- Mixteco Terrane 122
- Mixteco–Oaxaca–Juarez block (MOJB) 120, 121
 Early Tertiary deformation 121–123, 122
 Laramide deformation 120–121
 Tertiary deformation 124
- Mogens Heinesen Fjord 233, 235
- Montana disturbed belt (MDB) 179
- Monterey fault zone 67
- Monterey Microplate 67
- Morro fault zone 67
- mountain belts 1
- Murcia 250
- Nagssugtoqidian orogenic belt (Nag) 233
- Nankai Trough 143, 299
- Nanortalik 233
- Napasorsuaq Fjord 233, 235, 237
- New Zealand

- absolute plate motion (APM) and relative plate motion (RPM) 50
- seismic anisotropy 9–13, 31–32, 32–34
- applicability of models 36–37
- model results 36
- modelling results 16–31, 17, 18–19, **20–21**, 22
- shear wave splitting measurements 10
- study methods 13–16, 13
- shear-wave splitting 50
- Newport–Inglewood fault zone 68, 74–76
- Niaqornaarsuk 233
- Nobeoka Tectonic Line (NTL) 299
- Nørrearm 233, 239
- North American Cordillera 167–168, 168
- crustal architecture 178–183
- cross-sections 181–182
- crustal thickening and deep flow 173–174
- crustal thickening and unroofing 168–169
- Central Cordillera 169–170
- Northern Cordillera 169, 170
- Southern Cordillera 170–171
- displacement transfer in décollement systems 177–178, 185–187, 191
- generalized tectonic map 179
- Late Cretaceous–Tertiary structural elements 186–187
- oblique ramp system in Idaho–Montana basement 183–185, 184
- coupling v. decoupling 190–191
- influence on strike-slip systems 188
- influence on Tertiary extensional systems 188–189
- kinematic model for linked décollement system 189–190, 189
- regional expression 187–188
- plateaux 171–172
- unroofing mechanisms 172–173
- Nunnarsuit 233
- Oaxaca 118, 119
- Oboke nappe 281, 283, 285, 287
- Oita 282
- Oita–Kumamoto Tectonic Line (OKTL) 282
- Okanagan extensional complex (OC) 179
- Okinawa trough back-arc basin 297, 310
- diffuse extension across south Kyushu 301, 305–307
- Beppu region 305
- Hitoyoshi–Ichifusa region 305, 306
- Osumi region 301–305, 302, **303**, 304, 305
- geodynamical and geological outline
- cross-section 300
- Kyushi geological structure 301, 302, **303**, 304, 305
- present-day plate configuration and recent evolution 297–298, 299
- structure 298–301
- Okinawa–Kyushu junction area evolution model
- accommodation of extension through reactivation of thrust faults 307
- cross-section model 307–310, 309
- perpendicular extension 308
- transtension in northern region 307
- Olinala 122
- olivine lattice preferred orientation (LPO) *see* lattice preferred orientation (LPO), olivine
- Omineca batholith belt 168
- Omineca–Sevier batholith belt 168
- Orizaba 118, 119
- Orofino shear zone (OSZ) 179, 184, 186–187
- orogenic float 1
- orogenic zones, mantle-driven deformation 41–42, 60
- crustal deformation and mantle fabric
- ancient orogens 48
- interpretation of data 49–51
- neotectonic orogens 49
- strain history 51
- lithosphere/asthenosphere connections
- continental settings 47–48
- cratons 46
- oceanic settings 46–47, 47
- lithospheric deformation 42
- mantle fabric
- laboratory experiments 43
- numerical experiments 43–45
- olivine LPO and shear-wave splitting 42–43, 44
- mantle viscosity and seismic attenuation 45–46
- Osburn fault 184
- Oshima 282
- Osumi Peninsula 299, 301–305
- ages of pseudotachylite veins **303**, 304, 305
- cross-section of Osumi pluton 302
- geological map 302
- Otte Rud Øer 235
- Oxnard 71
- Oztotitlán Basin 122
- Paatusoq 233, 237
- Palos Verdes fault zone 68, 76–77
- Papalutla 118
- Papalutla Thrust 122
- Patton Escarpment 67
- Patton Ridge 67
- Pembroke Valley (P) 200
- P–T* data **201**, **202**
- Peninsular Ranges batholith (PRB) batholith belt **169**, 172
- Pinchi fault (PI) 186–187
- Poison Bay 200
- P–T* data **201**, **202**
- Priest River extensional complex (PC) 179, 184
- Prins Christian Sund 233, 237
- Puebla 118, 119
- Puente Hills 75

- Puerto Angel 118, 119
 Puisortoq 233, 235
 Puisortoq Fjord 235
- Qaqortoq 233
 Qernertoq 233, 237
 Qômoq augen granite 235
 Qoornoq 235
- Rambla Seca Basin 255, 262
 cross-section 263
 Raymond fault 68, 75
 relative plate motion (RPM), compared to absolute plate motion (APM) 58–60, 59
 rheology of partially molten rocks, strain-rate dependency 327–328, 334
 basic rheological laws 328–329, 329
 bulk response to low strain rates 332
 bulk response to tectonic stress 331–332, 332
 melt segregation at outcrop scale 333, 333
 melt segregation within a vein 333–334, 333
 pseudo-fluids 329–330, 330
 two-phase materials 330–331
 viscosity determination 334
 Ryoke metamorphic belt 281, 282
 Ryukyu Arc 299
- Sakamoto antiform 281
 Salina Cruz 119
 Salton Trough 67
 Sambagawa, flow patterns during exhumation of metamorphic rocks 279, 293–294
 extreme ductile layer, normal thinning and arc-parallel stretching 288–290
 exhumation scenario 292–293, 293
 normal fault development 289
 normal fault stereographs 290
 spacial distribution of recrystallized quartz grain sizes 291
 strike-slip displacements 290
 uniform shear sense and reversal by late-stage folding and faulting 290–291
 variable strain geometry of exhuming rocks 292
 five possible exhumation mechanisms 280
 geological outline 280–282, 281
 geological map 282
 study results
 3D strain geometries 284–288, 284–285, 286
 brittle deformation 288
 mesoscopic structures 282–284, 283
 shear sense distribution 287
 San Andreas fault (SAF) 67
 absolute plate motion (APM) and relative plate motion (RPM) 59
 seismic anisotropy 9–13
 Absolute Plate Motion (APM) model 29–30, 29, 30
 modelling results 16–31, 17, 18–19, 20–21, 22
 Pacific plate viscosity 29
 shear wave splitting measurements 10
 study methods 13–16, 13
 symmetric weak fault model 23–25, 24–26, 24
 San Benito fault 67
 San Clemente fault 67, 70–73
 aeromagnetic anomaly map 71
 faults and seismicity in the Santa Barbara Channel area 73
 seismic reflection profile 72
 San Clemente Island 71
 San Diego 68
 San Fernando fault zone 75
 San Gabriel fault 67, 68, 75
 San Gregorio fault 67
 San Isidro fault 67
 San Jacinto fault 67
 San Nicolas Island 71
 San Pedro Basin 74
 San Pedro Basin fault zone 73–74, 74
 San Pedro Bay 74
 San Quentin Basin 67
 Santa Barbara 68
 Santa Barbara Basin 71
 Santa Barbara Channel 72–73
 faults and seismicity 73
 Santa Barbara fault 71
 Santa Barbara Island 71
 Santa Catalina Island 71
 Santa Cruz Basin 67
 Santa Cruz Island 71, 73
 Santa Cruz–Catalina Ridge 71, 73
 Santa Lucia fault 67
 Santa Monica Basin 71, 74
 Santa Monica Bay 74
 Santa Monica–Hollywood fault zone 68
 Sârdlog shear zone 233
 Saruta, River 281, 283, 285, 287
 Sâtukujôq granite 235
 seismic anisotropy
 New Zealand and California 9–13, 31–37, 32–34
 applicability of models 36–37
 comparison between northern and southern California 35–36
 compression 34–35
 modelling results 16–31, 17, 18–19, 20–21, 22, 36
 study methods 13–16, 13
 two-layer anisotropy 12
 seismic attenuation 45–46
 Sermilagaarsuk 233
 Serreta de Guadalupe 255–256, 262
 Seto Inland Sea 144, 148, 149, 281
 Sevier batholith belt 168
 Sevilla 250
 shear-wave splitting 3
 as a function of wave polarization 23

- California *10, 50*
 changing depth to isotropy/anisotropy boundary *14*
 crustal block rotation by mantle flow *90–91*
 evolution of parameters *22*
 mantle fabric observations *42–43, 44*
 New Zealand *10, 50*
 oceanic material *46–47, 47*
 San Andreas fault (SAF) *10*
 Tibet *50*
 Trinidad *50*
 Venezuela *50*
- Shikoku Island *143, 281, 299*
 Shikoku–western Honshu region, Japan *144*
 Shimanto metamorphic belt *281, 282*
 Shimanto Terrane *306*
 Shimbara Peninsula *299*
 Shimokawa, River *281, 283, 285, 287*
 Shiraga, Mount *281*
 Shuswap extensional complex (SC) *179, 186–187*
 Sierra Nevada *10*
 Sierra del Gigante *255–256*
 Sierra del Maimón *255–256*
 Sierra del Pericay *255–256, 262*
 Sierra Larga *255–256*
 Sierra Madre fault zone *68, 75*
 Sierra Nevada (SN) batholith belt **169, 171**
 Sierra San Pedro Martir (SSPM) *172*
 Sikhote–Alin fault system *143*
 SKS phases *9–10*
 Snake River plain (SRP) *179*
 Snow Peak *184*
 Solana Formation *260*
 Søndre Igaliku *233*
 Søndre Sermilik *233, 243*
 Sorte Nunatak *233*
 Southern Japan Sea fault zone (SJSFZ) *143*
 strain gradients *101, 112–114*
 attachment tectonics *101–103, 102*
 modelling *103–104, 103, 104*
 transpression and transtension attachments *107–108, 109–112, 110, 113*
 transpression attachments *108–109, 111*
 transtension attachments *109, 112*
 wrench attachments *104–105, 105–107, 106, 107, 108, 109, 110*
 foliation and lineation patterns *105*
 strain modelling *9–13*
 California
 applicability of models *36–37*
 comparison between north and south California *35–36*
 model results *36*
 northern California *35*
 southern California *32–34*
 New Zealand *31–32, 32–34*
 applicability of models *36–37*
 model results *36*
 results *16*
 effect of viscosity structure *22–30*
 other flow models *30–31*
 relative plate motion with isoviscous model *16–22, 17, 18–19, 20–21, 22*
 study methods *13–14*
 changing depth to isotropy/anisotropy boundary *14*
 model parameters *13*
 relation between deformation parameters and anisotropy *15–16*
 strike-slip fault systems *1*
 applicability of models *36–37*
 block rotation and intracrustal vertical decoupling *141–142, 158, 160*
 California
 comparison between north and south California *35–36*
 northern California *35*
 southern California *32–34*
 coupling at boundaries *9–13*
 modelling results *16–31, 17, 18–19, 20–21, 22*
 study methods *13–16, 13*
 model results *36*
 New Zealand *31–32, 32–34*
 partitioning *58, 58*
 termination at convergence zones *65–66, 79–80*
 bending fault termination *76–78, 76*
 Pacific–North America transform plate boundary *66–68, 67, 68*
 straight fault termination *69–76, 70*
 termination styles *66, 68–78*
 vertical coupling and decoupling along WTR boundary *78–79*
- Tanakura Tectonic Line (TTL) *143*
 Tanegashima Island *299*
 Tasermiut *233*
 tectonic processes, implications of clutch tectonics *53*
 convergence *54, 57*
 divergence *54, 56–57*
 strike-slip partitioning and homogeneous mantle deformation *58, 58*
 transcurrent boundaries *53–56, 54*
- Tehuacan *119*
 Tehuantepec *119*
 Tehuantepec, Gulf of *118*
- Tibet
 absolute plate motion (APM) and relative plate motion (RPM) *50*
 lithospheric deformation *51*
 shear-wave splitting *50*
- Tintina fault (TI) *186–187*
 Tixtla *122*
 Tokara Line *299*
 Tokara Ridge *299, 300*
 Tokara Sub-basin *299, 300*
 Toluca *118*

- transpressional zones 2
- transpressional/transensional attachment zones, strain gradients 101, 107–108, 109–112, 110, 112–114, 113
- attachment tectonics 101–103, 102
- modelling 103–104, 103, 104
- transpression attachments 108–109, 111
- transtension attachments 109, 112
- wrench attachments 104–105, 105–107, 106, 107, 108, 109, 110
- foliation and lineation patterns 105
- transtensional deformation 297, 310
- Okinawa–Kyushu junction area evolution model
- accomodation of extension through reactivation of thrust faults 307
- cross-section model 307–310, 309
- northern region 307
- perpendicular extention 308
- Trinidad
- absolute plate motion (APM) and relative plate motion (RPM) 50, 59
- shear-wave splitting 50
- Tsunevama synform 281, 283
- Tsushima fault system (TFS) 143
- Tuliman 122
- Tunua 235
- Tuzantíán Basin 122
- Vélez Blanco 255–256, 260
- Vélez Rubio 255–256
- Venezuela
- absolute plate motion (APM) and relative plate motion (RPM) 50
- shear-wave splitting 50
- Verdugo fault zone 75
- vertical axis rotations 3–4, 83–85, 84, 97–98
- assumptions and applicability of model 97
- Betic Cordillera 249–250, 273–275
- evolution of structures and implications for coupling and decoupling 273, 274
- geological map 250, 255–256, 260
- geological setting 250–253, 252
- pattern of vertical-axis rotations 272–273
- regional constraints 271–272
- rock successions 253–259, 254
- structures 257–258, 259–271, 261, 262, 264, 265, 270
- rigid rotations
- application to attachment/detachment zones 92
- boundary conditions and background 85–87, 85, 86, 87
- experimental apparatus and design 87–89, 88, 89
- experimental results 89, 90, 91
- mantle deformation in obliquely convergent environments 91–92
- natural systems 89–92
- shear-wave splitting 90–91
- side-driven v. bottom-driven systems 95–97
- upper crustal rotation coinciding with mantle deformation 92, 94, 95
- Eastern Transverse Ranges, California 92–94, 93, 94
- Marlborough fault system, South Island, New Zealand 94–95, 96
- Western Transverse Ranges (WTR), California 69
- vertical coupling in the lithosphere
- channel flow 5
- geophysical constraints
- shear wave splitting 3
- vertical axis rotations 3–4
- island arcs and marginal basins 4–5
- orogenic belts and exposed attachment zones 4
- viscosity and strain modelling
- effect of viscosity structure 22–23
- Absolute Plate Motion (APM) model 29–30, 29, 30
- asymmetric viscosity models 25–28, 27–28
- effect of increasing compression component 28–29, 29
- symmetric weak fault model 23–25, 24–26, 24
- isoviscous model 16–22, 17, 18–19, 20–21, 22
- Vizcaino Peninsula 67
- western Idaho shear zone (WISZ) 179, 186–187
- Western Metamorphic Belt (WMB) 171
- western Nevada shear zone (WNSZ) 186–187
- Western Transverse Ranges (WTR), California 66–69, 67, 79–80
- clockwise vertical-axis rotation mechanisms 69
- strike-slip fault termination styles 68–69
- bending fault termination 76–78, 76
- straight fault termination 69–76, 70
- vertical coupling and decoupling along boundary 78
- basal shear-driven block rotation 79
- edge-driven block rotation 78–79
- Whittier–Elsinore fault zone 77–78
- Wind River Mountains (WR) 179
- wrench attachments 104–105
- foliation and lineation patterns 105
- strain gradients 105–107, 106, 107, 108, 109, 110
- Xochipala 122
- Yakushi antiform 281, 283
- Yakushima Island 299
- Yamaguchi City 148, 149, 151
- Yangsan fault system (YFS) 143
- Yanhuitlan 118
- Yoshiwa 146
- Zarcilla de Ramos 255–256
- Zarcilla de Ramos Basin 255
- Zihuatanejo 118
- Zitlala 122
- Zumpango 122