

Index

Figures are shown in *italics* and Tables in **bold**

- accretion 250, 257, 271–273
Ado 'Ale Volcanic Complex 2, 5, **151**
 dam safety 345, 349
 magnetotellurics 105, 106, *107*, 113, 115–119
aeromagnetics, Ogaden Dyke Swarm 227–231
Afar 22–23, 25, 26, 189, **190**
 gravity survey, high-precision 165–178
 magnetotelluric imaging 105–122
 seafloor spreading 120
Afar Depression 32
 palaeomagnetic study 209–217
 seismicity 343–346, 350–351
 volcanic hazards 356–358
Afar Rift 136, 137–138, *140*, 141, 143–144
 seismicity hazard 341–352
 topography *151*
 volcanism and magmatism 358–360
Afar Rift Consortium 2–4, 6, 22, 356, 358,
 361, 362
Afar triple junction 1, 2, 5–6, 69, 118, 222
 geodynamics 166, 221, 239–243
Africa–Arabia plate boundary 343, 346
African apparent polar wander path 216–217
African super-swell 48
Aisha Block
 palaeomagnetism study 209–217
 rotation 6
Albertine rift, seismic study 69–80
Ali-Sabieh Block, rotation 209–217
amagmatic domain **253**, 278, 279
anisotropy 130–131, 132–138, 144
Ar/Ar age, Ogaden Dyke Swarm 6, 225,
 231–236, **242**, 243
Archaeon unit 77
ash plume 360, 362
Askja Central Volcano 299, 300–301
Askja Fissure Swarms 309, *310*, 311
 fracture density 300
Atlantic *see* South Atlantic and Mid-Atlantic
Australian–Antarctic Discordance 252, 263, 265
aviation disruption 355, 359, 360, 362
Awash River Gorge 342, 343
Awash Valley Authority 342, 347
axial magma lens 257, 259, 260, 261, 267, 273
axial valley/summit trough 252, **253**, 284
 fast-spreading ridges 255, 258, 259, 261
 slow-spreading ridges 271–273
 South East Indian Ridge 266
 ultraslow-spreading ridges 278–279, 280
Badi volcano 106, *107*, 108, 117, 120–122
basaltic melt composition 176–177
bathymetry
 East Pacific Rise 256, 258, 260, 261
 Galapagos Spreading Centre 268, 269
 Mid-Atlantic Ridge 270, 271
 Rivera–Cocos 84, 85, 86
 South Atlantic 316
 South East Indian Ridge 264, 266
 South West Indian Ridge 276, 277
benth height, shadow analysis 188–189, 191,
 192, 194, *195*, 201
boreholes and seismic profiles 174
Bouguer anomaly 5, 168
 calculation 85, 170–174, *175*
 map 86–87, 88
 see also Mantle Bouguer Anomaly
Bunyaruguru volcanic field 70
buoyancy 11–13, 17, 19, 21
Buranga hot springs 70, 78
caldera 199
 collapse 49, 51
 Ertá 'Ale volcano *188*, 189
 Iceland 299, 301, 307, 311
caldera study, Kenyan Rift
 ellipticity and orientation 53–55
 extension 45–48
 formation mechanism 43–45, **46–47**, **50**
 methodology 51–52
 stress field and magmatism 48, 55–62
 tectonic setting 48–49
 volcanic setting 49–51
canyon location and slab features 88
Centroid Moment Tensor (CMT) 152, **153**, 155, 157, 159
chemical composition and resistivity 119–120
civil protection, disaster response 358, 359
climate impact 360
Cocos plate boundary *see* Rivera
Cocos–Nazca, spreading age 83
cold-spot 252
Colima Rift, Mexico 5, 83, 84
Colima Volcanic Complex 83, 85, 95, 96, 99, 101
Colorado Basin 331, 336
conductivity of partial melt 176–177
cone sheet 307
Congo, East African Rift 69
continental break-up 1, 4–6, 105, 136, 165, 177
 Afar triple junction 221–224
 South Atlantic 315–337
convection rate 185
crust, density 79
crustal structure 166, 168, 177
geophysics 23, 24

- crustal thickness 24, 49, 75, 80
 Afar 3–4, 166, 168, 352, 360
 East Pacific Rise 255, 257
 Galapagos Spreading Centre 267, 268
 Kenyan Rift 59, 60
 Main Ethiopian Rift 137
 Mid-Atlantic Ridge 273, 283, 285
 mid-ocean ridge 254–255
 South East Indian Ridge 265
 South West Indian Ridge 275
 crustal thinning 71, 80, 168, 177, 350
 South Atlantic 319, 328, 329, 331, 334, 336
 cyclic activity, lava lake 201, 202–203
- Dabbahu magmatic segment 160
 magnetotelluric imaging 105–108, 111–113, 115–122
 Dabbahu rifting episode 2–4, 5, 22
 Dabbahu volcano 105, 106, 107, 113, 118–122
 Dabbahu–Manda–Hararo dyking sequence 150, 151, 342, 360
 Dabbahu–Manda–Hararo rift 168, 347
 magmatic segment 136, 137–138, 140, 141, 143–144
 dam impoundment 349–352
 Danakil Block 211, 217
 rotation 6, 209, 210
 Danakil microplate 136, 137, 138, 141–144, 168
 data sources, Kenyan Rift 51
 dataset, bias correction 38–39
 decompressional melting 80, 80
 deformation 3, 26, 346
 Erta 'Ale volcano 194
 degassing 185, 201
 deglaciation and uplift 308–309
 delamination 69–70, 79, 80
 dense-rock equivalent 37
 density 79, 254, 255, 257, 259, 275
 Afar 170, 171, 173, 174, 175
 and melt composition 176–177
 Rivera–Cocos plate 87
 tuffs 37–38
 density anomalies 15, 17–21
 depth proxy 110
 deviatoric stress 18, 20
 disaster risk management 355, 360, 363
 dyke 2–3, 22, 194, 311
 -induced fracturing 61
 dilation and rifting 237–238
 propagating speed 159, 160
 stress indicator 48
 dyke intrusion
 2005 September 105, 348
 2010 May 5, 150–161
 2014 August 311
 dyke swarm *see also* Ogaden Dyke Swarm
 characterization 236–237
 Tertiary 309
- dyking 121–122, 150
 age 223
 dynamic topography 15–20, 22, 25, 26
- early warning systems 360
 Earth Observation data 183, 185–186, 189, 192–193, 203
 earthquake 6, 71, 132, 144
 Afar 106, 118, 190
 analysis 75, 80, 152, 156–157
 dam-induced 341–342, 344
 displacement record 344
 foci 154
 Magadi 53
 and magmatism 181–183
 magnitude 158, 345
 mid-Atlantic ridge 307, 308, 309, 311
 Iceland 298, 299, 300
 mid-ocean ridge 273–274
 Rivera–Cocos 84, 88, 92, 94–101
 swarms 150, 348
- East African Rift 2, 11–12, 15, 16, 20–22, 26, 209
 age of opening 217, 241
 Kenya 31, 43, 48, 49
 Rwenzori 69, 70
 seismicity 342, 344, 347
 volcanic hazards 357
- East Pacific Rise 249, 252–263, 282, 283
 spreading 120–121
- eccentricity of calderas, world-wide 58
- Edward Rift 70, 73, 75, 76, 78, 80
- effusion rate 158, 160, 201, 259
 dyke 156–157
 effusive eruption 357, 360
 elastic constant 128
 electrical conductivity/resistivity 107
 electromagnetic field
 magma imaging 108–110, 111
 elliptical calderas, Kenyan Rift 43–62
 formation mechanism 43, 45, 46–47
 ellipticity values 57
- Erta 'Ale dyke 190, 199, 202–203
 Erta 'Ale volcano 5–6
 lava lake and topography 182, 185–189
 magmatism and tectonics 189–199
 observation methods 185–189
 observations 183–185, 200–201
 synthesis and interpretation 201–203
 eruptions, loss of life 355
 eruptive fissures, Iceland 303, 305–308, 311
 Ethiopia, magnetotelluric imaging 105–122
 Ethiopia, volcanic hazard research 355–363
 Euler deconvolution method 172–173, 174, 176
 explosive eruption 357, 360
 extension 2, 160, 161, 166, 238, 346
 amount of 32, 49
 dyke swarms 107, 150
 oblique 48, 53–55, 57, 59–62

- rate of 52, 59
- South Atlantic 332, 334–335, 336
- Eyjafjallajökull 2010 eruption 355
- famine 361, 362
- Farallón plate, break-up 83
- fatalities 355, 360
- fault network 346, 347, 349, 350
- fault populations 52, 53, 54, 56–57, **58**
- faults
 - and caldera orientation 54–55
 - fracture induced 61
 - rift bounding 33, 44, 62
- feasibility study, Tendaho dam 342, 347
- fire fountains 185
- Fire Radiative Power data, MODIS 186, 192–193, 194, 195, 196, 198–201
- Fischer statistics 214, 215
- fissure 51, 155, 258, 261
 - eruption 33, 39, 150, 201, 305–308, 349
 - flow 160
 - swarms, Iceland 297–303, 305–306
 - vents 57, 61
- flood basalt 237, 240, 241
- fractionation 262, 263, 269, 282
- fracture systems, Icelandic rift 297–311
 - density 300, 302, 305, 310
 - length 309
 - orientation 306–308
- fracture-induced extension 61
- free air anomaly 85
- free-air reduction 170
- fumarolic activity 187–188, 200
- fumarolic index 191, 193, 198, 202
- funding, resilience building 362
- Gakkel ridge 275, 277, 279
- Galapagos Spreading Centre 263, 265, 267, 268, 269, 284
- gas release 185, 191, 192–193, 201
- geochemistry
 - high field strength elements 238–239
 - magma composition 121, 122
 - major and trace elements **242**
 - Ogaden Dyke Swarm 225, 231, 234–243
- geochemistry, mid-ocean ridges 254–255, 282–285
 - East Pacific Rise 256, 260, 261–263, 267–269
 - magmatic segmentation 250
 - Mid-Atlantic Ridge 270, 274, 275
 - South East Indian Ridge 264
 - South West Indian Ridge 276
- geodetic moment 159, 160
 - dyke emplacement 155
- geodetic techniques 22
- geohazard 4, 6
 - seismicity, Afar rift 341–352
 - volcanic 355–363
- geometry of melt 127, 130, 133
- geophysical hazards 361, 363
- geophysical investigation
 - lithosphere melt 22–25
 - mid-ocean ridges 254–261, 263–267, 271–274, 278–285
- Rivera–Cocos 85–94
- strain localization 26
- geophysical techniques
 - dyke study 150–155
 - magma storage 61–62
 - magnetotellurics 108–110
- geothermal activity 78, 351
- geothermal groundwater 342, 344, 347, 349
- geothermal prospect 107, 118
- geyser 349
- glaciation/uplift 308–309
- global hazard assessment 355–356
- Global Ocean Ridge System 249–286
- Global Ozone Monitoring Experiment 152
- Gode lava flow 227, 228–229, 237
- Gondwana, break-up 315
- gravimetric study, Rivera–Cocos plate boundary 83–102
 - data 83–86
 - deformation model 96–97
 - slab models 86–87
 - slab, lower surface 95, 96
 - slab, upper surface 94, 95
 - survey lines 87–94
- gravitational potential energy 11–14, 17–21, 22, 25
- gravity 5, 23, 231, 317
- gravity anomaly 254, 255, 267, 272, 285, 327
- gravity survey (high-precision), Afar
 - analysis and interpretation 170–174
 - data collection 168–169
 - data reduction and processing 169–170
 - modelling and interpretation 174–177
 - ocean crust formation 165–178
- Grímsey Oblique Rift 303, 306, 307, 311
- ground deformation 49, 51
 - magma induced 342
 - measurement 186, 189
 - groundwater 342, 344, 347, 349
- Gulf of Aden 189, **190**, 199, 209
 - age of rifting 221, 222, 223
- H_k stacking method 71–72, 76, **77**, 78, 80
 - Moho topography 75
- Hararo profile 108, **110**, 111–114, 116–118, 122
 - melt distribution 121
- horizontal shear traction 21–22, 25
- hot springs 345
- hot-spot 252, 267, 269, 274
 - Iceland 297
 - South Atlantic 329–330, 337
- Húvsavík Transform Zone 306, 311
- hyaloclastite 308
- hydrometeorological hazards 361, 363

- hydrothermal activity 351, 352
 hydrothermal vent 258, 259
- Iceland *see* Northern Volcanic Rift Zone
 ignimbrite 357
 infrared, short-wave 191, 192–193, 198, 199, 201, 202
 method 186, 187
 InSAR 150, 155, 159, 189, 203
 method 151
 interferogram 194
 intra-rift faults 45, 53–59, 61, 62
 isostatic compensation 15, 19
- Jalisco 1932 earthquake 89, 97, 98
 Jalisco block 83, 84
 Jebel al Tair eruption **190**, 199, 202
 jelly sandwich 14, 26
 Jessoma sandstone 217
 rotational data 211
- Karrayu Basin, active faults 350
 Katwe–Kikorongo, volcanic field 70
 Kenyan Dome **44**, 48
 Kenyan Rift
 caldera and tectonic study 43–62
 volcanic volume estimate 31–41
 Kolmogorov–Smirnoff test 199, 200
 Krafla Fissure Swarms 302, 305, 306, 308,
 309, 311
 Krafla rifting event, Iceland 150, 159–161,
 299, 300
- lake *see* lava lake
 Lake Edward 70
 landslide 361
 Large Igneous Province 31, 221, 223, 240, 315
 Paraná–Etendeka **316**, 329–330, 337
 lava dome 259
 lava flow geomorphology 155
 lava flow, Iceland **304**, 309–311
 lava lake 5–6
 Erta 'Ale volcano 181–203
 lava shield 308
 LiDAR, airborne survey 151, 153, 155
 lineament 231, 299
 lineation, magnetic 226, 229, 317, 327, 329, 335
 seafloor spreading 319, 326
 Love wave **130**–**131**, 132, **134**–**135**, 136, 138
 low-velocity zone 75–77, 78, 79, 80
- magma 60–62
 supply 184, 185, 285
 magma chamber
 depth 106, 118
 geometry 58, 61, 176–177
 resistivity 115–119
 storage 108, 120–122
 subaerial exposure 181–203
- magma composition
 Kenyan Rift 61–62
 Ogaden Dyke 237–243
 magma, magnetotelluric imaging 105–122
 magmatic (principal) spreading segment 280–281,
 282–284
 magmatic segmentation, ocean ridge 250, 335
 characteristics 254–255
- magmatism
 Afar Depression **346**
 Main Ethiopian Rift 166
 Rwenzori 78
 magmatism and tectonics
 lava lake observations 181–203
 rifting 1–6, 61
 magnetic anomaly
 Ogaden Dyke Swarm 226–231, 243
 South Atlantic 315–317, 319, 326–328
 magnetic field 108–110, **111**
 magnetic lineations 226, 229, 317, 327, 329, 335
 magnetization intensity 328, 329
 magnetotelluric data 137, 144, 168, 176, 177
 magnetotelluric magma imaging 25, 105–122
 Afar volcanic province 105–108
 interpretation 115–122
 method 108–110
 modelling 110–115
 Main Ethiopian Rift **32**, 45, 221, 308
 age of rifting 223, 243, 345, 346
 dyke emplacement 150, 238, 305
 magma supply 60, 62, 166
 melt, seismic imaging 22–25, 127, 133–139,
 143–144
 risk research 350, 362–363
 volcanic hazards 357–358
- Manda Hararo dyke study 149–161, 202
 methods 150–155
 results and discussion 155–161
 sequence of events 156–158
 sulphur emission 158–159
- Manda Hararo dykes
 2005 September/October 105, 150, **151**, 348
 2010 May 5, 150–161
- Manda Hararo Rift 360
 rifting cycle 183, 184, 185, **190**, 199
 mantle 3–4, 136–138, 143–144, 262
 convection 11–14
 density 79
 plume 40, 69, 107, 121, 330
 strength 26
 toroidal flow 84, 96
 upwelling 250, 252, 282–285
 Mantle Bouguer Anomaly 255–257, 259, 263–265,
 273–275
 Galapagos Spreading Centre 268
 Mid-Atlantic Ridge 270, 272
 South West Indian Ridge 276, 277, 278–279
 mantle flow and dynamic topography 15–20, 25, 26, 107

- mantle, overlying slab 90, 92
 Manzanillo Bulge 85, 86, 87, 88
 Marda Fault Zone 227, 230, 231, 238, 241, 243
 Marda Range 228, 237
 geology 224–226
 melt 26, 168
 depth 121, 122
 geophysical studies 12, 22–25
 high-precision gravity survey 165–178
 resistivity 115–120
 seismic imaging 127–144
 mantle 258–265
 mid-ocean ridge 251, 280–281
 production zone 350, 351
 volume 108, 116–120, 122
 Mid-Atlantic plate boundary 297–311
 Mid-Atlantic Ridge 6, 250, 252, 254, 269–274, 283
 geochemistry 282
 South Atlantic 316, 319, 326–330, 332, 334–335
 spreading 107, 120, 121–122
 mid-ocean ridge 4, 6, 12, 43, 60, 96, 120–121
see also ocean ridge systems
 Middle American Trench 84, 85
 Moho 23–25, 114, 130
 depth 76, 78, 80
 East Pacific Rise 259
 resistivity 122
 topography 69–80, 174–175, 177
 Moho-straddling conductor 115–116, 117
 monitoring hazards 362
 Mozambique Mobile Belt 44, 49
 Mustahil lava flow 226, 228–229, 237

 National Disaster Risk Management Commission
 358, 361
 nested caldera 45, 47, 62
 non-transform offset 256, 271, 275, 279, 285
 geophysical properties 272, 273
 terminology 249–250, 253
 Northern Volcanic Rift Zone, Iceland 297–311
 age, lava flow 304, 309–311
 earthquakes 309
 fissure eruptions 305–306, 307–308
 fissure swarms 300–303, 305–306
 study methods 299–300
 tectonic setting 297–299

 ocean ridge systems 249–286
 review 249–252
 ridge properties 253, 254–255, 256, 260,
 264, 268
 fast-spreading 255–263, 280–281, 283
 intermediate spreading 263–269
 slow-spreading 121, 269–274, 280–281, 283
 ultra-slow spreading 274–282
 segmentation, magmatic 254
 segmentation, tectonic 252–254
 synthesis 282–286

 oceanic crust formation 120–121, 150
 Red Sea Rift 165–178
 South Atlantic 315–337
 oceanic seafloor spreading 241, 243, 327
 Ogaden Dyke Swarm 224–227
 aeromagnetic data 227–231
 age 6, 231, 232–233, 236–237
 dilation and rifting 237–238
 geochemistry 231, 234–236, 242
 geodynamics 240–243
 magma source 237–240
 tectonic and magmatic setting 221–224
 orthogonal spreading 45, 48, 53–55, 56, 59, 60, 62
 overlapping spreading centre 249–252, 253, 283
 fast-spreading ridges 256, 257, 258, 262

 P-receiver functions method 71–72, 75
 P-wave velocity 168, 174
 pāhoehoe flow 155, 360
 palaeomagnetism
 natural remanent magnetization 213–214
 polar wander path 214–216, 217
 site mean direction 215–216
 palaeomagnetism study, Afar Depression 209–217
 sampling and analysis 211, 213
 palaeovalley 231, 243
 lava infill 226, 227, 228–229
 Paraná–Etendeka, large igneous province 315, 316,
 329–330, 337
 time-scale 331
 partial melt 71, 122, 176
 gravity survey 168
 seismic study 127–144
 velocity 22, 23, 76, 78, 80
 passive margin 15, 79, 80, 327
 Peak Ground Acceleration value 352
 pillow lava 259, 261, 308
 plate boundaries
 East Africa 2, 32, 106, 343
 Mexico–Cocos 84–85
 plate force paradox 11
 plate motion vector 45, 52–54, 55, 59, 60
 plate spreading vector 298
 plate tectonics
 driving mechanisms 11–14
 rate of movement 345
 Rivera–Cocos 84, 96–97
 rupture and pre-existing weakness 16, 26
 plume source 15, 26, 238–240, 243
see also under mantle
 Pn/refraction velocity 130–131, 134–135, 136–138
 polar wander path 214–216, 217
 polarity 230
 reverse 227, 230, 243
 population, at risk 348, 352, 358, 359, 362–363
 power spectrum analysis, gravity data 170–172,
 174, 176
 Proterozoic faults, Kenyan Rift 44, 49

- proxies 48, 57, 58, 110
 Earth Observation data 203
 pyroclastic cones 53, 54, 61
- radial anisotropy 133, **134–135**, 138, 140, 141, 142, **143**
 radial fractures 307
 radial tractions and gravitational potential energy 17–21, 22, 25
 rare earth elements 235–237
 Rayleigh wave *130–131*, 132, **134–135**, 136–138
 receiver functions 132–133, 168
 reconstruction, South Atlantic seafloor spreading 332–333
 Red Sea Rift 105, 150, 183, 189, **190**, 209, 221
 age 223, 240
 high-precision gravity survey 165–178
 melt 118, 120, 127, 143, 144
 seismicity 343, 350
 spreading 243
 remote sensing 347
 Ertá Ale volcano 183–203, 224, 226
 fault measurements **58**
 Manda Hararo dykes 150–155
 research funding, Afar Rift Consortium 3–4
 resistivity 115–120
 method 108–110
 modelling 111–115
 Reykjanes Peninsula Oblique Rift 297, 298, 305
 Reykjanes Ridge, axial magma lens 273
 rheology, mantle 11–14
 rifting and magmatism 1–3
 age 223
 Iceland 297–311
 Manda Hararo dykes 149–161
 South Atlantic 315–337
 rifting cycle 183–185, 199, 360
 rifting mechanism 11–26
 driving forces 12–14
 dynamic topography 15–17
 geophysical investigations 22–26
 lithosphere strength 14
 traction and gravity 17–22
 weaknesses and thin spots 14–15, *16*
 ring dyke formation 307
 risk assessment, volcanic hazards 356–362
 risk communication 359, 362
 risk management policies 355–356
 risk research, volcanic hazards 362–363
 Rivera–Cocos plate boundary
 earthquakes 97–101
 gravimetric data 85–86
 gravimetric modelling 86–94
 slab deformation model 96–97
 slab geometry 94–96
 tectonic setting 83–85
 rotation 6
 Ali-Sabieh Block 209–217
 South Atlantic 315, 329, 331, 333, 335, 336
 Rwenzori region, seismic study 69–80
- saloon door mechanism 209, 217
 salt deposits 113
 satellite imagery 52
 dyke emplacement 152–153
 seafloor spreading 6, 120, 149–150, 168
 age 223
 lineations 319, 326–327, 336
 South Atlantic reconstruction 332–333
 seamount 259, 272
 seismic interpretation
 South Atlantic 316–319, 320–325, 328–330
 seismic refraction survey 23
 seismic stations 70, 71
 seismic study 255–261
 mid-ocean ridges 263–268, 270, 271, 273, 278
 seismic study, melt distribution 118, 127–144
 imaging 127–128
 mantle 136–138
 melt and seismic waves **134–135**
 segregation inversions 138–143
 velocity 128–136
 seismic study, Moho topography 69–80
 crustal V_p/V_s ratio 77–78
 data and method 71–72
 stretching factors 78–80
 tectonics 69–71
 velocity model 72–77
 seismic-derived volume calculation 35–38
 seismicity 150, 156–157, 255, 279
 dyke emplacement 158, 159
 and moment tensor 151–152, **153**, *154*, 155
 network and data analysis 348–349
 recent activity 349
 see also earthquake
 seismicity swarms 181
 Sendai Framework for Disaster Risk Reduction 356, 362, 363
 Serdo, earthquake swarms 348
 serpentinitized peridotite 278
 SEVIRI thermal anomaly 186–187, *196–197*, 199, 201
 SEVIRI thermal observations 153, 156, *157*
 shadow, digitization 182, 188
 shear wave splitting 132, 144
 shear wave tomographic model 13, 19–20, 21, 22, 25
 shear wave velocity 15, *16*, 350–351
 shear zones, Kenyan Rift 44, 49, 59
 shear, crustal thinning 336
 shield volcano 201, 221, 357
 sill, resistivity 116–119
 slab 13, *19*, 21, 22, 25, 243
 force 11–12
 thickness 87
 slab geometry
 gravimetric model 84, 88–96, 99, *100*, 101
 upper surface, map 95, 101
 SO₂ emissions 151–153, 158–159, 360
 Ertá Ale volcano 185
 South African/South American margin 317, 319, 326

- South Atlantic, rifting and continental break-up 315–337
 age 315–316
 data collection 317
 gravity data 319, 320
 magnetic features 318, 319, 326–328
 opening history 327, 330–337
 seaward-dipping reflector 316, 328–330
 seismic interpretation/data 317–319, 320–325
- South East Indian Ridge 263–267, 284
 geochemistry 269
- South West Indian Ridge 274–282, 278–279
 geochemistry 282
- spreading cell 250, 283–284
- spreading rate 255, 263, 269, 274, 279
 Atlantic 297–299, 327
 Kenyan Rift 45, 60
- spreading ridge *see under* ocean ridge systems
- spreading vector 301, 302
- storage/transport of melt 127–144, 129
- strain 11–14, 15, 25, 26
- strain rifting 329
- strength 14–15, 25, 26
- stress 11–14, 15, 18, 19–21, 61
- stress field
 and deglaciation 308, 311
 Ertá Ale volcano 184
 and magmatism 55–62
 and structure 43–62
- subduction, dip angle 84, 241
- subduction, Neotethys 240
- subsidence 49, 51, 61–62
 Albertine Rift 79
 caldera 299
- super-plume 17, 26
- surface wave data 132
- Tanzanian Divergence 61
- Tecomán 2003 earthquake 88, 94, 95, 99, 100, 101
- tectonic segmentation, ocean ridge 252–254
- tectonics 344–347, 350–352
 elliptical calderas 43–62
 and magmatism 181–203
 Ogaden Dyke Swarm 240–241, 243
 stretching model 15, 25, 26
- temperature 273
 dyke eruption 157
 storage 176
 and velocity 127
- Tendaho dam 6
 fault network 347, 349
 history 342–344
 seismicity, dam-induced 341–342
 seismicity, recent activity 349–350
 seismicity, regional 347
- tectonics 344–347
- triple junction tectonics 350–352
- Tendaho Graben 166, 167, 345, 347, 349
 high-precision gravity survey 168–177
 tensional fracturing 243
- tephra, density and volume calculation 37–38
- Teru profile 108, 111–113, 115, 119, 120
- thermal anomaly 4, 330
 Ertá Ale volcano 183–185
 infrared 191–194, 195, 198–199, 201, 202
 remote sensing 153, 155, 156
- thermal emission 184–187
- thermal springs 177
- thermal structure 254–255
- tindar 302, 305, 308, 311
- titanomagnetite 217
- tomographic model 17, 19, 20
- topography *see also* dynamic topography
 remote sensing 182, 188–189
- Rivera–Cocos 85
- Toulouse Volcanic Ash Advisory Centre 359, 362
- Trans-Mexican Volcanic Belt 83
- transform fault
 Iceland 298, 303
 Mid-Atlantic Ridge 270, 271–273
 mid-ocean ridge 249–252, 255–259, 278, 285
- transient electromagnetic mode 108–110
- transpression and transtension, Rivera–Cocos 96–97, 101
- transtension 45, 48, 48, 59, 60, 62
- transverse electric (TE) and magnetic mode (TM) 109, 111–116, 117
- triple junction 166
 Afar Depression 343, 344, 346, 350–352
 Iceland 301, 311
- Tristan da Cunha 316
 hotspot 329–330, 336
- Turkana 32, 35, 36, 40, 48
 rifting age 241
- Ubetale dyke 226, 228–229, 231
- Uganda, East African Rift 69
- ultra-slow spreading ridges 274–282
- uplift 61–62, 69
 and deglaciation 308–309
 and rifting 17, 22
 Rwenzori 80
 and volcanism 49, 51
- velocity 13, 22–25, 48, 80, 120
 Afar 168, 174, 194
 HVLC (high-velocity lower crustal body) 329, 335, 336
 low zone 118
 mantle 3–4
 mid-ocean ridge 259–260, 261
 South Atlantic 319
 triple junction 350–351
- velocity and melt 127–130
- Pn and wide-angle refraction data 130–132
- S-wave and shear wave 132–138

- velocity model 71, 72–77, 152, 348
 vents 61
 viscosity 13
 volcanic effusion 330, 332, 334–335, 336
 South Atlantic 316, 327–329
 volcanic fields, Rwenzori 70, 78
 volcanic hazard maps 356–359
 volcanic hazard research, Ethiopia 355–363
 future needs and priorities 361–363
 historical volcanism/magmatism 358–360
 risk assessment 356–358
 volcanic mound fields 257
 volcanic province 106
 volcanic proxy for stress orientation 48
 volcanic ratio correction 39–41
 volcanic volume 31–38
 bias correction 38–41
 volcanism 350
 Main Ethiopian Rift 166
 Ogaden region 221–243
 volcanism and oblique extension 61–62
 volcanism and rifting 1–2, 149–161
 volcano dynamics 181–183
 volcanoes, Ethiopia 343, 357, 359
 volcanoes, Kenyan Rift 33, 49–51
 volume calculation, map-based 34–35, 38,
 40–41
 volume estimate, Kenya volcanics 31–41
 volume of eruption 4–5
 volume of magma
 dyke 155, 156, 159, 160
 resistivity 106, 118–120
 and SO₂ emission 159
 volume of melt 25
 water resources East African Rift 342
 workshop 2012 360–361, 362
 Magmatic Rifting and Active Volcanism 4
 Yatta Plateau, palaeo-river 36
 Zijderveld diagrams 213, 215