

# Index

Page numbers printed in *italic* refer to figures;  
Page numbers printed in **bold** refer to tables.

- A- and B-subduction 48
  - diagnostic criteria for **332**
- A-subduction 257, 394
  - Brazilian Shield 399
  - of Baltica 299
- Accident Champagne–Modane 233
- Accreted arcs, Saudi Arabia, Egypt and Sudan 336
- Accretionary complexes 12, 43, 51, 59, 63
- Accretionary continental growth, N American Cordillera 366, 369
- Accretionary processes, modern 52
- Accretionary wedges 105, 107, 326, 329, 389
  - possible deformation mechanism map 55
- Accretion, Gondwanaland margin fore-arc terrane 395
- Accretion, structures associated with 53–9
- Adamello Massif 68
- Adana Basin 19, 24
- Adria 263
  - palaeomagnetic poles 263–5, 264, **266–70**, 271–2
- Aegean Basin 9, 279
- Africa–Europe convergence 239
- African Plate, underthrusting 15
- Africa, pole positions for 263
- Aiguilles d'Arves flysch zone 254
- Aiguilles Rouges, basement massif 252
- Ailao Shan Fault 129
- Ailao Shan metamorphic core 128, 129
- Ailao Shan Mountains 128
- Ailao Shan–Red River Fault Zone 126–8, 133
- Akkajaure Nappe 291
- Al Amar Zone 336
- Alaska
  - accretion of terranes 369
  - simplified terrane map 370
  - tectonostratigraphical terranes 380–4
- Allorhthonous terranes and Cordilleran basement 394–5
- Alpine Belt
  - deformation history 273–80
  - Mesozoic palaeogeography 261–73
    - crustal structure 272–3
    - palaeomagnetism 263–5, 271–2
    - regional facies analysis 261, 263
- Alpine continent–continent suture 279
- Alpine molasse basins, peripheral 253
- Alpine nappe emplacement 223, 224
- Alpine Orogen in Anatolia 15
- Alpine Sole Thrust 257
- Alpine–Mediterranean area, structural elements 262
- Alpine/Himalayan system 4, 5, 9
- Alps 78, 330
  - cross-section 224
  - geochemical data 68
  - granitic magmatism 68
  - major collision zones 223
  - post-tectonic granitoids 69
- Alps–Apennine collision suture and the Tyrrhenian Sea 275
- Alps, Central and Western, tectonic sketch map 222
- Altyn Tagh Fault 118, 124, 143
- Anadaman–Nicobar Arc 142
- Anatolia, collisional assembly 12–15
- Anatolian Wedge (Block) 12, 15, 18, 19, 25, 28, 29
- Anatolide/Tauride Platform 12
- Andaman Basin, Central and Trough 142–3
- Andaman Sea 126
- Andean Basin, cross-section 393
- Andean Cordillera
  - and sedimentary basins (Triassic–Lower Cretaceous) 392
  - back-arc region deformation 396
  - uplift and tectonic compression 391
  - related to Gondwanaland 390
- Andean magmatism, migration of 394
- Andean orogenesis, causes of 394, 397–9
- Andes
  - Pacific margin, subduction-related volcanism 391
  - tectonic setting 389
- Anduo Suture 45, 167
- Angayucham Terrane 378, 379
- Apennines 263
- Appalachians 9, 107
- Apulian Platform 272
- Arc–continent collision and deformation, main Andean Cordillera 399
- Arc–continent collision, Chile 394–5
- Archaean basement, Mozambique Belt 338
- Archaean Orogeny, Limpopo Belt 341–6
- Arequipa Massif 389, 394, 396
- Argentera Massif 232, 236, 239, 255
- Asia, pre-collision margin 148
- Asian Plate and Kohistan Arc 207
- Aspres Fault 253, 254
- Assyrides 20
- Aswa Transform Fault 339
- Atauro and E Timor
  - interpreted cross-section, corresponding gravity field and Bouguer anomaly profile 359
  - isostatic cross-section, corresponding gravity field and Bouguer anomaly profile 359
- Atauro Island, compensation level 360
- Aulocogens, African orogenic belts 321
- Aurdal Duplex 291
- Austerfjord Thrust 295
- Austroalpine Front 232
- Austroalpine Thrust 257
- Austroalpine units 273, 274
- B-subduction 329, 330, 394
  - Baltica 299
- Back-arc basin formation, W Pacific type 275, 277
- Back-arc basins 273, 274
  - and mountain building 109
  - Pacific margin, subsidence of 391
- Back-arc extension 142
- Back-arc spreading 261

- Backthrusting 7  
   Himalayas 144  
   Ladakh 180–1  
 Baikal Rift System 28  
 Balanced cross-sections 291, 292  
   Alps 331  
   NW external Alpine Thrust Belt 248–58  
   Scandinavian Belt 292, 298  
   techniques and use 247–8  
 Baltic Cover Thrust Sheets 291, 295  
 Baltic Craton 287  
 Baltic Thrust Sheets, emplacement of 296  
 Banda Arc 107  
   related to W Indonesia and Australia 353  
 Bang Gong–Nuijiang Suture, reactivated 145, 148  
 Bangweulu Block 322, 323  
 Barisan Fault 142  
 Basin and Range province, N America, extension 84  
 Basin formation and development 20, 22–4, 98  
 Basin subsidence, S American continent 397  
 Basins  
   elongate strike-slip/thrust-bounded 22  
   extensional 115  
   flake and triple junction compatibility 22  
   pull-apart 22, 23, 24, 27  
 Batu Putih Limestone 354, 355  
 Baynes Drift Formation 343  
 Bayuda Desert 332  
 Beitbridge Group 343, 344  
 Beitbridge shelf sediments, Limpopo Belt 343  
 Belledonne Massif 246, 252, 254  
   imbricate slices 249  
 Belledonne Thrust 248  
 Belluno Basin 264  
 Benioff Zone 92, 108, 299, 329  
 Bentong–Raub Suture 139  
 Bergell intrusives 68, 234  
 Bergen Thrust Sheet 291  
 Bhutan Granites 68  
 Biella Pluton, monzo-syenitic 224  
 Bitlis Massif 20, 24  
 Bitlis Ocean 14  
 Bitlis Thrust Zone 25  
 Black Sea 15  
 Block faulting, Damara Belt 307  
 Blueschist-facies metamorphism 5, 31, 159, 209,  
   241, 322  
 Bobonaro Scaly Clay 352, 354, 355  
 Bohai Basin, extension of 139  
 Bon Nant couloir, shear lines 236  
 Boran Basin, 19  
 Borneo 134, 135  
 Bouguer anomalies, E Indonesia 356, 357  
 Briançonnais Bernhard basement 225–6  
 Briançonnais Front 236  
 Briançonnais Nappe 236  
 Briançonnais Platform 241  
 Briançonnais Zone 239  
 Brooks Range 379  
 Burma Plate 142  
 Calabrian Arc 273–5, 280  
 Caledonian Belt of Scotland 48  
 Caledonian Orogen, Scandinavia 287–8  
 Caledonian thrust faults 297  
 Canadian Rocky Mountain nappes 47  
 Canavese Line 232  
 Canavese sedimentary sequence 223  
 Carrelet Imbricates 254  
 Cenozoic extrusion and large faults, E Asia 125  
 Central Crystalline Complex, Himalayas 186  
   generalized cross-section 188  
   mineral analyses 196–7  
   radiometric ages (Tertiary)  
     metamorphic rocks and leucogranites 188  
 Chalt Volcanics 206–7  
 Chaman–Quetta Fault 143, 148–9  
 Chambeshi Fold and Thrust Zone 323  
 Chamonix–Martigny Zone 236  
 Charriage d'Archeboc 233, 234  
 Chiatsun Thrust 68  
 Chilas Complex 204, 212  
 Chulitna Terrane 372, 375  
 Cicatrice de Preit 236, 237  
 Collision 5, 21, 47, 77, 106, 107, 108  
   active and passive margins 105–6  
   criteria for 329  
   India–Asia 115–54  
   Kohistan Arc and Asian Plate 213  
   Western Alps 238–42  
 Collision and circum-Pacific orogenesis 388–9  
 Collision belts  
   pre-Alpine 48  
   the Alps 46–7  
   the Canadian Cordillera 47–8  
 Collision magmatism 67  
   classification of 69  
   geochemistry and tectonic setting 67–79  
   source regions 73–8  
 Collision tectonics model 105–9  
 Collisional orogens, elements of (schematic orogenic  
   section) 6  
 Collision, terminology 239  
 Combeynot Thrust 254  
 Concepcion–Chubut basement ridge 391  
 Continent–continent collision 3, 29–31, 43, 48, 51,  
   61, 77–8, 83, 89, 97, 101  
   Himalayan type 399  
   idealized section 79  
   Mozambique Belt 341  
 Continent–continent collision zones and tensional  
   stresses 278  
   strike-slip faulting 148–54  
 Continental geotherms, normal and transient 83  
 Continental lithosphere, concept of subduction 38–9  
 Continental lithosphere, shortening of 3–31  
   subduction and lateral expulsion processes 39  
 Continental margins  
   active 69  
   colliding 3  
   thermal age of 29  
   types of 388  
   unstable flexure 105  
 Continental rifts 95, 96, 97  
 Continental subduction 40, 48  
   and lithospheric strike-slip faults 42  
 Continental underthrusting 37

- Convergence slip rates (average), Plates in E Anatolia 24
- Convergent plate boundaries 3, 5
- Cooling ages, Alps 225
- Corbier Thrust 253, 254
- Couloir de la Stura 236, 237
- Crust and lithosphere  
deformation as a function of depth 106  
strength and deformation mechanisms 104–5  
viscosity model 100
- Crust and lithosphere stretching and shortening  
surface elevation changes 100–2  
crustal thickness and depth to Moho 103  
thermal changes 102–4
- Crustal extension before thrusting, NW external Alpine Thrust Belt 255–6
- Crustal Magmatism, diversity of 93
- Crustal melting 310  
in continental collision zones, mathematical model 85–91
- Crustal shortening 14, 23, 106, 324  
India–Eurasia boundary 143
- Crustal stacking wedges 45, 46, 47, 48  
concept of 41–6
- Crustal thickening 23, 78, 79, 87, 105, 118  
and extension 92  
and lateral flow 26  
and strike-slip extrusion 148–9, 151  
crustal melting 92  
Damara Belt 310  
in Tibet 144  
in Western Alps 224
- Crustal thickening and thinning processes, geometries of 84
- Crustal thickness  
Adriatic Sea 272  
Ionian Sea 272  
Levant Sea 272  
Timor Trough and seismic refraction studies 358
- Crustal thinning 83, 84, 85, 87
- Crustal wedge, NW external Alpine Thrust, dimensions of 256
- Crustal/lithospheric shortening 22
- Cryptic suture zones 7
- Crystalline Thrust Sheets (Scandinavian Caledonides) 291–2
- Damara Belt 305–7  
A-subduction model 330–1  
deformation phases, inferred movement of 315  
isotopic evolution of 313–14  
tectonic models 314, 316
- Damxung–Jiali Fault Zone 145
- Dauphinois cover rocks, stratigraphy of 245–6
- Dead Sea Transform Zone 24
- Décollement 9, 40, 41, 43, 46, 105–7, 120, 225  
Irumide Belt 323  
Umbrian Apennines 272
- Deep mantle anomaly 46
- Delamination 78, 331  
after B-subduction, Tibet 331  
of mantle lithosphere 279–80, 280
- Denali Fault System 373
- Dent Blanche Nappe 223, 236, 237
- Diablerets Thrust 249, 252
- Digitation de l'Iseran 234
- Digne Thrust 241
- Digne Thrust Sheet 255
- Dinarides 263
- Dir Volcanics 213
- Dir-Kalam Group 207
- Dokhan Volcanics 334
- Dras Island Arc 185
- EACZ *see* East Anatolian Convergent Zone
- Earthquake epicentres and focal mechanism solutions 15  
East Anatolia 13
- Earthquake fault-plane solutions 142
- Earthquake hypocentres, depth frequency of 9–10
- Earthquakes 16, 39, 116  
intracontinental 40  
North Anatolian Transform Fault 15, 18
- East Anatolia  
summary of tectonics 25  
vector diagram 26  
young collision zone 3–31
- East Anatolian Convergent Zone (EACZ) 12, 15, 20–4
- East Anatolian Transform Fault 15, 18–20, 22
- EATF *see* East Anatolian Transform Fault
- Egypt (Eastern Desert), section across 335
- Elastic lid 12, 22, 23, 29, 31  
tectonic regimes and fault sequences 26
- Embrunais Nappes 255
- Embu Series 338
- Erbaa Basin 16
- Erzincan Plain (pull-apart basin) 16, 17
- Etusis Formation 306, 312, 313
- Euphrates gorge, antecedent 21
- Eurasian Craton 15
- Eurasian Plate 68
- Exotic Nappe Complex Caledonides 294–6, 299
- Extension  
and basin formation, Andean Cordillera 391  
Basin and Range province, N America 84  
S Tibet 116, 117
- Extensional basins 115  
Gulf of Thailand and Sunda Shelf 139  
late-tectonic, generation of 275–80
- External Briançonnais Zone 236
- External Dauphinois Zone 245–7
- Faille d'Ornon 254
- Falkland Trough 394
- Fatula Limestone 178, 179, 180
- Fault-controlled basins 19
- Faulting  
extensional, Tibet and the Andes 83–4  
normal 19, 118, 136, 253, 261  
Mergui Basin 140  
S Tibet 116, 117  
Sunda Shelf 140  
strike-slip 15, 17, 19, 21, 45, 48, 61, 133, 135, 137, 138, 152–4, 233, 234  
and lateral expulsion 39  
and sutures 151–2  
*en échelon* 116, 118, 331

- Faulting, strike-slip (*cont.*)  
 in collision environments 16  
 intracontinental 19–20, 27  
 lithospheric 41, 48  
 major active, Tibet 119  
 Mergui Basin 140  
 parallel post-folding 28  
 S Tibet 145  
 side-stepping 27–8  
 Western Alps 237–8  
 transform 95, 97, 133, 135, 136, 142, 143, 326  
 Fenêtre de Lanslevillard 234  
 Flake tectonic model 330  
 Flake tectonics and intracrustal thrusting 331–2  
 Flysch 20, 173, 224, 239, 253, 256  
 Flysch basin, migrating 241  
 Flysch belts, N Himalayas 161  
 Flysch-molasse troughs, migration of 14  
 Fore-arc accretionary wedge 389  
 Foredeeps 392, 394  
 Foreland basins 7, 20, 21, 392  
 Foreland deformation 27  
 and continental convergence, stresses of 7, 9  
 Foreland flexures 7, 29  
 Foreland fold-and-thrust belt, Andean  
 Cordillera 393  
 Foreland/hinterland deformation 29  
 France–Sardinia–Calabria, evolution of a  
 transect 274  
 French external Alpine Thrust 245  
 French Hercynian Belt 48  
 French Massif Centrale 48  
 Frido Flysch 273  
 Frontal Duplex (imbricate zone), Caledonian  
 Front 289  
 Frontal Pennine Thrust 245, 248, 249, 252, 255  
 Furgg Formation 225
- Gabug Pluton 68  
 Gaisa Nappe 291  
 Gandise *see* Gangdise  
 Gangdise Batholith 145  
 Gangdise Granodiorite Belt 118  
 Ganges Foredeep 116  
 Gargatis Nappe 294  
 Geothermal gradients 23, 29, 96, 98, 104, 107, 109  
 Malay Basin 139  
 Geothermal region, Tibet 168  
 Gindicarc Line 68  
 Gitte Thrust Sheet 252, 253  
 Glarus Thrust 225  
 Gondwanaland 203, 263, 389  
 break-up of 397  
 part reconstruction 315, 316  
 Gondwanaland margin accretionary fore-arc  
 wedge 390, 395, 399  
 Gondwanaland margin fore-arc and magmatic arc,  
 Chile 394  
 Grand Chatelard Massif 248, 253  
 Grandes Rousses 253–4  
 Granites  
 collision related, isotopic data 70  
 Damara Belt 306, 310, 312–3  
 I-type 90, 92  
 and remelting of under-plated material 396  
 Peruvian batholith 396  
 Limpopo Belt 343  
 NE Kenya 337  
 Novate two-mica 68  
 S-type 90, 92, 193  
 and crustal fusion 396–7  
 Magellan Basin 397  
 subduction-related (Sundaland and S China) 139  
 Granitic and rhyolitic magmatism, Alps 221, 225  
 Granitic plutons, Pacific margin (Andean) 396  
 Granitoid rocks, Kaapvaal Craton 343  
 Gandise 68  
 High Himalayas and N Himalayas, comparison  
 between 165–6  
 Alps 69  
 Gravitational isostatic correction 357–8  
 Gravity anomalies and Himalayan Belt 151  
 Gravity effects, cold downgoing slab 362  
 Gravity gliding, Préalpes 232–3  
 Gravity low, Timor 360  
 Gravity sliding 255, 280  
 Tibetan Slab 162  
 Gravity spreading 31  
 Gravity-driven thrust systems, Provençal Alps 255  
 Grés du Champsaur 254, 255  
 Gula Group 292  
 Gula Thrust Sheet 291
- Hafafit Dome 334, 336  
 Hammamat Group 334, 336  
 Haneti–Itiso ultramafic complex 338  
 Hazara Syntaxis 214, 215  
 Heat flux 78, 83, 86–7, 89–91, 98  
 Hellenic Arc, present-day seismicity and  
 volcanism 273  
 Hellenic Trench 15  
 Hellenides 263  
 Helminthoid Flysch Nappe 237  
 Helvetic Nappes 252, 253  
 stacked thrust sheets 249  
 Helvetic Platform 241  
 Helvetic Root Zone 249  
 Helvetic Zone, Glarus Alps 224–5  
 Hengduan Syntaxis 148, 152  
 Hercynides 78  
 Hercynides (SW Europe), geochemical data 68  
 Higher Himalayas, ultrametamorphism and  
 granitization 190–1  
 Himalayan Arc 116  
 origin of 215–16  
 Himalayan Belt  
 general conclusions 46  
 structural sketch map 38  
 Himalayan collision belt 37–46  
 Himalayan granites and anatexis of continental  
 crust 191  
 Himalayan granitoid belts 166  
 Himalayan leucogranite chemistry 191–5  
 Himalayan orogen 5  
 Himalayan seismicity interpreted 41  
 Himalayan series 179  
 Himalayas 78, 109  
 as stacked thrusts 144  
 earthquake foci 40

- general framework 37, 38  
 geochemical data 68  
 present continental subduction 39–41  
 Himalayas (C Nepal), geologic and metamorphic  
   cross-section 163  
 Himalayas–Trans-Himalayas, main structural  
   divisions 160  
 Hunza valley 208  
   cross-section S margin Karakorum Batholith 209  
   variation in mineral lineations 209
- Iapetus Ocean 51, 287  
   closure of 298–9  
 Imbrication 14, 61  
   and thickening of Tibetan crust 216  
   of Indian crust by MCT 214  
 Indentation experiments 149, 153  
 Indentation theory  
   numerical experiments 120  
   plasticine experiments 120–4  
   slip-line fields 120  
 Indentation, India with Asia 150  
 India, rigid indenter 116, 151, 210  
 India–Asia collision 92–3  
   and strike-slip faulting in Sundaland 138–41  
 India–Asia plate boundary 142  
 Indian collision front 124  
 Indian Ocean Ridge 7  
 Indian Ocean, magnetic anomalies 37  
 Indian Plate 209  
   basement gneiss 214  
   subduction of 213  
 Indian Plate foreland, thrust tectonics 214–16  
 Indo-Gangetic Foredeep 7  
 Indoburman Ranges 142  
 Indoburman–Andaman Arc 142  
 Indosinian Foldbelt 133  
 Indus Group 173, 176  
   cross-section 176  
 Indus Suture Zone 159, 173–82, 207, 209–10  
 Indus Suture (India/Kohistan Island Arc  
   collision) 161  
 Indus–Tsangpo (-Zangbo) Suture Zone 148–9, 185  
 Innoko Terrane 378, 379  
 Insubrian Plate 232  
 Insubric Line 68, 223  
 Insubric–Tonale Line 234, 235, 236  
 Internal Zone, Exotic Nappe Complex (Scandinavian  
   Caledonides) 293–4  
 Intracontinental shortening and thickening 27  
 Intracontinental subduction 46, 48, 195  
   and inverted metamorphism in Nepal 185  
 Intracratonic basin, marginal, Irumide Belt 327  
 Intracratonic block motions 344  
 Inverted metamorphism  
   High Himalayas 186, 190, 195  
   Main Central Thrust Zone 162–4  
 Ionian Zone and rotation of thrust sheets 273  
 Irrawaddy–Martaban apron 142  
 Irumide and S Moçambique Belt 324  
 Irumide Belt 321–4  
 Irumide Orogeny 322–4  
 Isostatic anomalies, E Indonesia 356–8, 357  
 Isostatic compensation, Timor region 360  
 Isostatic disequilibrium 105  
   Indonesian Archipelago 358  
 Isostatic equilibrium 108  
 Isostatic uplift 108, 109, 279  
 Isothermal stretching 23, 24  
 Istria 264  
 Ivrea Block, Hercynian tilting 223  
 Ivrea Body 257  
 Ivrea–Verbano Zone 223
- Jaglot Syncline 204  
 Java Trench 352  
 Jiali Fault 118  
 Jiali Fault Zone 148  
 Jijal Complex 204  
 Jijal garnet granulites 159  
 Jijal–Patan Complex 209–10  
 Jotenheim Suture 293  
 Jotun Thrust Sheet 291
- K–Ar ages, Wrangellia 372  
 Kaapvaal Craton 341, 342, 343, 344, 345, 389  
 Kahiltna Flysch Terrane 372–5  
 Kalak Thrust Sheet 296  
 Kamila Amphibolites 204, 209  
 Kangmar Pluton 165  
 Karakorum Batholith 208, 213  
 Karakorum Fault 118, 133  
 Karakorum Fault Zone (Kohistan Island Arc/Asian  
   Plate collision) 161  
 Karakorum Plate 207–8  
 Karakorum strike-slip faults 41  
 Karakorum–Jiali Shear Zone 118  
 Karliova Basin 19  
 Karliova triple junction 25, 29  
 Karmøy Ophiolite 287, 296  
 Katawaz Basin 143  
 Khan Formation 306, 313  
 Khlong Marui Fault 139, 141  
 Khorat Basin 133  
 Kibaran Orogenic Belt, Central Africa 321  
 Kioto Limestone 177  
 Kohistan Arc 211–4  
   early deformation 204, 206  
   lithological and structural map 205  
   position in Himalayan and Tibetan collision  
   zones 203  
   reconstructed stratigraphy 204  
 Kohistan Arc Batholith 203–8  
 Kohistan–Ladakh Batholith 206, 210, 213  
 Kōli Supergroup 292  
 Kōli Thrust Sheet 292, 294  
 Konse Series 338  
 Kuiseb Formation 307  
 Kuiseb Schists 308, 312, 316  
 Kulu Valley, inverted metamorphic series 190  
 Kun Lun Mountains 116, 124, 167  
 Kure Fault 17  
 Kvitvola Nappe 291
- La Guerre Duplex 253, 254  
 La Meije Thrust 254  
 La Plata Craton 389  
 Ladakh Granodioritic belt 173

- Ladakh mélangé 210  
 Ladakh (Trans-Himalayan) Batholith 159, 164, 182, 185, 209  
 Lamayuru Flysch Nappe 176–7, 178, 180  
 Laurentian Craton 287  
 Lepontine Event 224, 226  
 Lepontine metamorphism 236  
 Lepontine Region, rotation of 234  
 Lesser Himalayan granites 68  
 Lesser Himalayas 116  
 Leucogranites 69, 189, 190, 191–3, 195, 198  
   High Himalayan 68, 69, 186, 193, 195, 200  
 Lhagoi Kangri Belt *see* North Himalayan Belt  
 Lhasa Block 43, 148, 151  
 Lice earthquake 20, 25  
 Lice Flysch 14, 20  
 Lice Thrust 25  
 Ligurian Sea 273–5  
 Limpopo Belt 341–7  
 Lithosphere 85–7, 91, 97, 101  
 Lithosphere delamination 23  
 Lithosphere (lower), reduction of 98  
 Lithosphere thickness, undisturbed 86  
 Lithosphere–asthenosphere boundary 97  
 Lithospheric deformation 3  
 Lithospheric deviatoric tensions 153  
 Lithospheric intracontinental subduction 48  
 Lithospheric mantle subduction 216–17  
 Lithospheric root, compressional effect 278, 279  
 Lithospheric shear zone 329  
 Lithospheric shortening 99, 148, 361  
 Lithospheric stretching 24, 29, 99  
 Lithospheric strike-slip faults 48  
 Lithospheric subduction 39, 40, 45, 46  
 Lithospheric thermal age 9  
 Lithospheric thickening 84  
 Lithospheric thinning and asthenospheric flow 277  
 Llagoi Kangri granite belt 68  
 Lofotens 295  
 Lung Men Shan 27  
 Luongo Fold and Thrust Zone 322–3  
 Lurio Belt 337
- Madagascar, position of 337–8  
 Magellan Basin 393, 395, 396, 397, 398, 399  
 Magmatism  
   and Himalayan collision 164–8  
   granitic and rhyolitic, Alps 221, 225  
   Himalayan domain 164–6  
     Higher Himalayan Belt 164  
     North Himalayan Belt 164–5  
   Tibetan domain 166–8  
     N Tibetan volcanism 167–8  
     S Tibetan volcanism 166–7
- Magnetic anomalies  
   Andaman Basin 142  
   Indian Ocean, interpretation of 37  
   S China Basin 136
- Magnetotelluric studies, Tibet 168  
 Main Boundary Thrust 214  
 Main Central Thrust 116, 214, 215, 216  
 Main Central Thrust Zone  
   inverted metamorphism 162–4  
   tectono-metamorphic relations 162
- Main Mantle Thrust 41, 159, 209–10, 211, 212, 214, 215, 216  
 Malay Basin 141  
 Malaysia, tin girdle 139  
 Manaslu Granite 68, 76  
 Manaslu Pluton 164, 185, 191  
 Manley Flysch 375–7  
 Mantle deformation, penetrative 104  
 Mantle detachment, concept of 98  
 Mantle partial melting 24  
 Mantle wedge 92  
 Mantled gneiss domes 293, 294, 295  
 Matchless Belt 307, 314  
 Matok Granite 345  
 Matsitama sequence 343  
 MBT *see* Main Boundary Thrust  
 MCT *see* Main Central Thrust  
 MCT/MBT junction 166, 167  
 Meatiq Dome 334, 336  
 Mergui Basin 126, 139  
 Mergui Ridge 143  
 Messina Suite 343  
 Messinian evaporites 275, 276  
 Metamorphism  
   Damara Belt 315, 316  
   during Himalayan collision 159–64  
   Himalayas  
     flysch belt 161  
     Tibetan sedimentary series 161–2  
   inverted, Main Central Thrust Zone 162–4  
   Lepontine 236  
   Limpopo Belt 344  
   N Himalayas 161–2  
     Damara Belt 307, 308, 310  
 Mica ages, Damara Belt 310  
 Mica dating, Himalayas 144  
 Miomaffu Tuff 353, 355  
 Mischabel back-fold 226  
 MMT *see* Main Mantle Thrust  
 Moçambique Belt 321  
 Moelv, duplex window (imbricates) 289  
 Moelv tillite, glaciogenic 291  
 Mohave wedge 9  
 Moho 38, 101–2, 102, 145, 295, 331  
   as a major décollement 48  
   isostatically depressed 257  
 Mojave Desert (California) 28  
 Mont Blanc Massif 236, 248, 249, 252, 253, 256  
 Mont Blanc–Pelvoux Thrust geometry 249–55  
 Mont Chetif Massif 252  
 Monta Rosa Granites 225  
 Montaimont Duplex 254  
   imbricate sequence 253  
 Morcles Nappe 236, 252, 253  
 Morcles Thrust 249  
 Mount Ararat 21  
 Mozambique Belt 321  
 Mozambique Belt (East Africa) 337–41  
   ophiolites 338–9  
   related to late Proterozoic tectonics of NE Africa 337  
   sequences in 339  
   stratigraphy 338  
   stretching lineations 341  
   structure 339, 341

- Mozambique Belt (Kenya), interpretative sections 340  
 Mulden Rocks 307  
 Mus-Van Basin 24  
 Muva Supergroup, sedimentary sequence 322, 323  
  
 N Tibet, mafic post-collisional magmatism 167–8  
 Najd Fault System 337  
 Nama Rocks 307  
 Namche Barwa Syntaxis 133, 148  
 Nan Shan 27, 118  
 Nanga Parbat Syntaxis 211–12, 215, 216  
   cross-section 211  
 Nasafjell Basement Culmination 294  
 Nasafjell Duplex 294, 295  
 NATF *see* North Anatolian Transform Fault  
 Natuna Arch 139  
 Naukluft Nappes 308  
 NE Africa  
   accretion of island arcs 346  
   late Proterozoic tectonics 332, 334, 336–7  
   sketch map Precambrian tectonics 333  
   structure 334, 336–7  
 New Hebrides back-arc region 277  
 Niksar Basin 16  
 Nindam and Lamayuru Nappes, contacts between 180  
 Nindam Flysch Nappe 176–7, 178, 180  
 Nordland and Troms, allochthonous basement 294–5  
 North American Craton 47–8  
 North Anatolian Transform Fault 15–18  
 North Kohistan Suture 45  
 Northern and Indus Sutures, age of formation 210  
 Northern Suture 206, 207, 208–9  
 Norway, W coast, restored section 292  
 Nosib Group 306  
 Novate two-mica granite 68, 79  
 NW Borneo–Palawan Trench, subduction along 136  
 NW external Alpine Thrust Belt 248–56, 258  
 NW external Alps 246  
 NW Himalayas, collision tectonics 203–17  
 Nyainqentanglha Belt 166  
 Nyainqentanglha Range 145, 148  
  
 Obduction 12, 14, 37, 43, 105, 108, 238  
   Banda Arc 107  
   collision-related 141  
   Oceanic Crystalline Thrust Sheets 299  
 Oblique faults 19  
   Mergui Basin 140  
   Sunda Shelf 140  
 Oceanic Crystalline Thrust Sheets 292–3, 295–6, 299  
 Oghi Thrust 214  
 Ophiolite obduction zones 31  
 Ophiolite sequence, Shakiso-Arero region, Ethiopia 341  
 Ophiolite sequences, Alpine Belt 261  
 Ophiolite zone, Sekerr 339  
 Ophiolite zones, Egypt to Mozambique 337  
 Ophiolites 14, 20, 161, 299, 329, 332  
   Andean Cordillera 391  
   Eastern Mediterranean 273  
   Ladakh 180  
   Mozambique Belt 338–9  
   NE Africa 334  
   Norway 292  
   obduction of, Baltic Craton 296  
   Pennine 223  
   Piémont 221, 223, 225  
   Sarmiento complex 395  
   Sol Hamed and Wadi Onib 336  
   Tortuga complex 395  
 Ophiolitic mélanges 159, 208, 210  
   Ladakh 210  
   NE Africa 334  
 Ophiolitic obduction and blueschist emplacement 159–69  
 Ophiolitic thrust sheets 141  
 Orogenesis, mechanics of 96–7  
 Orogenic belts 69, 93, 96  
   intersection of 314, 315, 316  
   thermal development of 83  
 Orogenic (mobile) belts (Proterozoic), African continent, models for 321  
 Orogenic sole thrust (Scandinavian Caledonides) 294, 295  
 Orogenies, classification 97  
 Osen–Røa Nappe Complex 291  
 Oslo Graben 296–7, 289  
 Ovas 14  
   Central Anatolian 28, 29  
 Overthrusting 61, 63, 77, 78, 95, 115  
   divergent 118  
   S Tibet 144  
   Tibet and the Himalayas 116  
 Oxygen-isotope values, Damara sediments 312  
  
 Pacific margin, S America 397–8  
 Pakistan, deduced detachments 9  
 Palaeo-Tethys 261  
 Palaeobiogeographical analysis, Wrangellia 371–2  
 Palaeomagnetic data  
   Damara Belt 307  
   Wragellia 369–71  
 Palaeomagnetic sampling localities, Umbrian Apennines 271  
 Palaeomagnetic sampling sites, Southern Alps 265  
 Pamir Arc and back-thrusts 45–6  
 Pamir subduction zones 41  
 Pamir Syntaxis 152  
 Pampean–Patagonian–Malvinas Arch 389  
 Pangea 261  
 Pannonian Basin 9, 278, 279  
 Patagonian batholith 397  
 Pegu–Yoma volcanic line 142  
 Pelvoux Massif 248, 253, 254  
 Penaz Imbricates 249, 252  
 Pennine Nappes 223  
 Pennine Thrust 232  
 Pennine Zones 245  
 Periadriatic Belt 261  
 Peripheral basins, Tyrrhenian Sea 275  
 Peruvian Batholith 397  
 Piémont Basin 239  
 Piémont Nappe 236  
 Piémont Trough 223  
 Piémont Zone, subduction of 225

- Plate displacement and strain 5  
 Plate slip rates 26  
 Plate tectonic processes  
   classical model 329, 331  
   role in Africa 326  
 Plate tectonics and orogenesis 388–9  
 Plateau Thrust 254  
 Plutonic complexes, E Alps 68  
 Plutons, Trans-Himalayan 68  
 Pole of rotation, Anatolia/Black Sea 18  
 Polyphase extrusion 115  
   E Asia 124–48  
 Polyphase extrusion model 149  
 Polyphase opening, Andaman–Mergui Basin and  
   Burma lowlands 142–4  
 Pop-ups  
   Irumide Belt 323, 324  
   Kohistan 212–14  
 Post-collisional strike-slip movement, Zangbo Suture  
   144–5  
 Post-collisional strike-slip zones, Irumide Belt 324  
 Poturge Massif 20  
 Pre-Alps Nappe 224  
 Provençal Platform 239  
 Pull-apart basins 12, 16, 19, 27, 136  
   Andaman Sea 142  
   strike-slip 22  
  
 Radioactive elements and geothermal gradient 104  
 Radioactive heat source (lithosphere) 86, 98  
 Radiogenic heat contributions 90–1  
 Ranong Fault 139, 141, 148  
 Ranong–Khlung Marui Fault System and the Mergui  
   Basin 143–4  
 Ranong–Khlung Marui Fault Zone 138  
 Rb/Sr isochron ages 324  
   Damara Belt 307  
   granites, Ubendian Belt 325  
   NE Africa 332  
 Red River Fault 118, 124, 126, 127, 128, 129, 133,  
   135, 137, 141, 143, 148  
 Red River system, possible links to S China Basin  
   136–7  
 Red River–Ailao Shan Fault Zone 127  
 Regional gravity anomalies, Eastern-Indonesia  
   356–60  
 Remobilization of crust, Damara Belt 310, 314  
 Resadiye Basin 17  
 Rhine Graben 241  
 Rhine–Rhône Line 234, 235, 236  
 Rhodesian Craton 341, 342, 343  
   rotation of 345  
 Rhodopian Massif 12  
 Rhône Graben 241  
 Ribeira Belt (Brazil) 315, 317  
 Rocas Verdes Basin 397, 399, 400  
   closure of 394  
 Rombak Culmination 294  
 Rotation  
   Alaskan rocks 370–1  
   and accretion stacking 59, 61  
   Baltica 299  
   India and Sundaland 140–1  
   India, N margin 140  
   Indian Plate 210  
   Istria 264  
   Lepontine Region 234  
   lithospheric blocks (E Asia) 153  
   of displacement vectors 298, 299  
   of Sundaland 124, 125  
   Rhodesian Craton 345  
   Scandinavia 299  
   Sundaland 124  
   thrust sheets, Ionan Zone 273  
   Umbria 272  
   Vancouver Island 371  
   W Himalayas 215  
 S Atlantic Ocean Basin, development of 398  
 S China Basin, Atlantic-type, marginal 136  
 S China margin, extension along, dating problem  
   137  
 S China Sea 124  
   mechanism for opening 133–8  
 S Tibet  
   collisional volcanics 166  
   Quaternary tectonics 115–18  
   Tertiary styles of deformation 144–8  
 Sabaoe Limestone 355  
 Sagaing Fault 118, 133, 138  
   and spreading centres in the Central Andaman  
   Trough 142–4  
 Salt Ranges, recent seismic activity 216  
 Samnanger volcanic sequence, imbricate duplex  
   292–3  
 San Andreas Fault 9, 20  
 San Gabriel Fault 20  
 San Gabriel Mountains 9  
 Sardinia, arc-related volcanism 274  
 Sarmiento complex, ophiolites 395  
 Särvi Nappe 291  
 Scandinavian Caledonides 287  
   a collision model 298–300  
   Baltic autochthon and Caledonian Thrust Front  
   289–9, 291  
   External Thrust Sheets 291–3  
   geological sections 290  
   geological terrane map 288  
   thrust displacements 297  
 Schistes Lustrés 234, 237, 241  
 SE Asia, rotation of 138  
 SE China, extrusion of 143  
 Sea-floor spreading 95, 97  
   Andaman Basin 142  
   Atlantic, and Periadriatic Mountain Belt  
   deformation 273–5  
   global increase in 400  
   S China Sea 133, 134  
 Seismicity, Calabrian Arc 280  
 Sekerr area, crustal shear zone 399  
 Selmo molasse 20  
 Sesfontein Thrust and Nappe Zone 314, 315  
 Sesia gneisses 223  
 Sesia Zone, Alps 5  
 Sesia–Lanzo Zone 223, 224  
   overthrusting of thick crustal sheets 225  
 Seve Nappe 296  
 Seve Thrust Sheet 291, 292, 294  
 Seven Devils volcanic arc 369



- Shan Plateau 149, 151  
 Shan Scarp 148–9  
     and the Mergui Shelf and Terrace 143  
 Shangla blueschists 159  
 Shansi Graben System 28  
 Shillakong Unit 177  
 Shiwa Ng'andu fold zone 323  
 Shyok Mélange 210  
 Shyok Mélange Zone 161  
 Sichuan Basin 133  
 Simplon–Centovalli Line 234, 235  
 Siwaliks 116  
 Soit Ayai Series 388  
 Sol Hamed–Wadi Onib Suture Zone 336  
 Sol Hamed, ophiolitic sequence 336  
 South Atlantic spreading centre 397  
 Southern Banda Arc, post-collision isostatic readjustment 352–62  
 Southern Uplands of Scotland 51–64  
 Spontang Ophiolite Klippe 161, 210  
 Spontang-Photaksar ophiolite nappe 178  
 Stretching and shortening, crust and lithosphere 97–100  
 Strike-slip collision 242  
 Strike-slip deformation 63  
     Southern Uplands 64  
 Strike-slip extrusion 115  
     and crustal thickening 148–9, 151  
 Strike-slip fault systems, continental, and ocean basins 136  
 Strike-slip faults 15, 17, 19, 48, 61, 79, 119, 133, 135, 137, 138, 152–4, 233, 234  
     and lateral expulsion 39  
     and sutures 151–2  
     as lateral ramps 237  
     foreland 28  
     in collision environments 16  
     intracontinental 27  
     lithospheric 41  
     Mergui Basin 140  
     parallel post-folding 28  
     S Tibet 115–16, 119, 145  
     side-stepping 27–8  
     Western Alps 237–8  
 Strike-slip valley morphology, Boran Basin 19  
 Strike-slip wedge tectonics 22  
 Strike-slip wedging 5  
 Strike-slip zones, post-collisional, Irumide Belt 324  
 Sub-Briançonnais Zone 236  
     stratigraphic analyses 232  
 Subduction 37, 39, 43, 47, 51, 57, 77–8, 97, 105, 327, 345  
     and blueschist formation 159  
     and compressive forces 106  
     and the Indian Plate 207  
     and the Ligurian Sea 273–4  
     continental 40, 48  
     ensialic 332  
     in the Hindu Kush 39  
     Indian plate and Andaman–Nicobar Arc 143  
     intracontinental 46, 48  
     lithospheric 40, 45, 46  
     oblique 143  
     Sunda Arc 361  
     Subduction during arc formation 206  
     Subduction models, Western Alps 229  
     Subduction of continental lithosphere, concept 38–9  
     Subduction zones 3, 14, 43, 48, 83  
         and calc-alkaline volcanism 92  
         Borneo 134–5  
         Hindu Kush 40–1  
         migration 278  
         Pacific margin of Asia 143  
         Pamir 41  
         Saudi Arabia 336  
     Subduction-accretion prisms 29, 31  
     Suleiman ranges 142–3  
     Sumatra Basin *see* Mergui Basin  
     Sunda Shear and reactivated Bentong Raub Suture 138  
     Sunda Shelf 135  
         rift and pull-apart basins 141  
     Sunda–Banda Arc subduction system 353  
     Sundaland 124, 142  
         extrusion of 129, 133, 140–1, 143  
         rotation of 126, 129  
         schematic structural map 130  
         Tertiary deformation of 138–42  
     Sungurlu Fault 17  
     Sutlifelma Ophiolite 292  
     Sutures 15, 24–5, 31, 41  
         and oblique collision 299  
         and strike-slip faults 151–2  
         reactivation of 151–2  
         Scandinavian Caledonides 300  
         Southern Mozambique Belt 326–7  
     Swaziland Supergroup 343  
     Synnfjell Duplex 291  
     Syrian Foreland 18  
  
     Takena red beds 145  
     Talkeetna Super Terrane 372  
     Talkeetna Thrust 373  
     Tanzanian Craton 338  
     Tauern Window 68  
     Tenasserim Granite Belt 148  
     Terranes  
         accretion of  
             Alaska 369  
             Wrangellia 369–72  
         Western N America  
             descriptions of 367–8  
             general distribution 367  
     Tethyan Ocean, closure of 185  
     Tethys (Mesozoic), subduction of 273  
     Thermal relaxation 3, 73–4, 77, 79, 83, 89, 100, 101–2, 108  
         and crustal melting 93  
     Thermal relaxation time constant 98  
     Thermal subsidence 100, 140  
     Thermal uplift 100  
     Thickened crust, thermal evolution of 91  
     Thickening  
         by arc-building 46  
         by deformation, Tibet 168  
     Three Pagodas Fault 138, 143, 144, 148  
     Three Pagodas Fault Zone 139

- Thrust belts 5  
 Assyride 21  
 metamorphic patterns in 5–6  
 Thrust displacements, Scandinavian Caledonides 297  
 Thrust emplacement, Scandinavian Caledonides 297–8  
 Thrust sheets 74  
 basal melting 76  
 external, Caledonian Orogen 287  
 Scandinavian Caledonides 291  
 stacked, Tethyan margin 263  
 Thrust shortening 5  
 Thrust slip vectors, rotation 296  
 Thrust stacking 29  
 Thrusting 14, 27, 83  
 Calabrian Arc 280  
 Thrusting direction, Alaskan Terranes 379  
 Thrusts 20, 47, 120, 198  
 accretion-related 53, 63  
 displacement on 248  
 intracontinental 37  
 syn-metamorphic ductile 41  
 Thrusts and décollements, geometry of 43–5  
 Thrusts and listric geometries 247  
 Thrusts and strike-slip faults, relationship 45  
 Tibet 109  
 expulsion of 41  
 extension in 93  
 interpretation of collisional structures 330  
 strike-slip shear zones (inferred) 146  
 Tibetan Plateau 5  
 extensional tectonics 116  
 extrusion of 118  
 Tibetan Slab 162, 166  
 and partial anatexis 164, 165  
 major formations 186  
 Tibetan Zone, metamorphism in 161  
 Tien Shan 27, 118  
 Timor  
 dating of emplacement of thrust sheets 354  
 geological structure of (outline) 352–6  
 late Cenozoic collision 353–4  
 post-collision processes 360–2  
 stratigraphic and structural events 355  
 Timor gravity low 360  
 Timor region, isostatic compensation 360  
 Tin girdle, possible continuity, Sundaland and S China 139  
 Tortuga complex, ophiolites 395  
 Tourmaline and Himalayan leucogranites 191, 195  
 Tozitna Terrane 378, 379  
 Trans-Amazonian Shield 394  
 Trans-Himalayan (Ladakh) Batholith 159, 164, 182, 185  
 Trans-Himalayan plutons 68  
 Transcurrent ductile shear zones, Limpopo Belt 341, 343  
 Transform faults 24, 95, 97, 133, 135, 142, 143, 239  
 Ubendian Belt 326  
 Transform valley, asymmetric 19  
 Transpressional bends 22  
 Transpressional locking 9  
 Transversale de Bariloche 395  
 Transversale de Huancabamba 395  
 Transversale de Salta 395  
 Transverse basement ridges, Andean Cordillera 391  
 Transverse Range (California) 9, 12  
 Traversella pluton, monzo-syenitic 224  
 Trench migration and back-arc opening 277  
 Trondheim Supergroup 292, 296  
 Trondheim Thrust Sheets 297  
 Tsaidam 118  
 Tsangpo *see also* Zangbo  
 Tsangpo Suture 30, 45, 68, 165  
 as strike-slip fault 43  
 Tuli–Sabi shear zone 344  
 Turkey, major tectonic subdivisions 12  
 Turkish/Iranian Plateau 5, 10  
 Tyrrhenian Basin 9, 279  
 evolution of 273–5  
 Tyrrhenian Sea 275  
 location of Messinian evaporites and major normal faults 276  
 Tyrrhenian/Calabrian suture zone 279  
 Tysfjord Culmination 294  
 Ubendian Belt 327  
 and strike-slip movement 324–5  
 as lateral ramp 325–6  
 Ultra-Dauphinois Thrust 254  
 Ultra-Briançonnais Nappe 236  
 Ultra-Helvetic Platform 241  
 Ultra-Helvetic Sheets 249, 253  
 Ultra-Helvetic Thrust 253  
 Umbria, rotation of 272  
 Umbrian Apennines, arcuate trend 265, 272  
 Upper Greenstones, Rhodesian Craton 343–4  
 Uranium mineralization and alaskite emplacement 307, 313  
 Usagaran rocks 337  
 Uttaradit Suture 129, 133  
 Valais Basin 239  
 Valdres Thrust Sheet 291  
 Vanoise Massif 233  
 Varto Fault 25  
 Vegdal Group 294  
 Verampio Gneiss 236  
 Vietnam Transform 135, 136, 139  
 Viqueque molasse 356  
 Volcanic activity and triple junctions 19–20  
 Volcanic arcs and subduction 105  
 Volcanic-arc intrusions 71, 73  
 Volcanic-arc magmas 73, 77  
 Wadi Haimur–Sol Hamed, interpretative section 335  
 Wadi Haimur, metasedimentary sequence 336  
 Wang Chao Fault System (Zone) 138, 139, 143, 148  
 West Kunlun and back-thrusts 45–6  
 West Peruvian Trough, cross-section 393  
 Western Alps  
 and strike-slip tectonics 237–8  
 as a diffuse strike-slip zone 232  
 collision in 238–42  
 cross-section 224  
 directions of maximum stress 278–9  
 earthquake focal mechanisms 278–9

- major strike-slip faults, present-day
  - configuration 238
- migration of deformations 238
- models of tectonic evolution 229–32
- pre-collision events 239
- strike-slip models, field evidence for 232–8
- tectonic evolution, diagrammatic representation 240
- tectonic history summarized 241–2
- tectonic interpretation 232
- tectonic map 231
- Western Himalayas, geological sketch map 187
- Wetar Strait
  - and seismic reflection studies 360
  - shearing movements 362
  - uplift 356
- Wetar Thrust 361, 362
- Wildhorn Thrust 249, 252
- Wilson Cycle 210, 388
  - attenuated 397
  - Andes 399
  - Magellan Basin 395
- Wrangellia
  - accretion of 369–72
  - evidence for displacement 369–72
  - palaeobiogeographical analysis 371–2
  - stratigraphy of 369, 371
  - structural history, Alaskan area 372
- Yadong-Gulu Rift 116
- Yangtze Platform (Tibet and S China) 124, 125
- Yarlung-Zangbo river belt, metamorphic facies 161
- Yunnan 128, 138
  - complex polyphase deformation 129
- Yunnan earthquakes, fault-plane solutions and strike-slip faulting 140–1
- Yunnan Grabens 28
- Zangbo *see also* Tsangpo
- Zangbo Suture 116, 118, 144, 145
  - post-collisional strike-slip movement 144–5
  - reactivation of 151
- Zangbo Suture Zone 148
- Zaskar Nappe 178, 179, 180
- Zaskar Range, anatectic granites 186
- Zaskar Unit 178
- Zone Houillère, France 233