

Index

Page numbers in *italics* refer to Figures and the *foldout*. page numbers in **bold** refer to Tables.

- Abat Basin 86
Abat Formation 35
Abu Mahara Group 11, 67, 68
Abu Mahara rifting 67–68
accessory quartz 31
accretion 52, 67, 69, 106
accumulation rates 14
actinolite 31
Afro-Arabian Peneplain 69
agriculture 11
Akhdar Group 18, 71
Al Khlata Formation 11, 17, 53, 107
Al-Aridh Group 23, 24, 25–26, 34, 114
Al-Aridh Trough 23, 71
Al-Ghafat Formation 24, 26
Al-Jil Formation 24, 70
Al-Khod Formation 21, 22, 33, 35, 37, 51, 57
 contact with listwaenite bodies 83
 pre-Permian clast deposition 80, 81, 105, 108
albite 31, 32
Alley lavas 29, 32, 33
allochthonous 2, 21, 22–33
 erosion 87
 exhumation 80
 mapped 34, 62, *foldout*
 thrusting on autochthonous units 49, 62, 63, 64, 73
alluvial fan deposits 35
Alveolina 36
Amdeh Formation 11, 15–17, 53, 55, 69, 107, 108
 decoupling layer 79, 80
 localization 90
Amdeh Quartzite clasts 57
amphibole microgabbro 31, 32
amphibolites 27, 29
Amq Member 11–12, 68
andesine 32
andesitic lavas 32, 70
Angudan folds (F2) 54–55, 56, 62, 64, 90, **106**
Angudan Orogeny 54, 55, 68, 69, 93, 105, 106, 108
Angudan Unconformity 2–3, 15, 17, 62, 68–69, **106**, 107
 units above 69, 107
 units below 11, 67–69
Angudan/Hercynian Unconformity 16, 17, 54, 56, 62, 68–69, **106**
anhydrite 15
ankerite 37
anticline 54, 55, 81, 82, 85
apatite fission tracks (AFT) 80, 81
apatite (U–Th)/He cooling ages 81
Aqil Formation 24, 26
⁴⁰Ar/³⁹Ar dating 4, 29, 35, 51, 57, 78
Ara Group 11, 14–15, 68, 69
Ara Salt 14–15, 68, 69, 109
Arabian continental lithosphere 4, 73–74, 80, 85, 90–92, 105, 109
 bulging 73, 78, 108
Arabian crust 4, 23, 81, 85, 90–92, 93, 106
 buoyant continental crust 80, 81, 92, 105
 evolution of the Semail–Arabia convergent margin 76
 extended continental crust 78, 105
 isostatic rebound and erosion 81
 rapid exhumation 4, 73, 79, 81, 83, 108
 tectonic evolution of Oman Mountains 84
 thickening 84, 85
Arabian margin 4, 71, 90–92, 108, *foldout*
 change from passive to convergent 78
 exhumation 78, 79, 80, 108
 extension and uplift 5, 71
 extensional stresses 74
 magma eruptions 70
 obduction of Masirah Ophiolite 83
 obduction of Semail Ophiolite onto 57, 78, 79
 passive continental 71, 76, 78, 80
 rifting/stretching episode 70
 subduction 73, 78, 79, 80, 81, 105
 tectonic evolution 89, 90–95
Arabian Peninsula 2, 35, 69–70
 present day tectonic frame 5
 tectonic overview map 3
 uplift 89
Arabian Plate 5–6, 64, *foldout*
 collision with Indian Plate 73, 86
 extensional structures 83, 86
 faults 93
 flexural bulge 21, 53, 78, 81
 ‘Hercynian’ deformation 3, 69
 obduction of allochthonous 49, 73
 rifting 70–71
 Semail Ophiolite rotation and 81
 uplift of Oman Mountains and 89, 93
Arabian Platform 34, 51, 55, 71–73, 90–92, *foldout*
 emergent 83
 erosion 22, 23, 71
 extensional stresses 74, 83
 flexural bending 21, 78, 81, 105
 Hulw–As Sifah windows 51
 Masirah Ophiolite emplacement 5
 sediments 71–73, 78, 105
 Semail Ophiolite obduction 21, 22, 78, 105
 thrust sequences 23–24
 uplift 22, 23, 71, 73
Arabian Shield 68
Arabian–Nubian Shield 67
Arabia–Eurasia collision zone 5–6, 64, 84
Arabia–Eurasia convergence 4, 57, 64, 83, 84, 87, 94
arch formation 3, 4, 69–70
artificial terraces 11
Aruma Foreland Basin 21, 22, 49, 52, 73, 105
 formation 78, 81, 91–92, 94
Aruma Group 21–22, 33, 49
As Sifah unit 79, 80
As Sifah window 49, 51
asthenospheric inflow/upwelling 76, 84, 91–92
autochthonous units 11–22, 62, *foldout*
 allochthonous thrusting on 49, 62, 63, 64, 73
 Autochthonous Unit A 11, 56
 Autochthonous Unit B 17, 56
 Neo-Autochthonous formations 33
back thrusts 85, 86
back-arc spreading centre 91
backbulge basin 87
Baid Formation 24, 26, 70, 71
Baid Horst 23
Baid Platform 71
bajada 87
banded schist 15
banded silicic tuff 15
Bani Kharus Bowl 11, 13
Barakat Formation 16
Barut Anticline 55
Barzaman Formation 36, 86, 87
basalt 30, 32, 108
 brecciated 33
 metabasalt 15, 27
 mid-ocean ridge basalt (MORB) 27, 32, 70–71, 76, 77
 normal mid-ocean ridge basalts (N-MORB) 32
 ocean-island basalt (OIB) 35
 pillow basalt 12, 33, 70, 71
 tholeiitic 27, 70, 71
basanite 35, 84, 85, 91–93
basement faults 15, 52, 61, 86–87
basement rocks 67, 68, 71, 89, 105
basin deepening 15, 68
Batain Basin 4, 5, 70
Batain Group 70
Batain Mélange 5
Batain Coastal Plain 13, 51, 57, 86
 crustal thickness 61
 disconformity 36
 Quaternary deposits 87
Batain Mélange 56, 57
bioclastic limestone 18, 20, 36
biotite 32
bioturbation 33, 36
blind faults 52, 61
block faulting 4, 17, 23, 68, 69
blueschist-facies 4, 51, 78
Boninitic Alley lavas 29, 33
bornite 33
braided river deposits 35
breccias 15, 18, 23, 26, 32
brecciated basalt 33

- Buah Formation 12, 14
 Bureau de Recherches Géologiques et Minières (BRGM) maps 2, 22, 26, 114
 Buwaydah Formation 24, 26
- Cadomian fold-and-thrust belt 68
 Cadomian folds (F1) 2, 53–54, 55, 56, 68, **106**
 Cadomian Orogeny 2, 53–54, 68, 105, 106
 calcarenite 24–25, 26, 36
 calcirudites 26
 calcite 36
 calcite veins 36, 81, 86
 calcitic metasomatic rocks 37
 canyons 71
 cap carbonates 12
 carbonate platforms 20, 22, 23, 33, 72–73
 carbonate ramp 14, 18, 21
 carbonate veins 21, 37, 51, 83
 carbonates 11, 15, 18, 20, 21, 23, 24–26
 cap carbonates 12
 forereef 23, 71
 platform 20, 22, 23, 33, 72–73
 reef 23, 71
 silicate-carbonate 37
 terrigenous-carbonate sediments 72
 veins 21, 37, 51, 83
 see also limestones
 celadonite 33
 Cenozoic sedimentary rocks 17, 30, 33, 57, 64
 central rift axis 70
 chalcopyrite 33
 chert deposits 15, 24, 32
 radiolarian chert 24, 25, 26, 27, 28, 70
 chlorite 4, 31, 37, 69
 chromite deposits 29, 33, 38
 chromite ore formation 33
 chromium 33
 chromium deposits 33, 34
 Cimmeria Superterrane 69, 105
 Cimmerian continental blocks 4, 70, 93
 clinopyroxene 30, 31
 clinopyroxenite 32
 Coastal Parallel Shear Zone 89
 compression events 68, 73, 83–87, 105, 106, 110
 conglomerates 15, 17, 18, 24, 33, 35, 36, 87, 109
 conodonts 16, 17, 70
 continental lithosphere
 exhumation 73–74, 80, 92, 105, 108
 obduction process 73–74, 90–92, 105, 109
 rifting 70
 stretched 68
 see also Arabian continental lithosphere
 continental margin 21, 70, 73
 see also Arabian margin
 continental rifting 4, 70, 90, 93–95
 continent–continent collision 2–3, 68, 83
 convergence 91, 108
 Arabia–Eurasia 4, 57, 64, 83, 84, 87, 94
 Arabia–India 5
 East and West Gondwana 2–3, 68
 Semail–Arabia convergent margin 76
 Zagros–Makran 83, 85
 cooling 70, 81–83, 108
 metamorphic sole 74–75, 78
 copper deposits 33, 34
 copper mining 33, 34, **35**
- coral-rich limestone 36
 covellite 33
 cross-bedded sandstone 15, 17
 cross-sections 61, *foldout*
 epeiric Cretaceous platform 72
 Jabal Akhdar Dome (JAD) 63
 Oman Mountains 84, 87
 Saih Hatat Dome (SHD) 50, 51, 61, 63–64
 Semail Ophiolite 28, 30
 tectonic model 87
 crustal formation, Semail Ophiolite 74–75
 crustal thickness 61, 84, 85
 Cryogenian terrain accretion 52, 106
 crystalline basement 105, 106
 culmination collapse 51, 57, 86
 cultivation 11
 cumulate gabbro 32
- Dammam Formation 36
 Dead Sea Transform Fault 5, 6
 debris-flow deposits 36
 decoupling layers 79, 80
 deep-sea sediments 4, 24, 70–71
 deformation 2–4, 17, 92–93
 Frontal Range Fault 35
 Hawasina nappes 49
 ‘Hercynian’ 3–4, 55, 69–70
 high-strain 18, 55, 57, 80
 limestone 54, 83
 metamorphic sole 27
 post-‘Hercynian’ 70–81, 89, 90–93
 post-obductional 51, 83–87, 108, 109–110
 pre-‘Hercynian’ 67–69
 Quaternary 87–89
 shallow-crustal 93
 Zagros Mountain Belt 6
 see also folds
 delta deposits 35, 83
 $\delta^{13}\text{C}$ excursion 14
 deposition environments 12, 20, 21, 25, 26, 36
 alluvial fan 35
 Arabian Platform 71–73
 basin 12, 15, 35
 bathyal 20, 26
 braided river 35
 carbonate platforms 20, 22, 23, 33, 72–73
 change of 36
 debris-flow 36
 deltaic 35, 83
 epeiric carbonate ramp 18
 flexural basin 21, 78
 fluvial 83
 glacio-lacustrine 17
 inner shelf 20, 26
 intertidal-supratidal 14, 15, 26
 intra-shelf slope 35
 lagoonal 12, 20, 35, 36
 proximal 20, 22, 25
 subtidal 20, 22, 26
 detrital quartz 35
 detrital zircons 17
 Dhofar Group 84
 Dhurma Formation 19–20, 71
 diabase dyke **28**, 30
 diamictites 17, 68, 109
 Dibba Zone 61, 64
 digital elevation model (DEM) 13
 dinosaur tracks/remains 35
- diorites 27, 31–32
 disconformity 35, 36
 dolerite 18, 32, 70
 doleritic microgabbros 31, 32
 dolomite 14, 15, 26, 108
 dolomite veins 51
 dolomitic limestone 12, 14, 36
 dolomitic metasomatic rocks 37
 dolostone 11, 12, 18
 doming 70, 81, 93, 109
 dunite 29, 30, 32
 dykes 29, 70, 76, 81
 basanite 35
 chromite 33
 diabase **28**, 30
 plagiogranitic 29, 32
 shale 35
 sheeted dyke complex 3, 29, 30, 31–32
- Early Cambrian tectonic events 2, 4, 17, 68
 earthquakes 89
 East African Orogeny 2–3, 16, 17, 68, 69, 90
 echelon faults 73
 eclogite-facies 4, 18, 51, 78, 80, 82, 84
 Ediacaran–Cambrian boundary 68
 Eocene–Miocene tectonic activity 51, 52, 83–87
 epeiric platforms/ramp 18, 72–73
 epidote 31
 epidote amphibolites 29
 erosion 11, 19
 allochthonous units 87
 Arabian Platform 22, 23, 71
 and cooling rates 81
 forebulge 21, 78, 81, 108
 isostatic rebound and 81, 87, 93
 Jabal Akhdar Dome (JAD) 11, 19, 108
 Oman Mountains uplift and 35, 87
 Saih Hatat Dome (SHD) 35, 105, 108
 Semail Ophiolite 93
 Eurasian Plate 5, 64
 evaporites 14–15, 36, 69
 exhumation 49, 53, 55, 57, 78–80, 81
 continental lithosphere 73–74, 80, 92, 105, 108
 continental rocks 92–93
 and cooling rates 81–83, 108
 high-pressure/low-temperature rocks 78–80, 81, 83, 84
 Jabal Akhdar Dome (JAD) 78, 81, 83, 85, 86–87, 108
 metamorphic sole formation 91
 Oman Mountains 86
 rapid exhumation of Arabian crust 4, 73, 79, 81, 83, 108
 Saih Hatat Dome (SHD) 53, 57, 78, 81, 83, 85, 108
 exhumation channel 49, 57
 exhumation rates 78
 ‘expulsion’ tectonics 79
 extension 5, 14, 36, 80, 93, 105, 106
 Abu Mahara rifting 67–68
 after Nabitah Orogeny 68
 between Arabia and India 4, 70
 downgoing plate 74
 Hawasina Basin 5, 23, 71
 intracontinental 67–68, 105
 Late Eocene–Oligocene 86
 post Semail Ophiolite obduction 83, 86
 Red Sea area 6

- Semail Gap 86, 106
 upper-plate extension 74, 80
- extensional fault systems 14, 51–53, 61, 62, 63, 68, 74
 Batinah Coastal Plain 86
 Frontal Range Fault 35, 51, 61, 63, 64, 83, 86
 post-obduction 83, 86, 109
 synsedimentary extensional faults 14
 thermal springs 89
 extrusive basalts 30
- F1 folds 2, 53–54, 55, 56, 68, **106**
 F2 folds 54–55, 56, 62, 63, 64, **106**
 F3 folds 53, 55, 62, 63
 F4 folds 53, 55, 57, 62, 63, 64, 92
 F5 folds 53, 56, 57, 62, 63, 64, 82
 F6 folds 57, 61, 62, 63, 64, 85–86
 Fahud Salt Basin 14, 15
 Fanja area 2, 35, 36, 37
 listwaenite bodies 51
 Fanjah Saddle 2
 Fara Formation 14–15, 68
 Fatah Formation 26
 fault zones
 Semail Gap Fault Zone (SGFZ) 52, 53, 61, 63
 upper-lower plate discontinuity 49–51, 55, 57, 62, 92–93
 Wadi Mansah Fault Zone (WMFZ) 52, 53, 63, 109
- faults 2, 5, 6, 62, 63, 90, 93
 basement faults 15, 52, 61, 86–87
 blind fault 52, 61
 block faulting 4, 17, 23, 68, 69
 collision of Arabian and Indian plates 73
 echelon faults 73
 fish-net pattern 73
 Ja'alan fault 3, 64, 89
 normal 2, 15, 49–52, 77, 85
 passive roof faults 80
 Qalhat fault 3, 64, 86, 89
 reactivated 63, 64, 68, 87, 89, 106
 Saih Hatat Dome (SHD) 51, 61, 64, 80, 83, 85
 Semail Gap 51–53, 106, 107
 strike-slip 73, 86
 Sur area 64
 syn-depositional 14, 68
 tectonic overview map 3
 thrust faults 37, 49
 transfer faults 51, 61
 transtensional 52, 53, 61, 73
 vertical displacement 85, 89
 Wadi Kabir Fault 51, 85
see also extensional fault systems; fault zones; thrusts; transform faults
- feldspatic sandstones 17–18
 felsic magmas 77
 Fe–Ti oxides 31
 Fiq Member 11–12, 67, 68
 Fiqa Formation 21–22, 78
 Fitri Formation 21
 flexural bulge 21, 53, 78, 81, 87, 94
 fluvial terraces 87
 folding 80, 81
 gabbro units 31
 Hajir Formation 2, 54
 Paleogene–Neogene 82
 related to Nabitah Orogeny 68
 Simsim Formation 22
- folds 53–57, 62, 63, 64
 Angudan (F2) 54–55, 56, 62, 64, 90, **106**
 anticline 54, 55, 81, 82, 85
 Cadomian (F1) 2, 53–54, 55, 56, 68, **106**
 Cadomian fold-and-thrust belt 68
 fold axes 2, 4
 fold vergence 54, 55
 Hawasina Foreland fold-and-thrust belt 49, 80, 91–92
 Jabal Akhdar Dome (JAD) 2, 4, 53, 54, 55, 56, 57, 81, 82, 106, 108
 monocline 52, 61
 obduction-related 53, 55–57, 80, 81, 82, 91–92
 open folds 85, 86
 post-obductional (F6) 57, 61, 85–86
 pre–Late Carboniferous 53–55
 pre–‘Hercynian’ rocks 4
 recumbent 50, 51, 57
 Rusayl Embayment 86
 Saih Hatat Dome (SHD) 53, 55, 57, 61, 80, 106, 108
 Saih Hatat fold nappe 50, 51, 55, 57
 Saiq Formation 18
 sheath folds 18, 19, 55, 57, 62, 63, 80, 92
- foliation 29, 30, 57
 footwall 37, 57, 85, 89
 exhumation 80, 82
 foraminifera 21, 26, 33, 35, 36
 forebulge 73, 78, 79, 81, 94
 active 87, 89
 erosion 21, 78, 81, 108
 migration 109
 foredeep 73, 78, 87
 foreland basins 21, 22, 78
see also Aruma Foreland Basin
 forereef carbonates 23, 71
 fossil dating 15–16, 17, 35
 fossil wood 17–18
 fossil-rich limestone 18, 33
 fossils 15–16, 17–18, 35, 36, 70
 conodonts 16, 17, 70
 dinosaur tracks/remains 35
 foraminifera 21, 26, 33, 35, 36
 freshwater 35
 fracture/vein analysis 21, 37, 51, 81, 83, 86
 Frontal Range Fault 35, 51, 61, 63, 64, 83, 86
 fuchs site 36, 37
- gabbronorites 32
 gabbros 28, 29–32
 garnets 27, 76, 78, 80
 Lu–Hf ages **28**, 74
 gas reservoir 18
 Gaskiers Glaciation 12
 geochemistry
 Al-Jil Formation 70
 Alley lavas 33
 Geotimes unit lavas 32, 76
 hyperalkaline springs 89
 Masirah Ophiolite 5
 metamorphic sole 27, 77
 ocean-island basalt (OIB) 35
 Saiq Formation 18, 70
 Semail Ophiolite 32, 33, 76, 77–78, 81
- geochronology 4–5, 18, *foldout*
 Al Khilata Formation 17
 Amdeh Formation 16
 Angudan Unconformity 69
 Aruma Group 22
 cooling and uplift 81–83
 extensional fault systems 51
 fold sets 53, 54–55, 57
 fossil dating 15–16, 17, 18
 glacial events 12
 Hawasina nappes 24, 25, 26, 27, 71
 Hercynian Unconformity 69
 high-pressure/low-temperature metamorphism 78
 Huqf Supergroup 11–12, 14–15
 listwaenite 36–37
 marine terraces 88–89
 Masirah Ophiolite 4–5
 metamorphic sole 27, 28, 29, 74, 75, 76
 Nafun groups 11, **12**
 Neo-Tethys rifting 70, 109
 post-obduction units 35, 36
 Sahtan Group 19
 Semail Gap 51–53
 Semail Ophiolite 27–28, 29, 32, 73, 74, 75, 77
 subduction and exhumation of Arabian margin 78
 subduction initiation 74
 upper-lower plate discontinuity 51
 Wasia Group 20, 21
 geodynamic reconstruction 89, 90–93
 geological maps *see* maps
 geological record 1
 geology blogs 114
 geology, Oman Mountains 1–2, 114, *foldout*
 geomorphology 11, 13, 15
 Geotimes (V1) unit 29, 32–33, 76
 Ghaba Salt Basin 14, 16, 53, 69, 109
 Gharif Formation 17–18
 Ghubrah Bowl 11, 13
 Ghubrah Member 11–12, 67
 glacial events 12, 15, 87, 105, 109, *foldout*
 glacio-lacustrine deposits 17
 glaciogenic deposits 12, 15, 17
 goethite 37–38
 gold 33
 Gondwana 2–3, 67, 68, 70, 93–94
 break-up 4, 5, 70, 93–94
 Cimmeria Superterrane breakaway 69, 105
 Gondwana Glaciation 105
 Gondwana–Laurasia collision zone 69
 gossans 33
 grabens 68, 70, 73, 90
 Tabas Graben 69
 grainstone 18, 20, 33, 36
 granitic basement 67
 granitic dykes 81
 gravitational collapse 51, 52, 53, 57, 73, 86, 93, 106
 gravity anomaly 61
 green hornblende 31, 32
 greenschist-facies 18, 27, 29
 greywacke 11, 12, 15
 Gulf of Aden 6, 86, 106
 Guwayza Formation 24–25, 71
 gypsum 15

- Habshan Formation 20, 72
 Hadash Formation 12, 68
 Hadhramaut Group 84, *foldout*
 Haima Supergroup 4, 16, 68
 Hajar Supergroup 17, 20, 21, 61, 80, 107–108
 mapped 56, *foldout*
 Hajir Formation 12, 14, 15, 54, 68
 folding 2, 54
 Hajir village 54
 Hajir–Mu'aydin boundary 14
 halokinesis 3–4, 14–15
 Hamrat Duru Basin 23, 24, 49, 70, 72
 Hamrat Duru Group 23, 24–25, 34, 70, 71, 114
 Hamrat Duru Range 49
 Hamrat Duru Sub-basin 71
 hanging wall 57, 75, 85
 Frontal Range Fault 61
 Jabal Akhdar Dome (JAD) 52, 53
 Saih Hatat Dome (SHD) 35, 52, 53, 61, 64, 86
 harzburgite 4, 29, 31, 77
 Hatat Bowl 11, 13, 15, 108
 Hatat Formation 15, 55, 69
 Haushi Group 17–18, 70
 Hawasina Basin 23, 79, 80, 81, 91–92, 109
 extension 5, 23, 71
 formation 4, 70–71, 90, 105
 mapped *foldout*
 schematic sketch *foldout*
 subduction 49, 73, 105
 Hawasina Complex 5, 23, 24, 26, 27, 34, 49
 Hawasina Foreland fold-and-thrust belt 49, 80, 91–92
 Hawasina nappes 2, 22–27, 29, 55, 70, 81, 82, 92
 Batinah Mélange 57
 deformation 49
 geochronology 24, 25, 26, 27, 71
 mapped 3, 34, 56, 62, *foldout*
 omission of 51
 palaeogeography 24, 49
 peak temperatures 80
 Semail Gap 51, 52, 53
 Hawasina Window 82
 Haybi Complex 5, 23–24, 26, 27, 29, 34, 71, 81, 91–92
 heavy minerals 16–17, 68
 'Hercynian' deformation 3–4, 55, 69–70
 'Hercynian' event 3–4, 17, 69–70, 105
 evidence 4, 69
 thermal 69, 70
 'Hercynian Orogeny' 3, 69, 105
 'Hercynian' Unconformity 4, 16, 62, 69–70, 89, 106, 107
 formations above 17–22, 55
 truncation at 12
 units below 11–17, 55
 see also Angudan/Hercynian Unconformity
 high-field strength elements (HFSEs) 32
 high-level gabbros 29, 31
 high-pressure/low-temperature metamorphism 17, 18, 20, 70, 73, 80, 108
 Arabian margin 78, 84, 108
 Saih Hatat Dome (SHD) 18, 20, 80, 108
 high-pressure/low-temperature rocks 78–80, 81, 83, 84, 108
 metamorphic core complexes 11, 83
 high-temperature foliation 30
 hinge migration 75, 78
 Hiyam Formation 15, 17, 55, 79
 horsts 23, 70, 71, 90
 Hulw unit 79, 80
 Hulw Window 49
 Hulw–As Sifah Window 49–51, 57, 62, 92–93
 Huqf area 4, 17–18, 68, 69
 Huqf Supergroup 11, 56, 67, 68, *foldout*
 hyaloclastites 32
 hydrocarbons 15, 17, 18, 20
 hydrothermal alteration 31–32, 37–38
 hydrothermal fluids 37, 51
 hyperalkaline springs 62, 89, 115
 igneous rocks see magmatic rocks
 ignimbrite 15
 Indian margin 70
 Indian Plate 5, 64, 73
 India–Pakistan terrain 68
 induced subduction 73, 74, 80, 91
 interglacial periods 87, 88
 International Continental Drilling Program (ICDP) 89
 International Stratigraphic Chart 114
 intra-shelf basin 21, 73
 intracontinental extension and rifting 67–68, 105
 intracontinental salt basins 68
 intraoceanic subduction 4, 73, 80, 105
 intraoceanic thrusting 4, 73–81
 ironstone 17
 island arcs 33, 67, 77
 isostatic rebound 73, 81, 87, 92, 93
 Ja'alán fault 3, 64, 89
 Ja'alán–Qalhat Wedge 89
 Jabal Akhdar Dome (JAD) 1–2, 3, 62, 63, *foldout*
 Angudan/Hercynian Unconformity 16, 17, 54, 56, 62, 68–69, 106
 comparison with SHD 18, 53, 70, 106–108
 cooling history 70, 81–83
 culmination collapse 51, 57
 deposition of Mistal Formation 67
 erosion 11, 19, 108
 exhumation 78, 81, 83, 85, 86–87, 108
 exposed formations 11–12, 14–15, 16, 18, 21, 22, 105
 extensional fault systems 51, 61, 74
 extensional shearing 83, 93, 108
 folds 2, 4, 53, 54, 55, 56, 57, 81, 82, 106, 108
 formation of Semail Gap 51–53
 Frontal Range Fault 83
 geodynamic evolution 86–87
 geodynamic reconstruction 89, 90–93, 95
 geomorphology, present day 11, 13
 gravitational collapse 51, 52, 53, 57, 86, 106
 hanging wall 52, 53
 'Hercynian' event 4
 lithology 53, 70, 106–108
 lithostratigraphy 106–107
 metamorphic core complexes 11, 83
 orogenic collapse 51, 52
 palaeoenvironment 20
 peak temperatures 80
 Quaternary deposits 87
 Sahtan Bowl 11, 12, 13, 14, 68
 Saiq–Mahil Boundary (SMB) 18
 tectono-stratigraphic units *foldout*
 thermal springs 89
 uplift 57, 71, 81, 83, 93
 volcanic rocks 70
 Jabal Misfah 24, 26
 Jafnayn Formation 33, 35, 51, 85
 Jaza'ir Daymaniyat 36
 Jaza'ir Suwadi 36
 Juweiza Formation 21, 22, 78, 109
 K-feldspar 32
 K/Ar crystallization ages 4, 28, 29, 69
 Kahmah Group 20, 71, 72, 78, 80
 Kawr Group 23, 24, 26, 34
 Kawr Misfah Platform 23
 Kawr Seamount/Horst 23, 71
 Kawr-Misfah Complex 23, 24, 49, 91
 Kharab Formation 20, 72
 Kharus Formation 14, 15, 16, 68
 Khufai Formation 12, 14
 Khufai–Shuram transition 14
 Khuff Formation 18
 Khuff Sequence KS4 18
 large-scale structure, Oman Mountains 61–64
 larger benthic foraminifera (LBF) 33, 35
 Lasail lavas 29, 32–33
 Late Carboniferous unconformity see Hercynian Unconformity
 Late Cretaceous tectonic events 4, 17, 49, 51, 55
 high-pressure/low temperature metamorphism 70, 80, 108
 rapid exhumation and cooling in SHD 83, 108
 Semail Ophiolite emplacement 4, 5, 22, 83, 108
 subduction 78–80
 Late Eocene uplift 57
 laterites 22, 35
 Laurasia 3, 69, 90, 94
 layered gabbros 29, 30–31
 Lekhwair Formation 20, 72
 leucogabbros 30
 leucoxene 31
 limestones 14, 20, 21, 24–26, 35–36, 108
 bioclastic 18, 20, 36
 deformation 54, 83
 dolomitic 12, 14, 36
 fossil-rich 18, 33
 grainstone 18, 20, 33, 36
 marly 21, 35, 36
 Mesozoic 21, 83, 86
 micritic 20, 25, 26, 27
 Oman Exotics 24
 platform limestones 33
 reef limestone 22
 shallow-marine 18, 20, 24, 26, 33, 35, 71–72, 83, 85, 106
 listwaenite 36–38, 63, 64, 109
 listwaenite bodies 51, 83
 listwaenitization 83
 lithology *foldout*
 comparison between JAD and SHD 18, 53, 70, 106–108
 Semail Ophiolite 4, 28, 29
 lithostratigraphy comparison 106–108
 lizardite 37
 lower Cambrian peneplain 69

- Lower Jurassic stratigraphic gap 71
 Lower Quartzite Member (Am2) 15
 Lower Siltstone Member (Am1) 15
 Lu–Hf garnet ages **28**, 74
- Mabrouk Formation 16
 macrofossils 18
 mafic intrusions 35, 89
 mafic rocks 27, 35, 70, 77, 89
 hydrothermal alteration 37–38
 Mafraq Formation 19–20, 71, 91
 Magan 33
 magmatic foliation 29, 30
 magmatic rocks 15, 77
 early magmatic sequence 27, **28**, 29–32,
 75, 76, 77, 81
 late magmatic sequence 27, **28**, 32–33,
 77, 81
 see also basalt; volcanic rocks
 magnetite 37
 Mahil Formation 18, 51, 70, 85, 90, 108
 Makran area 87
 Makran subduction zone 57, 61, 83–85, 89
 subduction velocity 57, 85, 105
 Malagasy Orogeny 3, 68, 69
 mantle diapirs 28, 29
 mantle rocks 29, 29, 30, 33
 maps *foldout*
 Arabian Peninsula tectonic overview 3
 BRGM 2, 22, 26, 114
 copper and chromium deposits 34
 digital elevation model (DEM) 13
 earlier mapping 2, 22
 folds 54, 55, 62, 106
 geological 1, 50, 114, *foldout*
 inconsistencies 114
 Jabal Akhdar Dome (JAD) 3, 62,
 foldout
 large scale structures 62
 nomenclature 22, 25, 26
 palaeogeographic 72, 93–95
 Saih Hatat Dome (SHD) 3, 50, 62,
 foldout
 Semail Ophiolite 2, 3, 28, 29, 62,
 foldout
 tectonic 3, 62
 Maradi Fault 3
 marine terraces 87–89
 Marinoan Glaciation 12, 15, 105, 109
 marls 20, 21, 33, 35–36, 72
 marly limestone 21, 35, 36
 Marwar Supergroup 68
 Masirah Bay Formation 11–12
 Masirah Island 71
 Masirah Ophiolite 4–5, 95
 obduction 4, 5, 83, 95
 protoliths 91
 tectonic overview map 3
 thrusting 55
 Matbat Formation 24, 114
 mega-sheath fold 55, 57, 92–93
 megabreccias 23, 26
 melagabbros 30, 32
 Mesozoic–Cenozoic transition 83
 metabasalt 15, 27
 metaclastic rocks 15
 metadolostone 15
 metagreywacke 15
 metamorphic core complexes 11, 83
 metamorphic sole 24, 27, 29, 34, 37, 73
 cooling 74–75, 78
 formation models 77, 81, 91
 garnets 76
 geochemistry 27, 77
 geochronology 27, 28, 29, 74, 75, 76
 tectonic overview map 3
 U–Pb zircon ages 28, 75
 metamorphism 17, 18, 20, 70, 73, 80, 108
 along metamorphic sole 75
 Arabian margin 78, 84, 108
 comparison between JAD and SHD
 106, 108
 metasedimentary formations 11, 105
 metasomatic rocks 37
 micaceous siltstone 14
 micritic limestone 20, 25, 26, 27
 micro-quartz diorite 32
 micro-quartz dolerite 32
 microdiorite 31
 microorganisms in hyperalkaline
 springs 89
 mid-Carboniferous tectonic event 4
 mid-ocean ridge, ophiolite formation
 model 5, 27, 75, 77
 mid-ocean ridge basalt (MORB) 27, 32,
 70–71, 76, 77
 Middle Shale Member (Am3) 15–16
 mineral deposits, metallic 33, 34, 35,
 35, 38
 mining 33
 Misfah Formation 24, 26
 Misfah Syncline 55
 Mistal Bowl 11, 13
 Mistal Formation 11–12, 14, 15, 67–68
 Moho 28, 29, 31
 depth 61, 93
 molasse-type deposits 86
 mollusc ¹⁴C ages 88–89
 monocline 52, 61
 morphology, present day 108
 Mu'askar Al Murtafa ('MAM') reef
 Formation 36
 Mu'aydin Bowl 11, 13
 Mu'aydin Formation 4, 14, 53, 54, 68, 69
 Muri Anticline 81, 82
 Musallah Formation 24, 26
 muscovite **28**, 29, 32
 Muti Formation 21–22, 52, 53, 78, 80, 82
- Nabitah Orogeny 68, 93, 105
 Nadan Formation 24, 26, 71
 Nafun groups 11, **12**, 68
 Nahr Umr Formation 20, 72, 78, 82, 108
 Nakhil Subdome (NS) 1–2, 53, 86
 Natih Formation 21, 52, 72, 73, 78, 80,
 82, 108
 Nayid Formation 24, 25
 Neo-Autochthonous formations 33,
 foldout
 Neo-Tethys continental margin 70
 Neo-Tethys Ocean 4, 69, 70–71, 72, 94
 palaeogeography of Hawasina nappes
 23, 24
 spreading ridge 76, 90–91
 subduction initiation 74, 91
 subduction zones 90, 91
 Neo-Tethys rifting 70, 71, 76, 90, 109
 Neoproterozoic formations 15, 108–109
 Neoproterozoic rocks 15, 69, 89, 108–109
 folded 16, 53–54, 69
 Neoproterozoic terranes 69
 nickel 35
 Nimr Group 11, 16
 nomenclature 2, 22, 24, 25, 26
- normal faults 2, 15, 49–52, 77, 85
 normal mid-ocean ridge basalts (N-
 MORB) 32
 North Muscat microplate 78
 Nummulites 36
- obduction 73, 74, 75, 76
 Masirah Ophiolite 4, 5, 83, 95
 process 73
 response of Arabian margin 78–81, 84,
 105, 108
 Semail Ophiolite 4, 49, 57, 73–81,
 91–92, 94–95, 105
 termination 73–74, 78–80, 81
 unanswered questions/future research
 109
 ocean-island basalt (OIB) 35
 oceanic lithosphere 4–5, 73, 91, 105
 formation 73, 74–75
 subduction 73, 74, 75–76, 83
 oil reservoirs 17, 20
 olivine 30, 89
 Oman basement terrane complex 68
 Oman Drilling Project (Oman DP) 89
 Oman Exotics 23, 24, 27, 71, 79
 Oman Mountains 13
 erosion 35, 87
 former studies 1–2
 future research/unanswered questions
 108–110
 geological record 1
 large-scale structure 61–64
 Late Paleozoic doming 70
 seismic network 61
 tectonic framework 2–6
 tectonic model 83, 84
 tectonic overview 105–106
 tectonostratigraphy 11–38
 uplift 35, 38
 see also tectonic evolution
 oolites 20, 24–25
 open folds 85, 86
 ophiolite clasts 35
 ophiolites 4–5, 35, 69
 protoliths 75, 91
 see also Masirah Ophiolite; Semail
 Ophiolite
 ore mineralogy 33
 orogenic collapse 51, 52, 106
 overburden thickness 80, 109
 Owen Transform Fault 6, 95
- palaeo-ridge system 27
 palaeoenvironments 20, 21, 26
 palaeogeography 93–95
 Arabia 70, 72, 93–95
 Arabian continental margin 21
 Hawasina nappes 24, 49
 Oman 67, 68, 70, *foldout*
 pre-obduction of Semail Ophiolite 79
 palaeolatitude, Oman 67, *foldout*
 palaeomagnetic data 67, 78
 Paleo-Tethys Ocean 93–94
 palynology 17
 Pan-African Orogeny 69
 Pangea rifting 17, 18, 70–71, 93–94, 105,
 108
 Panjal Traps event 70
 parautochthonous 2, 34, 62, *foldout*
 passive margins 68, 70, 71, 74, 76, 93, 94
 change to convergent 78
 exhumation and folding 80

- passive roof faults 80
 peak temperatures 29, 80
 peridotite 4, 30, 77
 serpentinization 36
 Permian rocks 55
 Permo-Mesozoic formations 17, 20, 24, 54, 107
 phengites 51, 78
 phyllosilicates 37
 pillow basalt 12, 33, 70, 71
 pillow lava 24, 26, 29, 32, 70
 plagioclase 30, 31, 32
 plagioclase wehrlites 32
 plagiogranite 29, 32, 78, 90–92
 plagiogranite dykes 29, 32
 planar-laminated gabbros 30
 platform carbonates 20, 22, 23, 33, 72–73
 platform limestones 33
 platinum group elements (PGEs) 33
 pluvial period sedimentary rocks 87
 Pn-tomography velocity anomaly 61, 64, 84, 85
 podiform chromite deposits 29, 33
 porphyritic andesite 70
 porphyritic units 32
 post-Eocene extensional faults 51
 post-Eocene surface uplift 57
 post-‘Hercynian’ deformation 70–81, 89, 90–93
 post-obduction sediments 83
 post-obduction units 33, 34, 35–38, 62
 post-obduction deformation 51, 57, 83–87, 108, 109–110
 pre-‘Hercynian’ deformation 67–69
 pre-Permian unconformity 4
 Pre-Unayzah unconformity 4
 Proto-Indian Ocean 70
 Proto-Owen Transform Fault 95
 Proto-Semail Gap 52–53
 protoliths
 metamorphic sole 27
 ophiolites 75, 91
 provenance studies 17, 68
 pyrite 33
 pyroxene 30
 pyroxenite dykes 29

 Qahlah Formation 22, 33
 Qalhat fault 3, 64, 86, 89
 quartz 16–17, 31, 32
 detrital 35
 in listwaenite 36, 37
 quartz diorite 32
 quartzite 15, 27, 57
 Quaternary deformation 38, 87–89, 110
 Quaternary deposits 34, 38, 62, 87, 93
 Quriyat area 36, 87, 88–89, 115

 radiolarian chert 24, 25, 26, 27, 28, 70
 radiolarite 33
 Raman spectroscopy data 80
 rare earth elements (REEs) 32, 33
 Rayda Formation 20, 71–72
 reactivated faults 63, 64, 68, 87, 89, 106
 recumbent fold 50, 51, 57
 Red Sea 6, 86, 106
 reef carbonates 23, 71
 reef limestone 22
 regressions 73
 ridge–trench–transform model 75
 Riedel faults 53
 rift basins 67–68
 rift shoulder uplift 69, 71
 rifting 4, 67–68, 69, 90
 Gulf of Aden 86, 106
 Hawasina Basin 23, 71
 intracontinental 67–68, 105
 Neo-Tethys rifting 70, 71, 76, 90, 109
 Pangea rifting 17, 18, 70–71, 93–94, 105, 108
 rollover anticline 85
 Rus Formation 36
 Rusayl Embayment 33, 57, 86
 Rusayl Formation 33, 35–36, 85
 Rustaq area 21, 31, 32, 33, 55, 88, 114, 115
 Ruwi unit 79, 80

 Safil Formation 24, 26
 Sahtan Bowl 11, 12, 13, 14, 55, 68
 Sahtan Group 18–20, 80
 Saih Hatat Dome (SHD) 2, 3, 50, 62, *foldout*
 Angudan Unconformity 17, 106, 107
 comparison with JAD 18, 53, 70, 106–108
 cooling history 70, 81, 82, 83
 cross-sections 50, 51, 61, 63–64
 culmination collapse 57, 86
 Early Permian igneous rocks 70
 erosion 35, 105, 108
 exhumation 53, 57, 78, 81, 83, 85, 108
 exposed formations 11, 15, 17–18, 22, 27, 78, 105
 extensional fault systems 51, 61
 extensional tectonic transport 86
 faulting 80, 85
 folds 53, 55, 57, 61, 80, 106, 108
 formation of Semail Gap 51–53
 Frontal Range Fault 35, 51, 61, 64, 83
 geodynamic reconstruction 89, 90–93, 95
 geomorphology, present day 11, 13
 gravitational collapse 51, 52, 53, 57, 86, 106
 hanging wall 35, 52, 53, 61, 64, 86
 Hatat Bowl 11, 13, 15, 108
 ‘Hercynian’ event 4, 69
 ‘Hercynian’ Unconformity 55, 69, 106, 107
 high strain deformation 18, 55, 57, 80
 high-pressure/low-temperature metamorphism 18, 20, 80, 108
 lithology 16–17, 18, 53, 70, 106–108
 lithostratigraphy 106–107
 metamorphic core complexes 11, 83
 orogenic collapse 51, 52
 palaeoenvironment 20
 post-obduction deformation 83
 post-obduction sediments 83
 tectono-stratigraphic units *foldout*
 thermal springs 89
 uplift 57, 81, 93
 upper crustal structure 63
 upper–lower plate discontinuity 49–51, 92–93
 volcanic rocks 70, 106, 108
 Saih Hatat fold nappe 50, 51, 55, 57, 63, 64
 Saiq Formation 16, 17, 18, 19, 70, 79, 90, 107–108
 Saiq Plateau 13, 18, 70
 Saiq–Mahil Boundary (SMB) 18
 Salakh Range 87

 Salil Formation 20, 72
 salt basins 14, 15, 16, 53, 68, 69, 109
 salt domes 14
 salt movements 3–4, 14–15
 sandstones 14, 16–17, 33, 36
 cross-bedded 15, 17
 feldspatic 17–18
 shallow-marine 20
 Saqlah Member 11–12, 67
 Sarin Member 15
 Sayfam Formation 24, 25–26
 schists 15, 70, 78, 108
 blueschist-facies 4, 51, 78
 greenschist-facies 18, 27, 29
 sea-level 71, 72, 73, 88–89, 90–93
 seafloor spreading 6, 70
 seamounts 23, 32–33, 71
 sedimentary rocks 17, 68, 105, 106
 Ara Group 14, 15
 Cenozoic 17, 30, 33, 57, 64
 glaciogenic 12, 15, 17
 Kahmah Group 20
 pluvial period 87
 Quaternary deposits 87
 Sahtan Group 20
 see also limestones; sandstones; shal-
 low-marine sedimentary rocks
 sedimentation 21, 33, 69, 71
 Aruma Basin 78
 fluvial and/or deltaic sediments 83
 Hajir–Mu’aydin contact 14
 sediments 72
 Arabian Platform 71–73, 78, 105
 deep-sea 4, 24, 70–71
 post-obduction 83
 Quaternary deposits 34, 38, 62, 87
 slope sediments 23, 24, 36, 72
 subducted 49, 80, 81
 terrigenous-carbonate sediments 72
 wadi sediments 33, 38
 Seeb Formation 33, 36
 Seeb-Muscat area 2, 33
 seismic data 55, 67, 72
 Pn-tomography 61, 64, 84, 85
 seismic network 61
 self-sustained subduction 73, 74–78, 80–81, 91
 Semail Gap 13, 14, 51–53, 61, 86, 90, 106, 107
 unanswered questions/future research 108, 109
 Semail Gap Fault Zone (SGFZ) 52, 53, 61, 63
 Semail Lineament 51–53
 Semail Nappe 2
 Semail Ophiolite 1, 4, 21, 22, 27–33, 52, 55, 82
 Batinah Mélange 56, 57
 comparison with Masirah Ophiolite 5
 cross-sections 28, 30
 early magmatic sequence 27, 28, 29–32, 75, 76, 77, 81
 exhumation of high-pressure/low-temperature rocks 78–80, 81, 84
 faulting 57
 felsic intrusions 77
 folds 57
 formation models 27, 74, 75–78, 91
 future research/unanswered questions 109–110
 geochemistry 32, 33, 76
 hyperalkaline springs 89

- intraoceanic thrusting models 74, 75–78
late magmatic sequence 27, **28**, 32–33, 77, 81
listwaenite and 36, 37
maps 2, 3, 28, 29, 62, *foldout*
metallic mineral deposits 33, 34
obduction 4, 49, 57, 73–81, 91–92, 94–95, 105, 108
origin 28, 32–33, 61, 64, 74, 75, 76–78
post-obduction deformation 83–87, 108, 109–110
rotation 73, 74, 78, 81, 105
stages of intraoceanic thrusting and obduction 73–81
subduction initiation 73, 74, 80
thickness 4, 22–23, 109
thinning 83, 93, 108, 109
thrust sheets 49
Semail Ophiolite thrusting 4, 23–24, 49, 62, 63, 81, 91–92
models 74, 75–78
Semail Thrust 29
Semail–Arabia convergent margin 76
serpentinite 37
serpentinization 36, 37, 77, 88, 89
shale 15, 17, 33, 36, 71
shale dyke 35
shallow-marine sedimentary rocks 17, 49, 57, 69, 72, 86
carbonates 18, 20, 23, 24, 26, 71
limestones 18, 20, 24, 26, 33, 35, 71–72, 83, 85, 93, 106
sandstone 20
siliciclastic 14, 15, 20, 33
Shama Formation 36
Shammar Formation 35
shear zones 49, 51, 76, 77, 80, 81, 83
Coastal Parallel Shear Zone 89
shearing 57, 77, 80, 83, 93, 108
sheath folds 18, 19, 55, 57, 62, 63, 80, 92
sheeted dyke complex 3, 29, 30, 31–32
Shu'aiba Formation 20, 72
Shuram Excursion 14
Shuram Formation **12**, 14
Shuram/Wonoka Excursion 14
siderite 37
Sid'r Formation 24, 25
silicate-carbonate 37
siliciclastic sediments 14, 15, 20, 33
siliciclastic shelf deposit 14
silicified stromatolites 14, 15
sills 18, 32, 70, 75
siltstones 14, 15, 17, 22
silver 33
Simsima Formation 21, 22, 33, 78
Sinni Formation 24, 26, 71
slab break-off 73, 80, 81, 83, 84, 85, 91–92, 105
slab mélange 56
slag fields 33, 34, **35**
slate 12, 15
slope sediments 23, 24, 72
redeposited 36
Sm–Nd dating 77, 78
Snowball Earth hypothesis 68
soil formation 71
Somalia-Mozambique-Madagascar (SoMoMa) Ocean 4, 5, 70, 71, 91, 94
South Oman Salt Basin 14, 15, 68, 69
speleothems 87
spontaneous subduction 74, 80
spreading centres 6, 27, 74, 75, 76, 77, 80–81, 91, 109
spreading rates 78, 109
palaeo-ridge system 27
springs 11
hyperalkaline 62, 89, **115**
thermal 62, 64, 89, 109–110, **115**
stratigraphic chart *foldout*
stress direction 69, 86, *foldout*
strike-slip faults 73, 86
stromatolites 14, 15
Sturtian Glaciation 12, 15, 105, 109
stylolites 86
Sub-Siq Unconformity 69
Subayb Formation 26
subduction 84, 90–92, 105, 106, 108
Arabian Plate 23
depth 80, 81
formation of listwaenite 36–37
initiation 73, 74, 75, 80, 91, 109
self-sustained 73, 74–78, 80–81
slab break-off 73, 80, 81, 83, 84, 85, 91–92, 105
terranes along eastern margin of Arabian Platform 67
vergence 77–78
subduction fluids 75, 76–77, 81
subduction rates 78, 85, 89
subduction zones 68, 73, 75, 80, 91–92
formation of Semail Ophiolite magmatic sequences 27–28, 32–33, 75–78, 81
intracontinental 78
intraoceanic 4, 73, 80, 105
listwaenite formation 36–37
Makran subduction zone 57, 61, 83–85, 89
Neo-Tethys Ocean 91, 105
orientation 73, 74, 75, 77–78, 80
stuffing/choking 79, 80, 81
supra-subduction zone 4, 27, 32, 73, 74–78, 75, 91
submarine rifting 70
subsidence
and deposition 17, 69, 84
regional 68
thermal 68, 70, 71, 108
Suhaylah Formation 29, 32
sulfide ores 33
Sumeini Group 23, 49
supra-subduction zone 4, 27, 32, 73, 74–78, 75, 91
Sur area 33, 36, 64, 86
recent tectonic activity 87, 89
Sur Formation 36
syn-depositional faults 14, 68
Tabas Graben 69
Tahwah Formation 36
tectonic activity 105–106, *foldout*
Abu Mahara rifting 67–68
Cadomian Orogeny 53–54, 68
collision of East and West Gondwana 2–3, 68
Cryogenian 52
Early Cambrian 2, 4, 17, 68
earthquakes 89
Eocene–Miocene 51, 52, 83–87
Neoproterozoic 53, 67–68, 105
post-obduction 81–87, 105–106, 109–110
recent and/or active 5–6, 87–89, 93, 106
related to Nabitah Orogeny 68
see also tectonic evolution, Oman Mountains
tectonic evolution, Oman Mountains 67–89, 90–95, 105–106, *foldout*
future research/unanswered questions 108–110
'Hercynian' deformation 3–4, 55, 69–70
palaeogeography 93–95
post-'Hercynian' deformation 70–81, 89, 90–92
post-obduction development 81–87, 84
Eocene–Miocene compression 83
post-obduction deformation 51, 83–87, 108, 109–110
rapid exhumation and cooling 83, 85
uplift and cooling 81–83
pre-'Hercynian' deformation 67–69
Quaternary deformation 87–89
tectonic framework 2–6
Tectonic Stage 1 83, *foldout*
Tectonic Stage 2A & 2B 86, *foldout*
Tectonic Stage 3 86, *foldout*
tectono-stratigraphic units *foldout*
terigenous-carbonate sediments 72
Tethyan Time Scale 114
Tethys Basin 49
thermal springs 62, 64, 89, 109–110, **115**
thermal subsidence 70, 71, 108
thermochronology 81
thickening 78, 84, 85
thinning 18, 70, 83, 93, 108, 109
tholeiitic basalts 27, 70, 71
thrust faults 37, 49
thrust sheets 23, 24, 49, 57
thrusts 5, 62, 63
allochthonous onto autochthonous 49, 62, 63, 64, 73
Arabian continent onto oceanic crust 84
back thrusts 85, 86
Masirah Ophiolite thrusting 55
reactivation 86
Semail Ophiolite thrusting 23–24, 49, 80, 91–92
tectonic overview map 3
upper-lower plate discontinuity 49–51
see also faults
tilted blocks 71
Tiwi area, marine terraces 88, 89
topographic high 24, 71
topographic profile 87
tourmaline 32
transfer faults 51, 61
transform faults
Dead Sea Transform Fault 5, 6
Owen Transform Fault 6, 95
subduction initiation 74, 75, 80, 91, 105
transgressions 70, 71–72, 73
transitional zone (TZ) 29
transtensional faults 52, 53, 61, 73
trondhjemites 29, 32, 75
tuffites 15, 18, 108
turbiditic calcarenite 24–25, 26
U–Pb zircon ages 12, 14, 15, 27–28, 32, 70
early magmatic sequence 75
high-pressure/low-temperature metamorphism 78

- U–Pb zircon ages (*Continued*)
 late magmatic sequence 75, 81
 metamorphic sole 28, 75
 ultramafic rocks 27, 31
 hydrothermal alteration 37–38
 hyperalkaline springs 89
 ultramafic xenoliths 35
 Umar Basin 23, 24, 71, 72
 Umar Group 26–27, 34, 71, 114
 Umar Sub-basin 71
 Umm Er Radhuma Formation 35
 unconformities 14, 18–19, 20, 21, 36, 68, 71, 72
 Sub-Siq Unconformity 69
see also Angudan Unconformity;
 ‘Hercynian’ Unconformity
 United States Geological Survey (USGS) 2
 uplift 5, 35, 69, 81–83
 Arabian Platform 22, 23, 71, 73, 91
 flexural bending of Arabian Foreland 21, 78, 81
 Ja’alan–Qalhat Wedge 89
 Jabal Akhdar Dome (JAD) 57, 71, 81, 83, 93
 marine terraces 87–89
 Oman Mountains 35, 86, 87, 89, 93
 rates 89, 110
 recent and/or active 38, 87–89, 93, 110
 related to Nabitah Orogeny 68, 105
 rift shoulder uplift 69, 71
 Saih Hatat Dome (SHD) 57, 81, 93
 Upper Quartzite Member (Am4) 15–17
 Upper Siltstone Member (Am5) 15–16, 17
 upper-lower plate discontinuity 49–51, 55, 57, 62, 92–93
 upper-plate extension 74, 80
 uralitic gabbro 29, 32
 vacuoles 33
 volcanic arcs 33, 67, 76, 77, 84, 85
 volcanic rocks 12, 17, 18, 25, 26, 32
 comparison between JAD and SHD 70, 106, 108
 geochemistry 70, 77
 Haybi volcanics 26, 27, 49
 volcanoclastic rocks 14, 18, 32, 67, 68
 volcanogenic massive sulfides (VMS) 33
 volcanostratigraphy 32
 wackestone 20, 36
 Wadi Al-Abyad 31, 88
 Wadi Al-Arabiyyin 17
 Wadi Amdeh 13, 17
 Wadi Bani Awf 14, 55, 56
 Wadi Bani Kharus 14, 16, 56
 Wadi Daiqa 13, 17, 89, 115
 Wadi Hajir 54, 56
 Wadi Haymiliyah 33
 wadi incisions 38, 87, 88, 93, 110
 Wadi Kabir Fault 51, 85
 Wadi Mansah Fault Zone (WMFZ) 52, 53, 63, 109
 Wadi Mayh 19, 55, 57, 63, 79, 80
 Wadi Mijlas Gorge 17
 Wadi Nahur Anticline 55
 Wadi Qazah 13, 16–17
 Wadi Sahtan 56
 wadi sediments 33, 38, 106
 Wadi Shakhar 13, 81, 82
 Wadi Tayin 13, 27, 28, 31, 51, 75
 wadi terraces 87
 Wahrah Formation 24, 25
 Wasia Group 17, 20–21, 106, 108
 Wasia-Aruma break 22
 water irrigation systems 11
 wehrlites 29, 30, 32, 90–92
 xenoliths 29, 35
 Yenkit-Yiti unit 79, 80
 Zagros collision phase 57
 Zagros collision zone 5, 89
 Zagros Mountains 5–6, 68, 83
 Zagros–Makran convergence 83, 85
 Zagros–Makran Subduction Zone 89
 zeolites 33
 zircon 17, 70
 fission track cooling ages 80, 81
 (U–Th)/He cooling ages 81
see also U–Pb zircon ages
 zirconium (Zr) 32, 33
 Zulla Formation 24