

Index

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

- active tectonics *see* neotectonics
aeromagnetic surveys 9–10, 9
agriculture
 pollution of groundwater 259, 290, 292, 292
 and volcanic hazards 220
Água de Pau *see* Fogo Volcano
Água Retorta Fault 79–80, 80, 81
Água Retorta Graben 27, 27, 27, 28, 28, 79, 80
Ajuda Formation 91–92, 101
Altiprado Fault 1 27, 28, 75, 76
Altiprado Fault 2 27, 28, 75–76, 76
Amoras Fault 77, 78
Azores–Gibraltar Fracture Zone 15–16, 33, 65
Azores Plateau 5–6, 6, 33
 magnetic chronology 7–9, 8
 morphotectonic structures 6–7, 7, 15–16,
 33–34, 34, 65–66, 66
Azores Triple Junction 5–12, 6, 7, 8, 15–16, 65,
 66, 239, 240
AZORIS methodology 223
- Barrosa eruptive sequence 111
basaltic volcanism 52, 135
 areas susceptible
 lava flows 158–159, 159
 pyroclastic fall 159–160, 160
 eruptive styles and frequencies 155, 157, 157
 see also Congro Fissural Volcanic System; Picos
 Fissural Volcanic System; scoria cones
basalts 53–54, 53, 54
 Fogo Volcano 109
 Nordeste Volcanic System 147–148, 148, 149
 Sete Cidades Volcano 99, 100
bathymetry surveys 6–7, 7
benmoreites 53, 53, 55, 56
boron isotope ratios 57
Brejos Graben 20, 21
Bretanha Formation 92–93, 92, 93,
 95, 100, 101
Brunhes–Matuyama transition 5, 8, 9
buildings
 landslide susceptibility 180, 181
 and volcanic hazards 214–215, 222
- Caldeira da Graciosa Volcano 24
Caldeira Formation 17
Caldeira Volcano 17
calderas
 Fogo Volcano 105–106, 108, 109, 119–120
 Furnas Volcano 126, 127, 128, 197
 Povoação Volcanic System 151
 Sete Cidades Volcano 87, 88, 89, 100–102
Campi Flegrei, Italy 252
Canary Islands 239
Capelo Volcanic Complex 17
carbon dioxide *see* permanent soil CO₂ diffuse degassing
 monitoring; soil CO₂ diffuse degassing
Cascalho Negro Member 96, 97
Cedros Volcanic Complex 17
Chã das Gatas eruptive sequence 111
CIELO model 294
cinder cones *see* scoria cones
CIVISA seismic network 228, 229–230
completeness, magnitude of 230–233, 235
compositional gap 52, 99, 99, 118, 118
Congro Fissural Volcanic System 26, 67, 143–144, 145
 eruptive styles and frequencies 155, 157, 158, 158
 geomorphology 71, 75, 76
 pyroclastic density currents 163
 seismic activity 43, 105, 230, 230, 233–234, 233, 236, 239, 251
 tectonics 75–76, 76, 143, 144
 see also Fogo–Congro 2011–12 seismic crisis
continuous GPS analysis 10–11, 239–253
 antenna and receivers 242
 data processing and velocity estimation 242, 243, 244, 244
 GNSS stations 10–11, 10, 240–242, 241
 inter-island displacement 10–11, 10
 intra-island deformation 11
 aseismic deformation 246–248, 247
 coseismic deformation 248, 249, 250, 251
 steady tectonic velocities 244–246, 245, 246
 tectonic implications 250–251
 volcanic implications 251–252
Coroa da Mata Formation 111, 119
Corvo Island 6, 44, 52, 61
Crista Submarina da Serreta 38, 41
Cú de Judas Fault 27, 79, 80, 80
cultural vulnerability 220–221, 221
cut and fill sequences 150, 152
- Daly Gap 52, 99, 99, 118, 118
deaths *see* fatalities
debris flows 37, 150, 167
deformation *see* continuous GPS analysis
demographic vulnerability 219–220
domes, trachytic
 areas susceptible 159, 159
 eruptive frequencies 157
 Fogo Volcano 105, 107–108, 107, 108, 109, 117,
 119, 120, 121
 Furnas Volcano 126, 127, 128–129
 Picos Fissural Volcanic System 137, 138
 Sete Cidades Volcano 89
Dom João de Castro Bank 7, 42
DRASTIC vulnerability index 292, 292
dykes
 Fogo Volcano 74–75, 75
 Furnas Volcano 79, 79
 Povoação and Nordeste Volcanic Systems 80, 83
 Sete Cidades Volcano 70, 72, 89

- earthquakes, destructive
 historical 15, 25–26, 34, **35–36**, 37, 42,
 105, 227–229
 epicentres 37, 228, 229
 fatalities 26, **35–36**, 37, 46
 and housing 214–215
 as landslide trigger 169, 170, 215–217
 return periods **156**
- East Azores Fracture Zone 5, 6, 16, 33, 34
 East Azores Volcano-Tectonic System 34, 43–44
 Eastern Graciosa Basin 6, 7
 economic vulnerability 220
 electricity generation *see* geothermal resources
 Environmental Impact Analysis (EIA) 222, 222
 erosional morphology, Fogo Volcano 105
 Eurasia–Nubia–North America triple junction 5–12,
 6, 7, 8, 15–16, 65, 239, 240
 Eurasia plate 5, 10, 10, 11, 240
see also Eurasia–Nubia–North America triple junction
 European Laboratory Volcano study 125
 European Macroseismic Scale (EMS) 214–215
 evacuation plans 215, 217–219, 218, **219**, 220
 explosive eruptions
 areas susceptible 160–163, 160, 161, 162
 frequencies 157, **157**, 158, **158**
- Faial Island 6
 age 8
 Brunhes–Matuyama transition 9
 destructive earthquakes **36**, 37, 37, 42
 fumarolic fields 186
 geothermal resources 300
 historical eruptions 37, 38, **39**, **41**
 housing 214
 intra-island deformation 11
 magma composition **53**, 55, 56, 61
 motion 10–11
 neotectonics 17–20, 18, **19**, 19, **20**
 radon 187
 seismic activity **36**, 37, 37, 42
 temporal distribution of volcanic activity 52
 Faial–Pico alignment 35, 43
 Falca Fault **27**, 72, 73, 74
 fatalities
 carbon dioxide 185, 192
 earthquakes 26, **35–36**, 37, 46
 landslides 167
 volcanic eruptions 38, **39–41**, 46, 198
 fault plane solutions 233–234, 236
 fault systems
 Faial Island 17–20, 18, **19**, 19, **20**
 Graciosa Island 23–25, **24**, 24, **25**
 Pico Island 20–21, 20, **21**, 21, **22**
 Santa Maria Island 28, 29, **29**
 São Jorge Island 22–23, 22, **23**, 23
 São Miguel Island 26–28, **27**, 27, **28**, 67, 81–84, 84
 Congro Fissural Volcanic System 75–76, 76, 143, 144
 Fogo Volcano 26–27, 72, 73–74, 73, 74, 107
 Furnas Volcano 77, 78–79, 78, 82, 198, 199
 Picos Fissural Volcanic System 71, 72,
 137–138, 138
 Povoação and Nordeste Volcanic Systems 27,
 79–80, 80, 81, 82, 83, 148–149, 151
 Sete Cidades Volcano 26, 68–69, 68, 69, 89, 90
 Terceira Island 25–26, 25, **26**
 Fenais da Luz eruptive sequence 111
 Feteiras Fault **27**, 28, **28**, 68, 68, 70
 Flores Island 6, 44, 52, 53, 150, 241
 Focal Zone (FOZO) mantle type 57
 Fogo A event 105
 Fogo A Formation 110, 111, 113–115, 115,
 116, 118–119
 Fogo B deposit 116, 120
 Fogo C deposit 116–117, 120
 Fogo–Congro 2011–12 seismic crisis 248, 249, 250, **251**
 Fogo D deposit 117, 120
 Fogo Volcano 26, 67, 105–121, 106, 272
 caldera 105–106, 108, 109, 119–120
 dykes 74–75, 75
 eruptive history 119–121
 eruptive styles and frequencies 157, **157**, **158**
 future eruption scenarios **214**
 geomorphology 71, 72–73, 105–107, 106, 107, 108
 historical eruptions 37, 38, **39**, 117, 117, 120, 121
 hydrothermal activity 105, 185
 lahars 119, 121, 163, 163
 landslides 105, 121, 173
 magnetization 10
 petrology 117–118, 118
 pyroclastic density currents 163
 seismic activity 43, 105, 121, 230, 230, 233–234,
 233, 236, 239
 settlement in area of 215, 216
 soil CO₂ diffuse degassing 190–192, 191, **192**
 stratigraphy 108–117, 110
 Barrosa eruptive sequence 111
 Chã das Gatas eruptive sequence 111
 Coroa da Mata Formation 111, 119
 Fenais da Luz eruptive sequence 111
 flank eruptions 117
 Fogo A Formation 110, 111, 113–115,
 115, 116, 118–119
 historical eruptions 117, 117
 Lombadas Formation 115–117, 118–119
 Lower Group 109–110, 110
 Pisão Formation 111, 113, 118–119
 Porto Formoso eruptive sequence 110–111, 119
 Ribeira Chã Formation 110, 111, 112–113,
 112, 113, 114, 118–119
 Roída da Praia Formation 111–112, 111, 118–119
 tectonics 26–27, 72, 73–75, 73, 74, 75, 107–108, 108
see also Fogo–Congro 2011–12 seismic crisis; permanent soil
 CO₂ diffuse degassing monitoring
- Formigas islets 6, 7
 fractional crystallization 60–61, 60
 fumarolic fields 133, 185–186, 187, 193, 198, 199, 203, 204
 Furnas village 216
 attitude survey 221–222
 carbon dioxide 186, 187, 188, 188, 189, **189**, 193, 272
 evacuation plans 217
 radon 187, 198, 199, 203, 204–205, 204,
 205, 206, 207, 208
 Furnas Volcano 26, 67, 125–133, 197–198, 272
 basal lavas 127
 caldera 126, 127, 128, 197
 dykes 79, 79

- eruptive styles and frequencies 131–132, 157, **157**, **158**
 Furnas C eruption 128, 129–132, 129, 130, 131, 132
 future eruption scenarios **214**
 geomorphology 71, 76–78, 126, 127, 127, 197, 199
 hazards 133
 historical eruptions 37, 38, **39**, 129, 198, 199
 hydrothermal activity 9, 131, 133, 185, 198, 199, 266
 lahars 163, 164
 landslides 133, 173
 magnetization 9
 pyroclastic density currents 163
 seismic activity 133, 230, 230, 233, 251
 settlement in area of 215, 216
 soil CO₂ diffuse degassing 186, 187–189, 187, 188, **189**
 stratigraphy 127–131, 129
 Lower Furnas Group 128, 128
 Middle Furnas Group 128–129, 128
 Upper Furnas Group 128, 129–132, 129, 130, 131, 132
 tectonics 77, 78–79, 78, 79, 82, 198, 199
see also permanent soil CO₂ diffuse degassing monitoring
- GEODVEL plate tectonic model 10, 10, 244–246
 geothermal resources 105, 251–252, 257, 297–300, 298, 299, 300
see also hydrothermal systems
 Gloria Fault 16, 33, 34
 GNSS stations 10–11, 10, 240–242, 241
 GPS *see* continuous GPS analysis
 Graciosa Island 6, 7
 destructive earthquakes **35–36**, 37
 fumarolic fields 186
 geothermal resources 300
 magma composition 53
 motion 10
 neotectonics 23–25, **24**, 24, **25**
 radon 187
 seismic activity **35–36**, 37, 42
 soil CO₂ diffuse degassing monitoring 272, 272
 tectonics 82
 temporal distribution of volcanic activity 52
 Graciosa–Terceira–São Miguel alignment 33–34, 43
 Graminhais inferred fault 80, 80
 Great Meteor Seamounts 6
 groundwater 258–259, 289–295, 291
 abstraction 290, 294, 295
 chemistry 259, 290, 291, 291
 pollution 259, 290, 291–293, 292
 protection zones 293, 293
 quality monitoring 293–294, 293
see also mineral waters
 Guilherme Moniz Volcano 25, 25
- Hawaiian eruptions 157, **157**, 159
 hawaiiites 53–54, **53**, 54, 99, 109, 147
 hazards 103, 133, 213
 return periods 155, **156**
see also earthquakes, destructive; landslides; radon; soil CO₂
 diffuse degassing; volcanic hazards zonation;
 volcanic hazard vulnerability
- health hazards
 carbon dioxide 185, **186**, 192–193, **192**, 221
 radon 197
 historical eruptions 20, 25, 37–38, 38, **39–41**
 fatalities 38, **39–41**, 46, 198
 Fogo Volcano 37, 38, **39**, 117, 117, 120, 121
 Furnas Volcano 37, 38, **39**, 129, 198, 199
 Picos Fissural Volcanic System 37, 140–143, 141, 142, 143
 Sete Cidades Volcano 98, **99**, 99, 102
 hotspots 6, 11, 59
 housing
 landslide susceptibility **180**, 181
 and volcanic hazards 214–215, 222
 hydrogen sulphide 186, 187, 193
 hydrogeology *see* groundwater; mineral waters
 hydromagmatic activity 21, 107, 108, 131–132, 289
 hydrothermal systems
 and deformation 252
 Fogo Volcano 105, 185
 fumarolic fields 133, 185–186, 187, 193, 198,
 199, 203, 204
 Furnas Volcano 9, 131, 133, 185, 198, 199, 266
 Sete Cidades Volcano 87, 185
 thermal waters 185, 265, 265, 266, 267, 267, 268
see also geothermal resources
- Iceland 239, 300
 informational vulnerability 221–222
 inter-island displacement 10–11, 10
 intra-island deformation 11
 aseismic deformation 246–248, 247
 coseismic deformation 248, 249, 250, **251**
 steady tectonic velocities 244–246, 245, 246
 isotopic ratios 57–59, 58
- Japan 252
- Lagoa do Fogo 105, 109
 Lagoas Formation 95–97, 97, 98
 lahars 119, 121, 157, 163, 163, 164
 LAHARZ model 163
 Lajes Graben 25–26, 25
 landslides **35–36**, 37, 38, **39–41**, 167–181
 debris flows 37, 150, 167
 Fogo Volcano 105, 121, 173
 Furnas Volcano 133, 173
 inventory maps 168, **172**, 172, 173, 176
 Pico Island 20
 predisposing factors 174–175, 177–178
 Sete Cidades Volcano 103
 spatial distribution 171, 176
 susceptibility analysis 167, 171, 178–181,
 178, 178, **179**, 179, **180**
 temporal distribution 169, 170, 176
 triggers 169, 170, 176, 215–217, 217
 lava flows
 areas susceptible 158–159, 159
 eruptive frequencies **157**
 Fogo Volcano 107, 108, 109, 117, 120, 121
 Picos Fissural Volcanic System 137, 140
 lava tubes 117
 livestock 220, 292, 292
 Lombadas Formation 115–117
 petrology 118–119
 Lomba dos Homens Fault **27**, 68, 68, 69
 Lomba do Vasco Fault **27**, 68, 68
 Lombas Formation 93–94, 94, 95
 Lombinha Fault **27**, 68, 68, 69

- LREE/HREE ratios 59
lung cancer 197
- maars 88, 89, 89, 137, 138
mafic rocks 53–54, 54, 55, 59
see also basaltic volcanism; basalts
magma chambers 99–100, 119
magmas 51–62
 eruptive temperatures 52
 fractional crystallization 60–61, 60
 melting model 59–60, 59
 petrography and geochemistry 52–56, **53**, 53,
 54, 55, 56, 57–59
 primitive melts 56–57, 56, 57, 58
 source characteristics 57–59
magnetic chronology 7–9, 8
magnitude of completeness 230–233, 235
Manadas Volcanic Complex 22
mantle composition 59–60
marine terraces 150–151
Matsushiro earthquake swarms, Japan 252
maximum expected magnitudes
 Faial Island 19–20, **20**
 Graciosa Island 25, **25**
 Pico Island 21, **22**
 Santa Maria Island 29, **29**
 São Jorge Island 23, **23**
 São Miguel Island 28, **28**
 Terceira Island 26, **26**
MELTS simulations 61
metasomatic melts 59
Mid-Atlantic Ridge 5, 6, 6, 7, 16, 33, 34, 44, 239, 240
mineral waters 257–268, 290
 chemical composition 259–266, **260–261**,
 262–263, 264, 265, 266, 267
 distribution 259, 259
 hydrogeological setting 258–259
MORVEL plate tectonic model 10, 10, 244–246
Mosteiros Graben 26, **27**, **28**, 67, 68, 69, 89, 90, 101
Mosteiros islets 94, 95
Mosteiros village 189–190, 189, **190**, 190, 192, 193
Mount Usu, Japan 252
mugearites 53, **53**, 55, 99, 109, 152
- naphthalene di-sulphonate (NDS) tracers 298–299
neotectonics 15–30
 Faial Island 17–20, 18, **19**, 19, **20**
 Graciosa Island 23–25, **24**, 24, **25**
 Pico Island 20–21, 20, **21**, 21, **22**
 Santa Maria Island 28–29, 28, **29**
 São Jorge Island 21–23, 22, **23**, 23
 São Miguel Island 26–28, **27**, 27, **28**
 Terceira Island 25–26, 25, **26**
Nordeste Volcanic System 26, 147–151
 basal lavas 127
 dykes 80, 83
 geochemistry of lavas 59
 geomorphology 71, 79, 150
 magnetization 10
 stratigraphy 147–148, **148**
 tectonics 27, 79–80, 80, 81, 82, 83, 148–149, 151
North America plate 5, 240
 see also Eurasia–Nubia–North America triple junction
North Azores Fracture Zone 5, 6, 11, 34, 34
North Hirondele Basin 6, 7
Nubia plate 5, 10, 11, 240
 see also Eurasia–Nubia–North America triple junction
- oblique spreading 11, 12, 15
oxygen isotope ratios 57
- parallel practice 221–222
Pedro Miguel Graben 17, 18
Pepom Member 96–97, 98
perceptual vulnerability 221–222
permanent soil CO₂ diffuse degassing monitoring 271–286
 descriptive statistics 274–275, **275**, **276**
 environmental influences on gas flux 280–281, **285**
 equipment 273, 273, **274**
 monitoring sites 272–274, 272, **274**
 multivariate regression analysis 276–280, 279,
 280, 280, 281, 282, **283**, 283, **284**, 284
 and seismic-volcano monitoring 286, **286**
 soil CO₂ flux long-term variations 276, 278, 285–286
 soil CO₂ flux short-term variations 275–276,
 277, **278**, 281–285, **285**
Pico Alto Volcano 25, 25, 186
Pico das Berlengas 121
Pico da Vara 149, 149
Pico de João Ramos 140–141, 141, 142, 143
Pico do Canario cone, Furnas Volcano 126, 129
Pico do Ferro domes, Furnas Volcano 126, 128–129
Pico do Fogo **139**, 140–141, 141, 143, 145
Pico do Paio 140–141, 141, 142
Pico do Sapateiro 107, 117, 121
Pico Fracture Zone 33, 34
Pico Island 6
 age 8
 destructive earthquakes **35–36**, 37, 37
 fumarolic fields 186
 geothermal resources 300
 groundwater 294
 historical eruptions 20, 37, 38, **39–40**
 intra-island deformation 11
 magma composition **53**, 55, 56
 motion 10–11
 neotectonics 20–21, 20, **21**, 21, **22**
 seismic activity **35–36**, 37, 37, 42
 temporal distribution of volcanic activity 52
Pico Queimado *see* Pico do Sapateiro
Pico Volcano 20
Picos Fissural Volcanic System 26, 67, 135–143,
 137, 144–145
 eruptive styles and frequencies 155, **157**, 158, **158**
 geomorphology 71, 72, 135–137, 136, 138
 historical eruptions 37, 140–143, 141, 142, 143
 pyroclastic density currents 163
 seismic activity 140, 230, 230, 233
 stratigraphy 138–140, **139**
 tectonics 71, 72, 137–138, 138
Pisão Formation 111, 113, 118–119
Plinian and sub-Plinian eruptions
 areas susceptible 160–163, 160, 161, 162
 frequencies 157, **157**, 158
pollution of groundwater 259, 290, 291–293, 292
population distribution 215–217, 216

- Porto Formoso eruptive sequence 110–111, 119
- Povoação Basin 6, 7
- Povoação Ignimbrite Formation 128, 152
- Povoação Volcanic System 26, 77, 127, 151–153, 152
 geomorphology 71, 79, 150, 151
 tectonics 79–80, 80, 83
- Praia da Vitória bay, Terceira 25, 25
- precipitation 258, 289
 as landslide trigger 169, 170, 176, 215, 217
- primitive melts 56–57, 56, 57, 58
- Princess Alice Basin 6, 7, 9, 11
- pumice cones 88, 89, 89, 107, 108, 127
- pumice fall
 areas susceptible 160–162, 160, 161
 eruptive frequencies **158**
- pyroclastic density currents
 areas susceptible 162–163, 162
 eruptive frequencies **158**
- radioactivity 197
see also radon
- radiogenic isotope ratios 57–59, 58
- radon 186, 187, 197–209
 health hazards 197
 indoor concentrations 200–201, 201, 204–207, 205, 206, 207, **208**, 208, 209
 recommended levels **207**
 soil concentrations 199–200, 200, 201–204, 201, **202**, 202, 203, 204, 205
- rainfall 258, 289
 as landslide trigger 169, 170, 176, 215, 217
- rare earth elements (REE) 59, 61
- Ribeira Chã event 105
- Ribeira Chã Formation 110, 111, 112–113, 112, 113, 114, 118–119
- Ribeira Grande geothermal field 297–299, 298, 300
- Ribeira Grande Graben 27, **27**, 27, **28**, 72, 73, 107, 185, 190
- Ribeira Quente village 216
 carbon dioxide 188, 188
 evacuation plans 217
 landslide 167
 radon 187, 199, 204, 205, 206
- Ribeira Seca village 191, 192, **192**
- Ribeirinha Volcano 17
- Risco Formation 90–91, 91, 92, 100, 101
- roads
 and evacuation 217–219, 218, **219**, 220
 landslide susceptibility **180**, 181
- Róida da Praia Formation 111–112, 111, 118–119
- Rosais Volcanic Complex 21
- rubble-stone construction 214
- Sabrina islet **40**, 98
- salinization of groundwater 259, 290
- Santa Bárbara Formation 94–95, 95, 96, 100
- Santa Bárbara Graben 25, 26
- Santa Bárbara Volcano 25, 25, 26
- Santa Maria Island 6
 age 8–9
 destructive earthquakes **36**, 37
 magma composition 53, 55
 marine terraces 150
 neotectonics 28–29, 28, **29**
 seismic activity **36**, 37, 43
 temporal distribution of volcanic activity 52
- São Jorge alignment 35, 44
- São Jorge Island 6
 age 8
 destructive earthquakes **35–36**, 37, 37
 geothermal resources 300
 historical eruptions 37, 38, **39–40**
 magma composition 55
 neotectonics 21–23, 22, **23**, 23
 temporal distribution of volcanic activity 52
- São Jorge–Terceira isotopic array 57, 58–59
- São Jorge Volcanic Complex 21
- scoria cones 52
 Faial Island 17
 Fogo Volcano 106–107, 107, 108, 117
 Furnas Volcano 126
 Pico Island 20
 Picos Fissural Volcanic System 136, 137, 138, 138, 140–141, 144
 São Jorge Island 21
 São Miguel Island 155
 Sete Cidades Volcano 87–88, 89, 89, 97–98, 101, 102
- scoria fall, areas susceptible 159–160, 160
- SCUTS roads programme 217–219, 218, **219**, 220
- SEGAL08 plate tectonic model 10, 10
- seismic activity 16, 17, 38, 42–44, 42–45, 46, 227–236, 239–240
 and aseismic deformation 246–248, 247
 Congro Fissural Volcanic System 43, 105, 230, 230, 233–234, 233, 236, 239, 251
 and coseismic deformation 248, 249, 250, **251**
 fault plane solutions 233–234, 236
 Fogo Volcano 43, 105, 121, 230, 230, 233–234, 233, 236, 239
 Furnas Volcano 133, 230, 230, 233, 251
 and geothermal power operations 251–252
 and housing 214–215
 as landslide trigger 169, 170, 215–217
 magnitude of completeness 230–233, 235
 Picos Fissural Volcanic System 140, 230, 230, 233
 seismic swarms 26, 105, 133, 239, 251
 Sete Cidades Volcano 103, 230, 230, 233
 spatial *b*-value distribution 233, 235
 temporal and spatial distribution 229–230, 229, 230, 231–232, 233, 234
see also earthquakes, destructive
- seismic crises 34, **35–36**, 37, 38, 42
see also Fogo–Congro 2011–12 seismic crisis
- seismic-volcano monitoring 38, 286, **286**
- seismogenic potential
 Faial Island 19–20, **20**
 Graciosa Island 25, **25**
 Pico Island 21, **22**
 Santa Maria Island 29, **29**
 São Jorge Island 23, **23**
 São Miguel Island 28, **28**
 Terceira Island 26, **26**
- Serra das Fontes Volcanic Complex 23
- Serra do Cume Volcano 25, 25
- Sete Cidades village 216, 217

- Sete Cidades Volcano 26, 67, 87–103
 caldera 87, 88, 89, 100–102
 dykes 70, 72, 89
 eruptive history 100–102, 101, 102
 eruptive styles and frequencies 157, 157, 158
 future eruption scenarios 214
 geochemistry of lavas 59
 geomorphology 67–68, 87–88, 88, 89
 historical eruptions 98, 99, 99, 102
 hydrothermal activity 87, 185
 magnetization 9–10
 petrology 98–100, 99, 100
 pyroclastic density currents 163
 radon 202–203, 203
 seismic activity 103, 230, 230, 233
 seismic crises 42
 settlement in area of 215, 216
 soil CO₂ diffuse degassing 87, 189–190, 189, 190, 190
 stratigraphy 89–98, 90, 138, 139
 Ajuda Formation 91–92, 101
 Bretanha Formation 92–93, 92, 93, 95, 100, 101
 flank eruptions 97–98
 historical eruptions 98, 99, 99
 Inferior Group 90, 91
 Lagoas Formation 95–97, 97, 98
 Lombas Formation 93–94, 94, 95
 Risco Formation 90–91, 91, 92, 100, 101
 Santa Bárbara Formation 94–95, 95, 96, 100
 tectonics 26, 68–72, 68, 69, 70, 89, 90
 settlement distribution 215–217, 216
 simple-stone construction 214
 slickensides 28, 79
 slip rates
 Faial Island 19, 19
 Graciosa Island 24–25, 24
 Pico Island 21, 21
 Santa Maria Island 29, 29
 São Jorge Island 23, 23
 São Miguel Island 28, 28
 Terceira Island 26, 26
 social vulnerability 220–221, 221
 SOGEO (Sociedade Geotérmica dos Açores) 297
 soil CO₂ diffuse degassing 185–193, 221
 Fogo Volcano 190–192, 191, 192
 Furnas Volcano 186, 187–189, 187, 188, 189
 health hazards 185, 186, 192–193, 192, 221
 indoor concentrations 187, 189–190, 189, 190,
 192–193, 192, 221
 Sete Cidades Volcano 87, 189–190, 189, 190, 190
 see also permanent soil CO₂ diffuse
 degassing monitoring
 South Hironnelle Basin 6, 7
 spatial *b*-value distribution 233, 235
 spatter cones and ramparts 52, 136
 springs 258, 264, 290, 291, 293, 293, 294, 295
 Sr–Nd–Pb isotopic ratios 57, 58, 58
 striated fault surfaces 67, 79, 81, 82
 Strombolian eruptions 157, 157, 159, 160
 submarine eruptions 37–38, 39–41, 98, 99, 102, 119–120
 sub-Plinian eruptions *see* Plinian and sub-Plinian eruptions
 subsidence 11
 surface displacement fields 10–11, 10,
 244–246, 245, 246
 tectonic deformation *see* continuous GPS analysis
 tectonic structures *see* neotectonics; volcano-tectonic structures
 Terceira Island 6, 7
 destructive earthquakes 25–26, 35–36, 37, 37
 fumarolic fields 185–186
 geothermal resources 300
 historical eruptions 25, 37, 38, 38, 40–41
 intra-island deformation 11
 magma composition 53, 53
 motion 10–11
 neotectonics 25–26, 25, 26
 seismic activity 25–26, 35–36, 37, 37, 42
 soil CO₂ diffuse degassing monitoring 272, 272
 temporal distribution of volcanic activity 52
 Terceira Rift 5, 6, 7, 8, 8, 11, 34, 34, 239
 thermal waters 185, 265, 265, 266, 267, 267, 268
 see also hydrothermal systems
 Topo Volcanic Complex (São Jorge) 21
 Topo Volcano (Pico) 20
 tourists 220
 trachytes 53, 53, 54, 55, 56
 Fogo Volcano 109, 112, 118
 Nordeste Volcanic System 147, 148, 150
 Sete Cidades Volcano 99, 100
 trachytic volcanism 52
 domes
 areas susceptible 159, 159
 eruptive frequencies 157
 Fogo Volcano 105, 107–108, 107, 108, 109,
 117, 119, 120, 121
 Furnas Volcano 126, 127, 128–129
 Picos Fissural Volcanic System 137, 138
 Sete Cidades Volcano 89
 eruptive styles and frequencies 157–158, 157, 158
 lava flows
 areas susceptible 159, 159
 eruptive frequencies 157
 pyroclastic fall
 areas susceptible 160–162, 160, 161
 eruptive frequencies 158
 tristanites 147, 148, 150
 Tronqueira Fault 27, 79, 80, 80, 82
 tsunamis 156
 tuff cones and rings 52, 88–89, 89, 107, 108, 136–137, 140
 Vale Grande Fault 27, 28, 79, 80, 80, 82
 Vila Franca do Campo village 35–36, 37, 105, 107, 167, 227
 volcanic deformation *see* continuous GPS analysis
 volcanic eruptions 51
 areas susceptible 158–163, 159, 160, 161, 162
 eruptive styles and frequencies 131–133, 155–158, 157, 158
 eruptive temperatures 52
 future eruption scenarios 214
 historical 20, 25, 37–38, 38, 39–41
 fatalities 38, 39–41, 46, 198
 Fogo Volcano 37, 38, 39, 117, 117, 120, 121
 Furnas Volcano 37, 38, 39, 129, 198, 199
 Picos Fissural Volcanic System 37, 140–143, 141, 142, 143
 Sete Cidades Volcano 98, 99, 99, 102
 return periods 156
 submarine 37–38, 39–41, 98, 99, 102, 119–120
 temporal distribution 52
 see also basaltic volcanism; magmas; trachytic volcanism

- volcanic hazards zonation
 - basaltic lava flows 158–159, 159
 - basaltic pyroclastic fall 159–160, 160
 - lahars 163, 163, 164
 - pyroclastic density currents 162–163, 162
 - trachytic domes and lava flows 159, 159
 - trachytic pyroclastic fall 160–162, 160, 161
- volcanic hazard vulnerability 213–223, **215**
 - demographic 219–220
 - economic 220
 - evacuation plans 215, 217–219, 218, **219**, 220
 - housing 214–215, 222
 - perceptual and informational 221–222
 - population distribution 215–217, 216
 - social and cultural 220–221, **221**
- volcano-tectonic structures 65–84, 67
 - Azores Plateau 6–7, 7, 15–16, 33–34, 34, 65–66, 66
 - Congro Fissural Volcanic System 75–76, 76, 143, 144
 - dynamic analysis 81–84, 84
 - Fogo Volcano 26–27, 72, 73–75, 73, 74, 75, 107–108, 108
 - Furnas Volcano 77, 78–79, 78, 79, 82, 198, 199
 - Nordeste Volcanic System 27, 79–80, 80, 81, 82, 83, 148–149, 151
 - Picos Fissural Volcanic System 71, 72, 137–138, 138
 - Povoação Volcanic System 79–80, 80, 83
 - Sete Cidades Volcano 26, 68–72, 68, 69, 70, 89, 90
 - see also* continuous GPS analysis; neotectonics
- Vulcanian eruptions 157
- wells, drilled 258, 264, 290, 291, 293, 293, 294, 295
- West Azores Fracture Zone 33, 34
- West Azores Volcano-Tectonic System 44
- Western Graciosa Basin 6, 7
- West Ribeira Grande Fault 72, 73, 74
- wetspot in mantle 61
- wind conditions 160–162, 161