

Index

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

- Abeokuta Formation, work of JRT Hazell 239
acoustic televiewer (ATV) amplitude data
 metolachlor contamination 218, 219
 porosity estimation 177–184
 analysis 180
 gamma-gamma logging 180–181, 182, **183**
 linear regression model 180, 182, **183**
 neutron logging 179–181, 182, **183**
 porewater conversion calculations 181–184
 sampling 178–180
 sources of error 182, 184
 travel time data 180
 Watervliet contaminated shale 112, 116, 117, 124
Adum West traverse 72, 73, 74, 75, **76**, 77
Africa *see* Benin; Burkina-Faso; Ivory Coast; Nigeria;
 South Africa; Sub-Saharan Africa; West Africa
Agbani Sandstone Formation 72, 73
Agramarou migmatites 84
alloterite 187–188
alterite 12, 13, 88, 187
AMMA-CATCH project 82
aquifers
 hard rock 1, 3
 catchment-scale heterogeneity 35–36, 43
 depth-dependent flow 1
 global model 12–13
 hydrogeological parameters 1, 3
 low yield 1, 2, 35, 147
 pumping tests 148–158
 drawdown models 149–151
 simulation 151–157
 sustainable well yield 147–148
 weathering 1, 59–69, 60
 karst 161–162
 conduit-aquifer interaction 161–162, 173–175
 Mendip Hills
 conduit flow 161–175
 dye tracing 167–170
 groundwater levels 164, 166–167
 hydraulic conductivity 164, 166, 171
Asham Quarry 163
Asu River Formation 72
 metamorphosed 72
Aumelas-Thua karst system 162
Avon Group 163–164
Awgu Shale Formation 72, 73, 78

Badoit, Saint-Galmier granite 193–194
bauxitic crust 187
Beacon Hill, Mendip Hills 162, 163, 164
Beaufort Group 132
Benin
 gneiss weathering profile, ERT 189
 numerical groundwater modelling 5, 81–98
Benue Trough, Cretaceous shale, igneous intrusions
 71–78
biotite, oxidation and hydration 59, 60, 65–66, 68–69, 188
Birimian schist 14–15, 19

Black Rock Limestone Group 163
borehole eccentricity 182, 184
boreholes
 Eastern Cape Karoo groundwater 135–138
 open
 hydraulic cross-connection 104
 Watervliet shale 104, 105, 106–107, 117, 119
Bottlehead Sinkhole 163, 164, 165, 166
 dye tracing 167–170, 171–173
Burkina-Faso, weathering profiles, ERT 189

Cabot-Head Shale Formation 210, 211, 220, 222, 226, 231
Calabria, hard rock aquifer, pumping tests 148, 150
Caledonian orogeny 36, 38
Cape Fold Belt 132
Cape Orogeny 132
Cape Supergroup 132, 134
carbon capture and storage 2
carbonate equilibrium 18–19, 25–26
Carboniferous Coal Measures Group 163
Carboniferous Limestone Supergroup 5, 163, 164
 see also karst aquifers
Caribbean Granites 194
clay minerals, Gortinlieve catchment aquifer 42–43
Clifton Down Limestone 163
Coalbrookdale Formation 163, 164
conduction 62, 64, 67
conductivity *see* electrical conductivity; hydraulic con-
 ductivity; thermal conductivity
conduit flow, eastern Mendip Hills karst 5, 161–175
conduit-aquifer interaction 161–162, 173–175
connectivity, fractured networks 2, 101–125
constant heads boundary conditions 152, 154
contamination
 hydraulic fracturing 130, 131
 matrix diffusion 208
 metolachlor 209–232
 transport 5, 101
 Watervliet shale FNCM 102–125
continuous multichannel tubing (CMT) system 106, 107,
 111, 114, 116
core analysis, Watervliet contaminated shale 105, 108
core contaminants *see* rock core contaminants
cracks, in granite weathering 65–66, 68–69

Dairyhouse Sinkhole 163, 164, 165, 166
 dye tracing 167–170, 171–173
decentralization, tool 182, 184
dense non-aqueous phase liquids (DNAPLs) 5, 103,
 207–208
 conceptual model 230, 231, 232
 disappearance time numerical model 213–215, **217**
 groundwater flow 209, 211
 matrix diffusion 208–209, 223, 224, 230, 231
 metolachlor 209–232
 plume attenuation 208, 209, 229, 230
 plume front retardation 208, 225, 229
 source zone evolution 209, 221, 230, 231

- dense non-aqueous phase liquids (DNAPLs) (*Continued*)
 Watervliet shale FNCM 102, 109, 111, 113, 115–116, 118, 121, 124
see also metolachlor contamination
- denudation rate 62, 64, 67
- dewatering, karst aquifers
 by quarries 161, 162
 Torr Quarry 166–167, 169
- dichloroethylene, Watervliet contaminated shale 109, 114
- diffusion, contaminant migration 102, 103, 113, 117, 121
- diffusivity 62
- digital elevation model
 Sassandra River catchment 15, 16
 Upper Ouémé Basin 82, 89–90
- discrete fracture matrix (DFM) 208, 209, 218, 219, 220
- discrete fracture network (DFN) numerical models 2, 101
 groundwater flow and contaminant transport 121–124
- discrete interval sampler (DIS) 135
- Djouougou Formation 84
- dolerite, intrusion into Cretaceous shale 5, 71–78
 boreholes 73
 electrical conductivity 73, 74
 fractures 78
 magnetic field deflection 73, 74
 Middle Benue Trough 72–78
 transmissivity 75, 76, 77–78
- dolostone aquifer
 Guelph
 ATV porosity estimation 5, 177–184
 analysis 180
 gamma-gamma logging 180–181, 182, **183**
 neutron logging 179–181, 182, **183**
 sampling 178–180
 metolachlor contamination 209, 211, 222
- Donga Formation 84
- Downhead Fault 163, 164
- Downhead Sinkhole 163, 164, 166
 dye tracing 167–170, 171–173
- Drakensberg Group 132, 133
- drawdown, pumping tests 148–153
- Dwyka Group 132
 dye tracing 161
 Mendip Hills karst 167–174
- Eastern Cape Karoo
 groundwater resources 130–142
 aquifer yield 141, 142
 baseline research 131–142
 depth 139, 140–141, 142
 determinands 137
 electrical conductivity 135, **136**, 138, 140
 geophysical surveys 142
 geospatial statistical analysis 136–137, 139, 142
 hydrocensus 135, 136, 138
 isotope research 135, 137, 142
 methodology 133–137, 135
 overabstraction 142
 sampling 135–136, 142
 water quality 138–139
 precipitation 133, 134
- Eastern Karoo Basin, shale gas 5
- Eburnean orogeny 14, 15
- Ecce Group 132, 133
- electrical conductivity
 dolerite 73, 74
 Eastern Cape Karoo groundwater 135, **136**, 138, 140
 smectite/dolerite intrusions 73, 74
- electrical resistivity tomography (ERT) 36
 Gortinlieve catchment aquifer 40, 41, 44, 45, 47, 49, 54
 Upper Ouémé Basin 85, 87
 weathering profile 5, 189–203
 dipole-dipole (DD) array 190–191, 193, 198
 geophysical acquisition 190–191
 geophysical modelling 192–193
 inversion methods 191–192
 robust or blocky parameters 191, 192, 198
 STDH 191–192, 192, 196, 197–198, 199, 201
 STDV 191, 192
 pole-dipole (PD) array 190–191, 192, 197–198
 Saint-Galmier granite 194–199, 201–202
 Sparouine schist 194, 195, 199–200, 201, 202
- electromagnetic surveying, work of JRT Hazell 240, 241, 242
- eogenetic karst 162
- Eramosa Formation 210, 211, **215**, **218**, 222, 223, 224, 225, 226, 231
- erosion rate 62
- estavelle, Seven Springs Main 164, 168, 170
- Eze-Aku Shale Formation 72
- faults 1, 3
- FEFLOW 48, 50, 55, 91, 92
- Finite Difference (FD) models 90–91
- Finite Element (FE) models 91
- FLUTE MLS 106, 107, 110, 111, 118, 178, 179, 180, 213
- FracDNT disappearance time numerical model 213–215, **217**
- FRACTRAN DFM transport model 120, 121–123, 124, 215, 218, **218**, 219, 220, 221, 228
- fracture networks
 borehole testing 102, 104, 124
 conceptual models (FNCMs) 101
 Watervliet shale 102, 104–125
 revised 117–121, 124
 connectivity 1, 2, 101, 102
 Watervliet shale 103–125
 metolachlor contamination 219, 223–224
 transmissivity 101–102
see also stratiform fractured layer
- fracture spacing 121, 218, 220
- fractured bedrock environments 3
 investigation methods 4
 publications 2, 4
- fractures 1, 3
 Gortinlieve River catchment aquifer 38, 41–42
 in granite weathering 65–67
 in shale 71–78
see also fracture networks
- fracturing 59
see also hydraulic fracturing
- French Guiana, Sparouine mica schist, ERT 194, 195, 199–200, 201, 202
- gamma-gamma logging 180–181, 182, **183**
- geospatial statistical analysis, Eastern Cape Karoo
 groundwater resources 136–137, 139, 142
- geothermal energy 2
- gneiss, weathering profile, ERT 189

- Gortinlieve River catchment aquifer 5, 36–55
 borehole instrumentation 38
 clay minerals 42–43
 ERT 40, 41, 43, 44, 45, 47, 49, 54
 flow simulation 51, 52
 flux simulation 50, 51, 52
 fracture analysis 38, 41–42
 geology 36, 37, 38
 hydraulic properties 40, 43–45, 50
 hydrogeology 38, 39
 methodology limitation 54
 mineral analysis 38–39, 42–43
 MRS 40–41, 45, 46, 47, 48, 49, 54
 numerical groundwater modelling 48–53
 petrography 38–39
 porosity 40, 41, 43, 45, 47, 50, 54
 recharge estimation 41, 48, 50
 residence time simulation 52–53, 54
 resilience to climate variability and contaminants 53–54
 storage properties 45–48
 weathering 42
- Grampian terrane 36, 37
- granite
 grussic saprolite 59, 195
 Saint-Galmier 193–194
 weathering profile
 ERT 195–199
 vertical discontinuity 198–199
 weathering front velocity 65–67
 weathering profile, ERT 189
- GRIBA (Groundwater Resources In Basement rocks of Africa) project 82, 84, 85
- groundwater
 contamination
 hydraulic fracturing 130
 metolachlor 209, 211, 215, 224–225, 226–228
 Eastern Cape Karoo 130–142
 methodology 133–137, 135
 flow and transport 2, 209, 220, 224
 Ivory Coast 11–31
 Mendip Hills 164, 166–167
 Middle Benue Trough, Nigeria 73, 75, 76, 77–78
 Upper Ouémé Basin, numerical modelling 5, 81–98
 Guelph, dolostone aquifer, ATV porosity estimation 177–184
 Guelph Formation 210, 211, 215, 216, 217, 218, 222, 223, 224, 226, 231
- Hana-Lobo Fault Zone 14–15, 30
- Haute Vallée de l’Ouémé (HVO) *see* Upper Ouémé Basin
- Hazell, James Robert Temple (Robin) (1927–2017) 5, 237–243, 238, 242
 Northern Nigeria 240–243
 SE Nigeria 237–238
 SW Nigeria 239
- Heale Sinkhole 163, 164, 166
- heat capacity 62
- Holwell Rising 174
- hydration 59, 60, 64
- hydraulic conductivity
 fracture networks 1, 2, 101, 102
 Gortinlieve River catchment aquifer 40, 43–45, 49
 Mendip Hills karst 164, 166, 171
 Watervliet contaminated shale 103–125
 metolachlor contamination 213, 214, 215, 224–225
 hydraulic fracturing
 Karoo 129
 contamination 130, 131
 induced seismic activity 130
 injected fluids 130
 need for monitoring 129–131
 water demand 130
 hydraulic testing 4, 102
 metolachlor contamination coreholes 213, 214, 215
 hydrocarbon energy 2, 4, 5
 hydrogeology, work of JRT Hazell 237–243
 hydrothermalism 60, 67
- igneous intrusions
 in shale 71
 Middle Benue Trough 71–78
- illite 71
 electrical conductivity 73
 IMPETUS project 82, 84
- India, weathering profiles, ERT 189
- intrusions 3, 5
- Inverse Distance Weighting (IDW) 84, 85, 87, 90
- Ireland
 Gortinlieve River catchment 5, 35–55
 poorly productive aquifers 36
 telogenic karst aquifer 162
 weathering profiles, ERT 189
- iron crust 187
- isalterite 13, 188, 195
- isotope variation
 in granitoid aquifers 14
 Sassandra River lower catchment 19, 26–27
- Itoyo traverse 72, 73, 75, 76, 77
- Ivory Coast, Lower Sassandra groundwater 5, 11–31
see also Sassandra River lower catchment
- Kaapvaal Craton 132
- Kandi fault 82, 84
- kaolinite, in granite weathering 65, 66, 68
- Karoo
 geology 131–133
 hydrogeology 133
 shale gas 129
 exploration applications 133
 hydraulic fracturing 130
 potential 133
see also Eastern Cape Karoo
 Karoo Basin, geology 131–132
 Karoo dolerite suite 132, 133, 134
 Karoo large igneous province 133
 Karoo red-bed sediments 132
 Karoo Supergroup 132–133, 134
 fractured-rock aquifers 133
 karst aquifers 161–162
 drawdown from quarries 161, 162
 eogenetic 162
 Mendip Hills
 conduit flow 5, 161–175
 dewatering, Torr Quarry 166, 167, 169
 dye tracing 167–170, 171–174
 groundwater levels 164, 167
 hydraulic conductivity 164, 166, 171
 telogenic 162
 karst features, as conduits 223

- laminated layer 188
 electrical resistivity tomography 189, 190, 192–193, 197, 198, 201–203
 geophysical modelling 200
- laterite 12, 73, 82, 85, 88
- Lockport Formation 210, 211, **215**, **216**, **217**, **218**, 222, 223, 224, 226, 231
- magnetic field deflection, smectite/dolerite intrusion 73, 74
- magnetic resonance sounding (MRS) 5, 36
 Gortinlieve catchment aquifer 40–41, 45, 46, 47, 48, 49, 54
 Upper Ouémé Basin 84
- Makurdi Sandstone Formation 72
- matrix diffusion 208, 209, 224, 229, 230, 231
- Mediterranean region
 well yields 5, 147–158
 baseline data 148
 pumping scenario simulation 151–157
- Mendip Hills
 conduit flow 5, 161–175
 geology 162–164
 karst aquifer
 dye tracing 167–170, 171–174
 groundwater levels 164
 hydraulic conductivity 164, 166, 171
- metamorphism
 in shale, Middle Benue Trough 71
 stratiform weathered profile 199–200
- meteoric water, in weathering 60
- metolachlor contamination 209–232
 ATV data 218, 219
 borehole geophysics 213
 degradation processes 229
 discrete fracture matrix 218, 219, 223
 field investigation 220–229
 FracDNT disappearance time numerical model 213–215, **217**
 FRACTRAN DFM transport model 215, 218, 219, 220, 221, 228, 229–230
 fracture analysis 219, 223
 fracture dip distribution 223
 fracture frequency 218, 219, 220, 223
 fracture networks 223–224
 hydraulic testing 213, 214, **215**, 224–225
 matrix diffusion 224, 229, 230, 231
 migration 223, 224–225, 226, 227, 228
 MLS groundwater monitoring 213, 220, 224–225, 226, 227
 numerical modelling 213–220, 229–230
 physical and chemical properties 209, **210**
 plume 210, 211, 220, 222, 225, 226, 229–230, 232
 rock cores 211–213, 214
 fracture analysis 219, 223
 physical properties **216**, **218**
 porewater analysis 220–221
 site background and hydrogeology 209–211, 212
 site-conceptual model 230, 231, 232
- mica schist
 Gortinlieve river catchment aquifer 36, 37, 40
 Sparouine 194, 195, 199–200, 201, 202
- migmatites
 Upper Ouémé Basin 84
 weathering profile, ERT 189
- Millstone Grit Group 163
- MLU, pumping simulation 152, 153, 155–156, 158
- MODFLOW, pumping simulation 152, 153, 154, 155–156, 158
- multi-level monitoring systems (MLSs)
 metolachlor contamination 209, 213, 220, 224–225
 Watervliet contaminated shale 104, 106, 107, 109, 116, 118, 121
- mylonite, Sassandra Fault 14
- National Development Plan, South Africa 130
- National Water Act (1998), South Africa 130
- neutron logging 179–181, 182, **183**
- Nigeria
 dolerite intrusions, Cretaceous shale 5, 71–78
 work of JRT Hazell 5, 237–243
- Nikki-Perere complex 84
- non-aqueous phase liquids (NAPLs) *see* dense non-aqueous phase liquids (DNAPLs)
- North Obi traverse 72, 73, 74, 75, **76**
- nuclear waste repositories 2
- ocean lithosphere, heat anomalies 60, 71
- Oju/Obi, dolerite intrusions in shale 71–78
- Old Red Sandstone Group *see* Upper Old Red Sandstone Group
- olivine, serpentinization 59, 60
- Orapu shales 194
- Ordinary Kriging (OK) 84, 85, 90
- Ouémé River catchment *see* Upper Ouémé Basin
- Ouémé trench group 84
- pegmatites, work of JRT Hazell 240, 242
- perchloroethylene contamination, Watervliet shale 103, 104, 109, 113, 114, 115
- permanganate injection, Watervliet contaminated shale 103, 106, 107, 109, 110, 116, 118, 121, 124
- phreatic loops 164
- plume attenuation 208, 209, 220, 229, 230
- plume front retardation, DNAPLs 208, 225, 229
- plumes
 DNAPLs 103, 106, 208, 210, 211, 225
 simulation 101, 122, 123, 229–230
- porosity, and bulk density 179, 180, 181, **183**
- porosity estimation
 ATV amplitude data 177–184
 analysis 180
 gamma-gamma logging 180–181, 182, **183**
 neutron logging 179–181, 182, **183**
 porewater conversion calculations 181–182, 184
 sampling 178–180
- psammite, Gortinlieve catchment aquifer 36, 37, 40
- pumping tests, hard rock aquifers 148
 constant heads boundary conditions 152, 154, 155
 drawdown 148–153
 simulation 151–157
- quarries
 dewatering of karst aquifers 161, 162
 Torr Quarry 166
- recharge estimation, Gortinlieve River catchment aquifer 41

- regolith 1, 12, 59, 60
 - in granitic rock 62, 65
 - rate of production 64
- rock core contaminants
 - metolachlor 209–232
 - Watervliet contaminated shale 105, 107, 109, 111, 113–116, 117, 119, 121
- Saint-Galmier granite, weathering profile, ERT 193–199, 201–203
- saprock 12, 13, 85
 - Sassandra catchment 13, 29, 31
- saprolite 12–13, 59, 60, 85, 187–188
 - electrical resistivity tomography 189–190, 195–199
 - grussic 59
 - Sassandra catchment 13, 17–18, 29–31
 - Upper Ouémé Basin 82, 84, 87–88, 90, 94
 - base 88, 94
 - reference surface 87–88, 90, 94
- Sardinia, hard rock aquifer, pumping tests 148–149, 150
- Sassandra Fault 14
- Sassandra River lower catchment
 - digital elevation model 15, 16
 - geology and morphology 14–15
 - groundwater 11–31
 - boreholes 13, 18
 - carbonate equilibrium 18–19, 25–26
 - connectivity 13
 - hydrochemical sampling 18–19
 - hydrochemistry 18, 19, **20–21**, 22–23, **24**
 - ion analysis 18, 23, 25
 - isotopic analysis 19, 26–27
 - linear yield 13
 - principal component analysis 18, 19, 22
 - regional flow 13
 - saprock 13, 29, 31
 - saprolite 13, 17–18, 29–31
 - typology 27–29, 30
 - vertical flow paths 13, 29
 - weathering 30
 - well yield 27, **28**
 - lineament mapping 15, 19
 - piezometric surface 15, 17
 - satellite imagery 15
- satellite imagery, lower Sassandra catchment 15
- schist, weathering profile
 - ERT 189
 - see also* Birimian schist; mica schist
- serpentinization 59
 - exothermic reaction 61, 66
- Seven Springs 163, 164, 166, 168
- Seven Springs Main
 - conduit flow 171
 - dye tracing 167–170, 172, 174
 - as estavelle 164, 168, 170
- shale
 - Cretaceous
 - Middle Benue Trough, Nigeria 71–78
 - boreholes 73, 75, 77–78
 - geophysical profiles 73, 74, 75, **76**, 77
 - groundwater 73, 75, **76**, 77–78
 - lithology 73, 75, **76**
 - pumping tests 73, 75, **76**, 77–78
 - transmissivity 73, 75, **76**, 77–78
 - fractures 71–78
 - igneous intrusions 71–78
 - metamorphism 71
 - Ordovician, Watervliet, fracture network connectivity 102–125
 - permeability 71
 - shale gas 5
 - Karoo 129, 133
 - hydraulic fracturing 130
 - sinkholes
 - Mendip Hills 164, 165, 166
 - dye tracing 167–170, 171–173
 - smectite 71
 - dolerite intrusions, Middle Benue Trough 72–78
 - electrical conductivity 73, 74
 - South Africa
 - Eastern Cape Karoo, water resources 130–142
 - Karoo shale gas, hydraulic fracturing 130
 - Southern Highland Group 36
 - Spain, granite weathering profile, ERT 189
 - Sparouine, mica schist, weathering profiles, ERT 194, 195, 199–200, 201, 202
 - Stallman model 151–152
 - Stormberg Group 132
 - stratiform fractured layer 59, 187, 188
 - electrical resistivity tomography 189, 192, 195–198, 199, 201–203
 - Sub-Saharan Africa, hard rock aquifers 4–5
 - telogenetic karst 162
 - thermal conductivity 62
 - Thin Plate Splines with Tension (TPST) 84, 85, 90
 - Torr Quarry 163
 - dewatering 166–167, 168, 169
 - dye tracing 171–172
 - tracer tests 4, 36
 - transmissivity 101–102, 147
 - Middle Benue Trough 73, 75, **76**, 77–78
 - Watervliet contaminated shale 107, 108, 116, 117
 - trichloroethene/trichloroethylene contamination
 - Guelph dolostone 178, 179, 181
 - Watervliet contaminated shale 103, 109, 113, 114, 115
 - Turkey, hard rock aquifer, pumping tests 148, 149
- Ugbodun traverse 72, 73, 75, **76**
- ultramylonites 84
- Upper Floridian aquifer, conduit flow 162
- Upper Old Red Sandstone Group 163, 164
- Upper Ouémé Basin 82, 83
 - borehole data interpolation 84–87, 90, 92
 - digital elevation model 82, 89–90
 - electrical resistivity tomography (ERT) 85, 87
 - fractures 88–90
 - and geology 90, 92
 - and hydrogeological parameters 88–90, 91
 - geology 82, 84
 - groundwater level 84, 86
 - groundwater models 84–98
 - hydrogeological parameters 88–90, 94
 - hydrology 82, 84
 - magnetic resonance sounding (MRS) 84
 - migmatites 84
 - numerical modelling 90–98

- Upper Ouémé Basin (*Continued*)
 groundwater discharge 97
 groundwater models 94, 95–98
 model ranking 94–95
 multimodel analysis 94
 steady-state 93, 95
 transient state 93–94, 95
 water balance 97–98
 river discharge 82, 84
 saprolite 82, 84, 87–88, 94
 water resource management 81–82
- Vallis Limestone Formation 163
 vertical discontinuity, weathering profile 198–199
 vinyl chloride 114
 volatile organic compound (VOC)
 porosity and bulk density 180
 Watervliet contaminated shale 103, 107, 109, 111, 112, 113, 114, 115, 116, 118, 121
- Wari Maro complex 84
 water resource management 2, 147
 catchment-scale approach 35
 Eastern Cape Karoo 130, 139, 142
 Middle Benue Trough 78
 Sassandra River lower catchment 11–12, 30
 Upper Ouémé Basin 81–82
- Watervliet contaminated shale, FNCM 102–125
 core analysis 105, 108
 coreholes 103, 104, 106, 107, 108, 111, 116, 119
 DFN flow and contaminant transport 121–123
 DNAPLs 102, 109, 111, 113, 115–116, 118, 121
 FRACTRAN simulation 120, 121–123, 124
 fracture spacing 121
 groundwater sampling 107
 hydraulic head 110–111, 114
 multi-level monitoring systems 104, 106, 107, 109, 116, 118, 121
 open borehole measurements 104, 106–107, 116, 117, 119
 permanganate injection 106, 107, 109, 110, 116, 118, 121, 124
 revised 117–121, 124
 rock core contaminants method 109, 111, 113–116, 117, 119, 121
 transmissivity 107, 108, 116, 117
 VOCs 107, 109, 111, 112, 113, 114, 115, 116, 118, 121
- We We migmatites 84
 weathering front 85
 velocity 60, 61–67, 63
 granite 65–67
- weathering processes 1, 3, 5, 187
 chemical 59–60
 exothermic heat anomalies 60, 67
 exothermic reaction 61–62, 64–67
 and geothermal regime 60–69
 maximum temperature 64–65
 steady state 62–64, 64
 transient state 63, 64, 67–68
 coupled with fracturing 60, 62
 Gortinlieve River catchment aquifer 42
 hard rock aquifers 59–69, 60, 85
 mechanical 59, 65–66, 67, 68–69
 meteoric water 60
 stratiform fractured layer 187
- weathering profile 62–64, 85, 187, 188, 189
 electrical resistivity tomography 5, 189–203
 geophysical acquisition 190–191
 inversion methods 191–192
 Saint-Galmier granite 194–199, 201–202
 Sparouine schist 194, 195, 199–200, 201, 202
- Web of Science Index 2, 4
 well testing 4
 well yield 27, 28, 147–148
- West Africa
 dolerite intrusions 5, 71–78
 double-layer aquifers 12
 Lower Sassandra groundwater 11–31
 water resource modelling 81–98
- West African Craton 11
 Westbay MLS system 106, 107, 116, 213
 Whatley Brook 163, 164, 166
 Whitehill Formation 129
- zeolite, Middle Benue Trough dolerite 73, 78