

Index

acoustic Doppler velocimeters, 160

acoustic Doppler current profilers, 160

ADCP, 92, 204, *see* acoustic Doppler current profiler

ADV, 92, *see* acoustic Doppler velocimeter

aeolian sediment supply

 effect of tidal cycles, 312

 seasonal effects, 328

aeolian transport

 activity parameter, 322

 beach moisture content, 312

 bedload, 308

 concentration profile, 309

 cosine effect, 325

 critical fetch distance, 324

 effect of salts, 314

 effects of flow unsteadiness, 321

 effects of moisture, 312

 effects of pebble lag, 315

 effects of profile slope, 316

 equilibrium transport rate, 311

 fetch effect, 324

 fluid threshold, 307

 impact threshold, 308

 instantaneous transport prediction, 310

 intermittency, 321

 non-equilibrium conditions, 311

 potential sediment supply, 327

 probabilistic threshold, 322

 saltation, 308

 saltation cascade, 324

 saltation load, 308

 sediment flurries, 321

 Shields parameter, 307

 supply limited, 311

 suspension load, 308

 transport events, 327

 wind events, 327

atoll, *see* coral reef geomorphology: atoll

barrier dynamics

 barrier drowning, 381

 barrier evolution, 379

 Great Lakes overwash cycles, 360

 inlet formation, 350

 inundation overwash, 351, 357

 overstepping, 375

 overwash, 350, 354

 overwash fan, 355

 overwash regime, 351–2

 progradation, 379

 response to sea level change, 379

 response to sea level rise, 380

run-up overwash, 351

spit morphodynamics, 370

stages of dune recovery, 358

tidal inlet formation, 366

tidal inlet stability, 367

vegetation and washover healing, 357

washover healing, 356, 362

washover terrace, 357

barriers

 backbarrier sediments, 343

 barrier components, 347

 barrier island form, 364

 barrier island formation, 376

 mainland beach detachment, 378

 shoal aggradation, 376

 spit detachment, 376

 barrier islands, 280, 347, 375

 natural hazards, 381

 cuspatate forelands, 346

 ebb tidal delta, 203

 flood tidal delta, 366

 flying spits, 203

 human impacts, 381–2

 lagoon types, 368

 lagoons, 359, 368

 choked, 368–9

 leaky, 368

 restricted, 368

 littoral sediment budget, 379

 management of transgressive barriers, 383

 morphological classification

 no free ends, 344

 one free end, 345

 two free ends, 347

 spit evolution, 371

 spit platform, 371

 spits, 347

 distal prograding end, 374

 dune ridge curvature, 371, 373

 spit extension, 374

 transgressive proximal end, 374

 transition zone, 374

 tidal inlet channel, 364

 tidal inlet prism, 359

 tidal inlet spacing, 363

 tidal inlets, 359

beach, 230

 beach plan form, 246

 berm, 201

 coarse sand beach, 201

 cobble, 230

 cobble beach, 201, 239, *see* beach: gravel beach

- beach (cont.)
 fine sand beach, 202
 gravel beach, 236
 log spiral, 248
 mixed sediment, 236
 sandy beach, 230, 236
 swash aligned, 246
- beach berm, 265
 height, 266
- beach cusps, 269
 formation, 270
 giant cusps, 269
- beach morphodynamics, 249
 dimensionless fall velocity parameter, 245, 257
 sandy beaches, 263
 temporal scales, 249
- beach morphology, 232, 234
- beach nourishment, 266
 mega-nourishment, 268
 Sandmotor, 268
- beach profile
 barred, 239, 243, 245
 barred profile controls, 246
 equilibrium profile form, 242–3
 measurement, 233
 planar, 243
 sediment size, 242
 sweep zone, 239
 sweep zone and oil spill, 242
- beach sediment budget, *see* littoral sediment budget
- beach slope, 236
- beach stage model, 257, 260, 266
- beach system, 232
- beach video monitoring, 233
 Argus system, 233, 260
- beach water table, 264
- bed elevation measurements, 235
 ultrasonic distance sensor, 235
- bed shear stress waves, 186, 189
- bedforms due to waves, 187
 3D ripples, 189–90
 asymmetric flow regime, 189
 asymmetric ripples, 190
 barred profile, 190
 cross ripples, 190
 lunate megaripples, 189–90
 oscillatory flow regime, 187
 planar profile, 190
 plane bed, 190
 ripples, 187
 rolling grain ripples, 187
 sheet flow, 193
 surface roughness, 191
 vortex ripples, 187
- bluff, *see* cohesive bluffs
- boundary layer
 oscillatory flow, 185
 unidirectional flow, 184
- breaker zone, 15
- cliffed coast
 classification, 478
 definition, 477
 erosion modelling
 COSMOS 2-D, 503
 horizontal platform, 480
 morphological components, 477
 plunging cliffs, 478
 process-response model, 487
- shore platform, 478, 508
 range in form, 510
- shore platform types, 509
- shore platforms
 abrasion effects, 511
 sloping platform, 479
- soft coast erosion, 503
- soft coast erosion modelling
 SCAPE, 503
 Trenhaile, 504
- soft rock shoreline definition, 488
- toe erosion of hard rock, 504
- cliffed coast classification
 recession rate, 487
- cliffed coast erosion, 480
 effect of water level, 483
 effects of rock weathering, 484
- erosion probability, 485
- hydraulic forces, 482
- hydrostatic forces, 482
- measurement of rock strength, 485
- notch and visor formation, 506
- rock resistance, 484
- role of biological agents, 506
- role of cliff height, 508
- Sunamura model, 481
- toe erosion processes, 481
- weathering of hard rock, 504
- weathering rate, 484
- cliffed coast recession
 cliff recession system, 480
 decadal scale, 481
 effect of platform lowering, 487
- hard rock cliffs, 504
- measurement techniques, 486
- recession models, 481
- recession rate, 486
- coastal classification, 15–18
 Davies, 19
 Fairbridge, 18
 Inman and Nordstrom, 17
 Shepard, 17
 Valentin, 18
- coastal dune vegetation
 dune rebuilding, 299
 invasive species, 285
 pioneer plant species, 300

- plant zonation, 300
- vegetation and stability, 284
- vegetation cover, 299
- coastal dunes, 280
 - beach-dune interaction, 330, 333
 - blowouts, 290
 - disturbance, 290
 - dune fields, 203, 290, 293
 - dune sediment budget, 212, 282, 302
 - embryo dune, *see* incipient dune
 - foredune equilibrium, 298
 - foredune erosion by storms, 297
 - foredune evolution
 - beach sediment budget, 331
 - beach stage model, 331
 - conceptual models, 330
 - Hesp model, 333
 - large-scale controls, 333
 - foredune lee slope, 288
 - foredune scarps, 297
 - foredune stoss slope, 288
 - foredunes, 280, 283, 288
 - impeded, 283
 - incipient dune, 289, 301
 - mobile, 283
 - nebkha, 294, 357
 - parabolic dunes, 283, 291
 - sand ramp, 298
 - secondary dunes, 290
 - sediment size distribution, 282
 - shadow dunes, 294
 - transgressive dune fields, 293
 - transgressive dunes, 302
- coastal evolution, 18, 25
- coastal geomorphology, 9
- coastal management
 - sandy beach setbacks, 385
 - setbacks, 384
 - stable beach setback, 385
 - transgressive sandy beaches, 386
- coastal sediment compartments, *see* littoral cells
- coastal systems, 9
- coastal zone, 12
- coastal zone description
 - backshore, 14
 - beach, 13
 - coastal zone, 12
 - foreshore, 14
 - littoral zone, 13
 - nearshore zone, 13
 - offshore zone, 13
 - shoreface, 13
 - shoreline, 12
- cohesive bluff erosion
 - abrasion by sand, 493
 - equilibrium profile, 489
 - mass wasting processes, 502
 - measurement of toe erosion, 497
 - measurement of vertical lowering, 494
 - nearshore erosion, 490–1
 - nearshore erosion rate, 491
 - shear strength of substrate, 493
 - toe erosion, 495, 499
 - vertical lowering, 489–90
 - weathering, 495
 - weathering of substrate, 493
- cohesive bluff recession, 489
- cohesive bluff recession rate
 - effect of beach width, 501
 - surficial sediment cover, 499
- cohesive bluffs, 477, 488
 - distribution, 489
- computational fluid dynamics, 291, 318
- coral organisms, 445
 - calcium carbonate secretion, 445
 - cold water corals, 450
 - rates of carbonate accumulation, 446
 - reef-building corals, 445
 - scleractinian hard corals, 445
 - soft corals, 446
- coral reef disturbance, 466
 - biological causes, 467
 - coral bleaching, 467
 - human causes, 470
 - natural causes, 466
 - physical causes, 467
 - tropical cyclones, 468
 - tsunamis, 469
- coral reef geomorphology, 453
 - atoll response to RSL change, 457
 - atolls, 457
 - fringing reefs, 454
 - Pacific atolls, 457
 - reef island accretion, 461
 - reef islands, 459
 - shallow continental shelves, 455
 - volcanic islands, 457
- coral reef hydrodynamics, 464
 - inlets and flushing, 466
 - seasonal wave climate, 464
 - wave attenuation, 464
 - wave energy and zonation, 464
- coral reefs, 447
 - coastal protection, 451
 - coring, 462
 - distribution, 448
 - facies in uplifted reefs, 462
 - forereef slope, 448
 - framework facies, 462
 - geomorphic resilience, 450
 - Great Barrier Reef, 448
 - physical zonation, 447
 - reef crest, 448
 - response to sea level change, 451
 - response to sea level fall, 452
 - response to sea level rise, 452, 471

- coral reefs (cont.)
 - sedimentary facies, 462
 - vertical accretion, 452
 - vulnerability to climate change, 470
- DEM, *see* digital elevation model
- digital elevation model, 21, 23
- drone, *see* UAV
- echo sounding, 233
- electromagnetic current meter, 160, 195
- equatorial siphoning, 39
- ETRS89, (European Terrestrial Reference System 1989), 32
- Exner equation, 24
- extra tropical storms, *see* mid-latitude cyclones
- fluid properties of air, 303
- forebulge, 41
- geographic information system, 21
- geoid, 39
- GIS, *see* geographic information system
- global climate change, 25
- GLOSS, (Global Sea Level Observing System), 35
- ground penetrating radar, 370
- headland bay beach, 246
- Holocene transgression, 379
- hurricanes, *see* tropical cyclone
- hydrodynamic models, 24
- incipient dunes
 - evolution model, 289
- intertidal zone, 15, 44
- isostatic adjustment, *see* sea level change
- isostatic loading, *see* isostasy
- Lanphere Dunes, 285
- LiDAR, 20, 234, 352, 484, 510
- littoral cells, 201, 213
 - boundaries, 213
 - interruptive boundary, 216
 - Lake Erie, 214
- littoral sediment budget, 211, 213, 371
 - coastal erosion source, 213
 - modelling, 371
 - river source, 212
 - sink, 211, 213
 - source, 211, 213
- littoral sediment gradient, 217, 371, 374
 - ABC model, 217
 - modelling, 218
- littoral sediment transport
 - gross littoral transport, 202
 - net littoral transport, 202, 206
- littoral zone, 231
- longshore sandwaves, 209, 360, 502
- mangrove hydrodynamics, 434
 - effects of vegetation, 434
 - effects on flows, 434
 - reduction of wave energy, 434
- mangrove sedimentation, 434
 - autocompaction, 436
 - organic deposition, 436
- mangroves, 395, 430
 - adaptation to waterlogging, 431
 - classification of systems, 430
 - primary productivity, 398
 - protection against tsunamis, 436
 - river dominated, 430
 - salt ponds, 430
 - species distribution, 430
 - species zonation, 432
 - TSS concentration, 434
 - vegetation, 396
- Mason Bay Dunes, 287
- MEM, 494
- micro-erosion meter, *see* MEM
- mid-latitude cyclones, 59
- Milankovitch cycles, 38
- morphodynamics, 11, 22
 - beach and nearshore, 232
- NAD83, 32
- nearshore and intertidal bars
 - classification, 249
 - controls on dynamic range, 256
 - ridge and runnel, 250
- nearshore bars
 - bar switching, 253
 - bar welding, 260, 266
 - formation, 253
 - formation by cross-shore flows, 254
 - formation by infragravity waves, 253–4
 - inner bars, 252, 256
 - multiple parallel, 250
 - tidal range control, 262
- nearshore morphology, 233
- nearshore sediment size, 238
- nearshore slope, 238
- numerical model, 22
- OBS, 160, 195, 204, 206, *see* optical backscatterance sensors
- oil spill, 241
- optical backscatterance sensor, *see* OBS
- optical luminescence, 36
- particle image velocimetry, 160
- pressure bulge, *see* forebulge
- reductionist approach, 21–2
- rips, *see* surf zone circulation
- saltmarsh erosion
 - erosion cycle model, 423
 - erosion cycles, 422–3

- modelling, 422
- wave attack, 422
- saltmarsh hydrodynamics, 406
 - effects of vegetation, 408
 - flow modelling, 409
 - flows in tidal creeks, 406
 - flows over marsh surface, 408
 - wave reduction, 409
- saltmarsh sedimentation, 410
 - annual, 417
 - autocompaction, 411
 - decadal, 420
 - decadal scale, 419
 - effects of winter ice, 417
 - measurement of accretion, 413
 - models, 415
 - organic accretion, 411
 - rate of deposition, 414
 - sediment budget, 410–11
 - sediment erosion table, 413
 - spatial patterns, 416, 418
 - tidal cycles, 413
 - trap measurements, 414
 - TSS concentration, 413, 417
- saltmarshes, 395
 - annual mass balance, 422
 - distribution, 398
 - effects of sea level rise, 425
 - evolution, 400, 404
 - high marsh, 398
 - low marsh, 400
 - managed realignment, 426
 - Cumberland Basin, 427
 - minerogenic, 396
 - morphology, 398
 - organogenic, 396
 - primary productivity, 398
 - RSLR and coastal squeeze, 426
 - sediment sources, 404
 - tidal creek evolution, 405
 - tidal creek network, 405
 - vegetation, 396
 - vegetation zonation, 398
- satellite mapping, 234
- SBEACH, 23
- sea level, 32
 - ellipsoid model, 32
 - geoid model, 32, 34
 - mean sea level, 32, 36
 - measurement, 35
 - satellite altimetry, 35, 65
- sea level change, 31–2
 - Bruun rule, 25, 67
 - decadal, 56
 - eustatic, 31, 36, 38
 - forecast sea level rise, 68
 - historic, 36
 - Holocene transgression, 31, 38–9, 41
 - hydro-isostasy, 40–1
- isostatic, 36, 42
- regression, 31
- sea level rise, 63
- seiche, 61
- shoreline recession, 67
- storm surge, 56, 358
- storm surge models, 58
- tectonic, 40
- transgression, 31
- sediment transport, 24
 - cross-shore, 184, 194
 - direction indicators, 202
 - energetics approach, 199
 - fluorescent tracers, 207
 - longshore transport, 184, 200, 202
 - beach drifting, 200–1
 - longshore currents, 200–2
 - rip current effects, 200
- suspended sediment concentration profile, 195, 198
- suspended sediment transport, 195
- threshold of motion, 186
- transport rate, 198
- sediment transport by waves, 184
- sediment transport measurement
 - fluorescent tracers, 204
 - radioactive tracers, 204
 - RFID tags, 205
 - sediment tracers, 204
 - streamer traps, 205
- sediment transport models
 - Baillard, 199–200
 - Bowen, 199
 - Delft3D, 218
 - SBEACH, 199
 - wave tanks, 200
- sediment transport models, 199
- sediment transport rate, 200
- self-organisational models, 170
- shoaling zone, 14
- shore platform, *see* cliffted coast: shore platform
- shoreface, 184
 - inner, 231
 - outer, 231
- shoreline change, 11
- shoreline mapping, 19
- stilling well, 35
- structure from motion, 484
- surf zone, 15, 130, 158
 - barred, 161
 - planar, 158
- surf zone circulation
 - boundary rips, 169
 - channelised rips, 167
 - drogue tracking, 160
 - feeder currents, 165
 - longshore current, 174
 - barred, 175
 - longshore current speed, 174
 - mass transport, 158

- surf zone circulation (cont.)
 - measurement, 159
 - planar, 161
 - planar rips, 167
 - rip cell, 164
 - rip cell spacing, 170
 - rip channel, 164
 - rip current, 164
 - rip current hazards, 172
 - rip head, 164
 - rip neck, 164
 - rip speed, 169
 - rips, 164
 - shear waves, 177
 - undertow, 158, 161, 171, 184, 195, 256
 - undertow speed, 158, 163
 - wind-driven currents, 177, 184
- swash zone, 15
 - backwash, 143
 - run-up, 143
 - swash, 143
- template models, 170
- thermo-luminescence, 36
- tide gauges, 35
- tides
 - amphidrome, 53
 - astronomical tides, 44
 - diurnal, 45
 - dynamic theory, 52
 - equilibrium theory, 48
 - harmonic analysis, 51
 - hypertidal, 47
 - meteorological tides, 44, 55
 - neap tide, 49
 - semi-diurnal, 45, 49
 - spring-neap cycle, 45
 - spring tide, 46, 49
 - tidal bore, 55
 - tidal currents, 177
 - tidal range, 44–6, 54
 - tidal type, 45
 - tidal wave, 48, 52
- total suspended solids, *see* saltmarsh sedimentation:TSS
- tropical cyclone, 59
- typhoons, *see* tropical cyclone
- UAV, 235
- undertow, *see* surf zone circulation
- washover fan, *see* barrier dynamics: overwash fan
- wave analysis, 93
 - energy density spectrum, 98
 - frequency domain, 96
 - mean wave height, 95
 - RMS height, 96
 - significant wave height, 96
 - spectral analysis, 96
- time domain, 93
- variance spectrum, 98
- wave climate, 106
- wavelet analysis, 101
- zero crossing, 93
- wave breaking, 128, 183
 - breaker height, 129
 - breaker indices, 135
 - breaker types, 131
 - breaker zone, 129
 - collapsing breaker, 134
 - deep water, 128
 - edge waves, 151
 - harmonic waves, 140
 - infragravity waves, 149
 - plunging breaker, 132, 158
 - radiation stress, 174
 - reflection, 140
 - saturated surf zone, 139
 - shallow water, 129
 - spilling breaker, 131, 158
 - surf bore, 137
 - surf scaling parameter, 135
 - surging breaker, 134
 - vortical motion, 137
 - water depth, 129
 - wave set-up, 148
- wave description
 - amplitude, 76
 - capillary waves, 79–80
 - celerity, 76
 - deep water length, 113
 - deep water wave, 78
 - definition, 76
 - edge wave, 170
 - energy density, 117
 - frequency, 76
 - group celerity, 117
 - height, 76
 - infragravity waves, 80, 195
 - length, 76
 - linear wave profile, 111
 - maximum orbital velocity, 115
 - mean water level, 76
 - orbital diameters, 115
 - orbital motion, 76
 - period, 76
 - power, 117
 - pressure fluctuations, 116
 - sea, 79
 - shallow water L, 113
 - still water level, 76
 - Stokes drift, 119, 158, 184
 - surface gravity waves, 76, 81
 - swell, 79
 - tsunami, 144
 - wave energy flux
 - longshore component P_L , 207

- wave generation
 - dispersion, 84, 112
 - energy spectrum, 82
 - event duration, 81
 - fetch length, 81, 86
 - fully arisen sea, 85
 - spectrum, 80
 - wave growth, 82
 - wave spectrum, 91
 - whitecapping, 84, 129
 - wind speed, 81
- wave measurement, 86
 - direction, 91
 - pressure transducers, 89
 - remote sensing, 93
 - wave staffs, 89
 - wave-rider buoy, 92
- wave prediction, 101
 - direction, 104
 - forecasting, 101
 - hindcasting, 101
 - JONSWAP, 102
 - SMB method, 102
 - SWAN, 103
- wave shoaling, 122–3
 - diffraction, 126
 - MIKE 21, 128
 - orthogonals, 122
 - radiation stress, 147
 - refraction, 122, 125, 371
- Snell's law, 127
- STWAVE, 128
- wave refraction, 373
- wave set down, 147
- wave theory, 110
 - Airy (linear), 110
 - applicability, 120
 - cnoidal, 120
 - Stokes second-order, 118
 - trochoidal, 120
 - wave potential function, 111
- wetland ecosystem, 395
- WGS84, 32
- wind flow
 - bed shear velocity, 305
 - boundary layer profile, 303
 - coherent flow structures, 322
 - drag by plants, 317
 - flow separation, 319
 - flow unsteadiness, 319
 - Reynolds shear stress, 323
 - roughness elements, 306
 - roughness length, 303
 - sonic anemometers, 323
 - speed up, 317
 - topographic effects, 317
 - topographic steering, 318
- XBEACH, 23