

Index

- Acacia*, 49, 308, 315, 337, 370
 adaptation, 384, 468
 human, 448
 adobe, 460
 adsorption, 207, 209
 aeolian processes, 29, 34
 aerosols, 17, 240, 247
 Afghanistan, 351, 361, 367
 Africa
 Central Sahara, 303
 East, 308
 Guinea Coast, 304
 Northern, 301
 Sahel, 304
 Soudan, 304
 Southern, 315
 African Easterly Jet, 79, 244, 246, 250, 295,
 305–06, 421
 African Easterly Waves, 250, 306
 agriculture, 453
 Air, 302
 air masses, 258, 341
 albedo, 100, 103, 105–07, 157, 166, 176, 411,
 433, 443
 Aleutian Low, 87, 257, 356
 alluvial fans, 7, 25
 Altay Mountains, 358, 365
 American Southwest, 191, 257, 272, 451
 American West, 458, 500
 Amu Dar'ya River, 361, 364, 367, 463
 Andes, 275–76, 286, 378
 annual cycle, 6, 246, 258, 265, 290, 301, 303,
 305, 310, 330, 344, 397
 annual range, 157, 159, 165, 263, 268, 272,
 286–88, 297, 304, 313, 327, 330–32, 335,
 368, 379, 384, 389–90, 392, 396, 400
 anthropogenic effects, 105, 247, 413, 493
 anticyclones, 316, 340, 346, 356–57, 365, 375
 aquifer, 212, 223, 329, 456
 Arabian Desert, 240, 301
 Arabian Peninsula, 330, 499
 Aral Sea, 463
 architecture, 450–53
 adobe, 450
 sod house, 451
 subterranean housing, 451
 traditional housing, 450
 wall thickness, 451
 arid regions, 4, 11, 29
 aridisols, 270
 aridity, 155
 causes, 70, 310, 367
 definitions, 151
 eastern Africa, 310
 extreme, 142
 factors, 375
 indices, 151
 Meigs, 151
Aristida, 49, 337
 arroyos, 14, 219
Artemisia, 268, 328, 331–32, 366, 368, 469
 Asia
 Afghanistan, 367
 Caspian Lowlands, 366
 Central Kazakhstan, 363
 climate, 353
 Eastern Siberia, 364
 Gobi Desert, 360
 Iran, 367
 Karakum Desert, 364
 Kyzulkum Desert, 361
 Takla Makan, 360
 Tarim Basin, 360
 Thar Desert, 369
 Tsaidam basin, 361
 Turkestan Desert, 364
 Asian monsoon, 74, 351, 354, 356, 358
 Aswan High Dam, 177, 465
 Atlantic Multidecadal Oscillation, 97
 Atlantic Ocean, 70, 91
 Atlas Mountains, 91, 301, 323, 325, 330, 420,
 425
 atmospheric circulation, 67
 Australia, 342
 seasonal change, 75, 85
 upper air patterns, 76
 atmospheric gases, 67
 Australian desert, 337
 Australian monsoon, 339, 346
 Azores High, 257
 Azores/Bermuda High, 271, 294, 323, 363,
 366–67, 399
 Bagnold, 39
 Baja California, 207, 258, 272, 376, 394–95,
 397
 bajadas, 25, 270
 baobab, 295
 Basin and Range desert, 269
 basin-and-range deserts, 24
 beetles, 169, 479–80
 belg rains, 312
 Benguela Current, 318, 320, 385, 388
 Benguela Jet, 394
 Benguela Niños, 385
 berg wind, 233, 394
 Bernoulli effect, 30, 453
 biogeophysical feedback, 411
 biological adaptation, 468, 476
 biological crusts, 105, 208, 215
 biomass, 49, 170
 biomass burning, 250
 biomes, 46, 51, 57, 155, 283
 biota, 169–70
 bistability, 61
 Bodélé Depression, 240, 305
 Bodélé Jet, 305
 body temperature, 476–77
 Bolivian High, 279
 Bonneville, 173
 salt flats, 107, 231
 Botswana, 58, 173
 Bouchet's hypothesis, 128, 143
 boundary forcing, 410, 492–93, 495
 boundary layer, 134, 143–44, 176, 266, 379
 Bowen ratio, 105, 115, 130, 176
 bush encroachment, 438
 bushfire, 349
 cactus, 49, 270, 384
 organ pipe, 181
 Saguaro, 181

- caliche, 26, 42, 137, 270
 California current, 394, 399
 campos, 289
 Canaries current, 399
 canopy, 109–10
 canopy conductance, 133, 136
 canopy interception, 140
 canopy patches, 185, 216, 225
 canopy resistance, 134
 capillary water, 125
 carbon dioxide, 55, 108, 143, 495
 carbonate, 138, 462
 Caribbean low-level jet, 291
 Caribbean waves, 291
 Caspian cyclones, 362
 Caspian Lowlands, 351, 366
 Caspian Sea, 361, 367–68
 Casuarina, 337, 339
 catastrophic change, 50, 61
 Central Asia, 351, 354–55, 357
 Chaco, 275, 282, 288
 Chaco Low, 279
 chaparral, 399
 Charney, 411, 432–33, 443, 495
Chenopodiaceae, 49, 268, 368
 Chenopods. *See* *Chenopodiaceae*
 Chihuahuan Desert, 152, 191, 269, 395, 500
 Chilean-Atacama desert, 207
 China, 356–57, 432, 436
 chinook, 232
 chotts, 27, 174
 clay, 30, 42, 117, 126, 219, 234
 climate, 0001,
 change, 3, 24, 285, 482
 classification, 152, 156
 controls, 309, 367
 extremes, 6
 historical fluctuations, 500
 Climatic Optimum, 497
 climatic variability, 96, 482, 485
 causes, 492
 climatology, 119, 122
 clothing, 448
 cloud cover, 115, 163, 264, 287, 326, 333, 364,
 383–84, 400
 cloud forests, 207, 384
 cloud seeding, 459
 cloudiness, 267–68, 288, 304, 307, 314, 317,
 332, 334–35, 343, 363, 368, 371, 376, 382,
 390, 400
 coastal deserts, 374
 Coastal Deserts
 Namib Desert, 384
 Peruvian-Atacama Desert, 377
 Western North America, 394
 Western Sahara, 399
 coastal jets, 275, 374–75, 379
 coefficient of variation, 196
 cohesiveness, 33
 cold fronts, 276, 280, 282, 312, 333, 347–48,
 356, 362, 420
 cold outbreaks, 316, 325, 327
 cold surges, 231, 282, 358, 360, 362
 Colorado River, 465
 comfort, 448–49
 competition, 60
 condensation, 71, 166, 457, 459
 conduction, 100, 103, 110, 163, 468
 Congo air boundary, 294, 309, 312, 316
 continentality, 364
 convection, 100, 103, 110
 convective rainfall, 188, 260, 271, 290, 317, 326
 convergence, 298, 312
 cooling mechanisms, 448
 corals, 486
 Coriolis force, 67, 73, 87
 creosote, 139, 284
 crust, 226
 crusts, 8, 173, 216, 270, 387
 cut-off low, 93, 282, 316, 324, 346, 388
 cycles, 199, 414
 cyclogenesis, 257, 357
 cyclones, 331, 361, 363, 421
 extra-tropical, 87, 258, 286, 316, 324,
 354–55, 357, 360–61, 365, 367, 370,
 374, 397
 Mediterranean, 330, 333, 361, 366
 tropical. *See* tropical cyclones
 Cyprus Lows, 333
 daily rainfall, 188, 191
 dams, 418, 458, 463
 Danakil Desert, 308, 374
 Darfur, 301–02
 data
 availability, 189
 GHCN, 8, 189
 in situ, 8
 NCEP, 8
 precipitation, 8
 text sources, 8
 Death Valley, 158, 163, 174, 463
 deposition, 235
 depression tracks, 257
 desalinization, 418, 465
 desert, 46
 Asia, cold, 357
 climate, 172
 crusts, 7
 depression, 171, 173
 inhabitants, 476
 lakes, 177
 lowlands, 26
 microclimate, 162
 mid-latitude, 6, 154
 oases, 176
 pavement, 26–27
 pavements, 33–34
 soils, 11, 42
 survival, 476
 uplands and slopes, 25
 uplands and steppes, 24
 varnish, 11, 27
 vegetation, 49
 desertification, 3, 293, 495
 causes, 436
 controversy, 434–35
 definition, 435
 global inventories, 441
 history, 434
 impact, 442
 indicators, 441
 issues, 431
 manifestations, 437
 measurements, 442
 monitoring, 441–42
 prevention, 444
 reversibility, 439
 susceptibility, 435
 deserts
 low-latitude, 426
 temperate-latitude, 47
 detention, 124, 132
 detritus, 169, 388, 479
 dew, 166, 168, 207–08, 330, 332–33, 335,
 363–64, 383, 397, 457
 diagonal cloud bands, 88, 280, 317–18, 339, 388
 diffuse radiation, 67, 106
 diffusivity, 142
 dishpan experiments, 68
 distillation, 124, 126
 disturbance, 60–61, 78, 439
 diurnal cycle, 95, 266
 diurnal range, 157, 159, 163, 167, 264, 268,
 272, 286–88, 297, 304, 313, 327, 330–32,
 334–35, 355, 364, 366, 368, 371, 376, 379,
 384, 390, 392, 396, 401
 divergence, 28, 70, 83, 95, 276, 308–09, 311,
 370, 374
 downbursts, 265
 downdraft, 250, 419–20
 drainage, 28, 337
 drainage density, 28, 219
 drizzle, 380, 400
 drought, 266, 290, 318, 349, 369, 434, 495
 agricultural, 408
 biogeophysical feedback, 411
 causes, 410
 characteristics, 413
 definition, 407
 duration, 413, 425
 forecasting, 504
 human origin, 411
 hydrological, 408, 410
 impact, 415
 indices, 408–10
 management, 415, 417
 meteorological, 408–09
 monitoring, 418
 prediction, 414
 Sahel, 293
 societal response, 416
 types, 408
 drought resistant species, 470
 dry season, 50, 85, 151
 dry spells, 157, 203
 dryland
 classification, 4
 climate, 156
 definition, 3
 extent, 4
 global distribution, 83
 patchiness, 59–61
 physical features, 6
 precipitation, 188, 206

- research institutes, 8
 soils, 41
 streams, 218
 vegetation, 46
 dryness ratio, 47–48, 115, 152, 154
 dunes, 34–41, 235, 270, 285, 330, 332, 364, 368, 370, 387, 393, 436
 barchan, 36–37, 167, 361, 364, 384, 387
 complex forms, 37
 crest, 169
 feedback, 40
 habitats, 169
 linear, 35, 169, 387
 moisture conditions, 168
 plinth, 166, 168–69
 slipface, 166–68
 star, 35, 387
 thermal environment, 166
 transverse, 35, 37, 387
 types, 35
 wind and transport, 166
 dunes habitats, 170
 duricrust, 26
 dust, 291, 305, 327, 335, 351, 360–61, 371, 382
 African, 248
 characteristics, 240
 composition, 243
 global sources, 239
 impacts, 247–48
 long distance, 245
 mobilization, 30
 modelling, 247–48
 monitoring, 239
 radiative effects, 248
 size, 243
 sources, 240, 245
 Dust Bowl, 243, 266, 416, 433
 dust devil, 236–39, 332, 348, 422
 motion, 237
 dust haze, 239–40, 243, 422
 dust mobilization, 234
 dust storms, 235, 239–40, 243, 303, 305, 332, 335, 348, 360, 362, 366, 369, 371, 420–21, 424
 impact, 422

 earth system, 0003, 15
 East Africa, 93, 200, 308
 East African highlands, 94, 301
 easterlies, 69, 316, 346
 easterly waves, 79, 91, 246, 271, 282, 297, 303
 eastern Siberia, 351, 364
 ecohydrology, 212
 eddy correlation, 130
 Ekman transport, 375
 El Niño, 96, 260, 266, 278, 281, 289–90, 313, 318, 328, 333, 347, 357, 361, 369, 380, 398, 411, 415, 493–95
 El Niño-Southern Oscillation, 96, 493, 504
 endogenous streams, 218
 energy balance, 15, 59, 128, 130, 176
 energy supply, 460
 environmental conditions, 48, 56
 ephemeral streams, 219
 ephemerals, 49, 468–69, 472

 equatorial trough, 73
 equatorial westerlies, 73
 equatorial westerly jet, 308
 ergs, 34, 302, 329, 368
 erosion, 25, 32–33, 418, 437–38, 458
 espinal, 275, 282, 288
 etesian, 232
 Ethiopian highlands, 222, 298, 308, 311
 eucalyptus, 337
 euphorbia, 49, 399
 evaporation, 118, 132, 165, 176, 226
 evaporative cooling, 448, 453, 460
 evaporites, 268, 463
 evapotranspiration, 115, 119, 129, 137, 141, 216
 aerodynamic methods, 130
 beta method, 131
 dryland, 134–42
 methods based on potential
 evapotranspiration, 131
 regional, 143
 temporal variability, 139
 turbulent transfer methods, 130
 vegetated surface, 132
 water balance method, 119, 129
 exchange coefficients, 130
 exogenous streams, 219, 222, 456
 exploration, 3
 extreme temperature, 158

 facilitation, 59–60
 factors governing climate, 492
 Famine Early Warning System, 419
 fauna, 168
 feedback, 41, 46, 59, 105, 138, 144, 216, 250, 412, 433, 443, 495
 field capacity, 116, 131–32
 field program, 8, 135
 fire, 50, 250–51, 349, 398, 407
 fishing, 454, 464
 floodplain, 26, 28, 455
 floods, 91, 93, 157, 174, 178, 194, 220, 316, 333, 367, 387, 398, 407, 424–26
 fluvial processes, 29
 fluxes, 14, 104, 126, 130, 143, 145, 184
 foehn winds, 232, 286–87, 328, 362, 365, 383
 fog, 207, 268, 285, 287–89, 291, 298, 304, 332–34, 363–64, 371, 377, 379, 383–84, 385, 390, 393, 396, 400
 fog deserts, 374, 382, 398
 fog oases, 207, 374, 379, 384
 fog water, 168, 470, 479
 friagem, 282
 friction, 94–95, 108
 friction velocity, 31, 37
 frictionally-induced divergence, 273, 276, 291, 309, 311, 374–75, 378
 frontal rainfall, 188, 220, 260, 271, 317, 346–47
 frost, 29, 284, 287, 289, 330, 334, 348, 364, 368, 398, 486
 fynbos, 315

 gamma distribution, 191, 196
 garua, 380, 382–83
 general circulation models, 247, 495, 504
 geographic controls, 257

 Geographical Information Systems (GIS), 18
 Geostationary Operational Environmental Satellite (GOES), 17
 geostrophic motion, 68
 Ghor, 333, 335
 global temperature, 497
 global warming, 495
 Gobi Desert, 85, 351, 357–58, 360
 grassland, 42, 46, 83, 156, 262, 268, 283, 286, 289, 308, 315, 323, 337, 365–66
 grazing, 105, 436, 454
 Great Basin, 226, 257–58, 271
 climate, 268
 Great Plains, 84, 258, 271, 413, 416, 497, 500
 precipitation, 268
 green belts, 444, 460
 greenhouse gases, 495
 ground temperature, 162, 363
 groundwater, 124–25, 142, 172, 213, 220, 223, 456
 recharge, 223
 growing season, 48, 416, 440
 Guinea Coast, 304
 dry zone, 305
 Gulf of California, 269, 271
 Gulf of Mexico, 258, 266, 269, 271
 gullying, 32

 habitats, 166–67
 haboob, 305, 330, 419
 Hadley circulation, 69–70, 78, 83, 295
 hail, 264, 268, 284, 287, 317, 348, 363, 371
 halophytes, 50, 289, 331, 360, 468
 hammada, 26, 329, 361
 HAPEX-Sahel, 224
 Harmattan, 231, 244, 294, 307, 491
 heat balance, 101–05, 476
 human, 448
 heat low, 294, 323, 339, 358, 420
 heat stress, 449
 heat transfer, 110
 heat waves, 327, 347, 420
 heterogeneity, 135, 143–44, 225
 Heug weather, 400
 high pressure, 69–70
 highlands, 92
 Himalayas, 497, 503
 Hoggar, 93–94, 231, 301–02
 Holocene, 496–500
 Horn of Africa, 84, 308
 human systems, 0002,
 Humboldt current, 378, 380, 382
 humid regions, 28, 41, 119
 humidity, 93, 125, 174, 177
 hummock grasses, 387
 hummock grassland, 337
 hurricanes, 282
 hydraulic conductivity, 125
 hydraulic gradient, 125
 hydroclimatology, 0006,
 hydrology, 15, 129, 156, 212, 216

 Ice Age, 435, 493, 496
 Icelandic Low, 87, 257, 356
 India, 83, 357, 499

- Indian Ocean, 503
infiltration, 59–60, 124, 219
influence of man, 495
inselbergs, 7, 388
instability, 157, 164, 237
interannual variability, 272, 307, 312, 328, 347, 369, 380, 389, 398, 421, 440, 484, 493
inter-anticyclonic fronts, 345
intercanopy space, 59, 61, 185, 216, 225
interception, 59, 124
interdune corridor, 168–69
interflow, 124, 214
intermontane region, 257–58, 267, 272
interstorm periods, 140
Intertropical Convergence Zone, 69, 71, 75, 85, 92, 275–76, 289, 293, 298, 379, 400
intraseasonal variability, 226
inversion, 175, 244, 315, 383, 400
inversion layer, 316, 356, 377, 379, 395
Iran, 367
Iranian Desert, 11, 354, 367
irreversible change, 62
irrigation, 455–58, 496
islands of fertility, 59, 217
Israel, 194, 235, 333
- jet streak, 79
jet stream, 77, 97, 270, 276, 342, 354, 367, 397, 411
Joshua tree, 270
- Kalahari, 423, 433, 454, 460, 499
Karakum Desert, 361–62, 364, 463
karoo, 46, 315
Kavir, 11, 367
Kazakhstan, 357, 363
Kelvin wave, 92
khamsin, 232, 303, 334, 420
Kuiseb River, 387
Kyzulkum Desert, 361, 364
- La Niña, 96, 278, 289, 313, 318, 333, 347, 369, 411, 494, 504
La Plata Basin, 282–83
lake basins, 26–27
Lake Chad, 177, 302, 489
lake cores, 497
Lake Eyre, 224, 337, 339, 343
Lake Malawi, 491
Lake Ngami, 486
Lake Victoria, 95, 132, 222–23, 502
land degradation, 3, 25, 432–33, 435–36, 440, 458
land use, 13, 436, 439
land–atmosphere feedback, 495
lapse rate, 110, 164, 237
late glacial maximum, 497
latent heat, 92, 100–01, 105, 115, 142, 173
latent heat of vaporization, 115
leaching, 43, 462
leaf area index (LAI), 109, 184
leaf conductance, 136
leaf drip, 59
leakiness, 218
lee depressions, 324
- lichen, 387, 476
life forms, 46
Little Ice Age, 496
local winds, 231–33, 362, 420
log law, 108
loma, 384
Loma, 232
long rains, 202, 310, 312, 484
low-level jets, 80, 266, 271, 342, 394–95
- Madden–Julian Oscillation, 97, 281, 311, 369
maritime influence, 275, 278, 284, 287, 355, 379
maximum temperature, 50
Medieval Warm Period, 496
Mediterranean and Middle East
 Arabian Peninsula, 330
 Iraq, 335
 Israel, 333
 Jordan, 335
 Lebanon, 335
 Near East, 332
 Northern Sahara, 328
 Syria, 334
 Turkey, 332
Mediterranean climate, 323, 332–33, 394–95
Mediterranean depressions, 335, 354
Mediterranean forest, 53–54
megadrought, 416
megaripples, 35
Meigs, 154
mesoscale convective complexes, 301
mesoscale convective systems, 87, 188, 258, 265, 271, 281–82, 305–06
mesoscale systems, 67
mesquite, 49, 223, 472
Mexico, 207, 257–58, 269, 271–72
microcatchments, 458
microclimate, 107, 109, 162
 dunes, 166
 moisture, 165
 Sahara, 170
 savanna, 180
 tropical savanna, 184
 woodland, 184
Middle Asia, 351–52, 357, 361
Middle East, 84, 422, 432
mid-latitude depressions, 345, 347
Milankovitch cycles, 492, 496
minimum temperature, 165, 314
mining, 453–54, 461–62
miombo, 315
mist belts, 93, 207
MODIS, 11
moisture, 0004, 4
 availability, 50, 54
 profile, 165, 216
 regime, 379
 sources, 268, 270
 supply, 48, 176, 455
Mojave Desert, 56, 152, 191, 237, 269, 398, 500
mollisols, 42, 262
Mongolia, 356–58, 360
monsoon, 367, 371
monsoons, 70, 74
Monte Desert, 283–84
- mopane, 315
mountain-valley breezes, 94, 384
Mt. Kenya, 93, 298, 308
Mt. Kilimanjaro, 94, 298, 308
- Namib Desert, 384, 474
nara, 474–75
Near East, 332
nebkhas, 387
Negev, 105, 168–69, 209, 332–34, 442, 455, 477
net primary production, 55, 57, 442
net radiation, 100–01, 115, 127–28, 152, 157, 176, 411
Niger River, 221–22, 456, 463
Nile River, 221–22
nocturnal rainfall, 95, 265–66, 270, 282, 306
nomads, 455
Nordeste, 289
Normalized Difference Vegetation Index, 12–13, 419
North America, 504
 Chihuahuan Desert, 269
 Great Basin, 267
 Great Plains, 260
 Mojave Desert, 269
 regions, 258
 Sonoran Desert, 269
 west coast, 394
North American drylands, 257, 272
North American monsoon, 269, 271
North Atlantic Oscillation, 96, 240, 328, 357, 363, 369
North Pacific High, 257–58, 269, 271, 394
Northeast Brazil, 95, 276–77, 501
Northeast Brazil Low, 279
nutrient recycling, 46
nutrients, 42, 50, 54, 60, 217, 240, 422, 439–40, 468, 479
- oases, 175, 462
oasis effect, 176
ocean currents, 71, 87
organic matter, 43, 51, 57
overgrazing, 412, 431, 458, 495
overland flow, 32, 213–14, 220
- Pacific North American pattern, 96
Pacific Ocean, 70
Palmer Drought Index, 409
Pamir, 359, 361
Pamir–Alay Mountains, 94
Pampa de la Joya, 9, 163, 383
pampas, 282, 289
pans, 11, 27, 128, 171, 463
passive cooling systems, 460
pastoralists, 417, 434, 454–55
Patagonian Desert, 84, 277, 283–84, 286
patch dynamics, 61
patchiness, 216, 439
patterned ground, 27
peak flow, 222
pediments, 7, 25
Penman equation, 128, 132
Penman–Monteith, 129, 134

- percolation, 124, 213
 perennials, 474
 persistence, 199–200, 485
 Peru, 287, 380, 497
 Peruvian jet, 376
 Peruvian-Atacama Desert, 275, 277–78, 375, 377
 pH, 43, 51
 photosynthesis, 55
 photosynthetic pathways, 56, 135
 photosynthetically active radiation, 12, 55
 phreatophytes, 49, 472
 physical characteristics, 24
 piedmont, 24–25
 Pinnacle Desert, 34
 plant adaptations, 468
 plant temperature, 180
 plant–water relationships, 54
 playas, 27, 171, 173, 224, 235, 270, 305, 462
 Pleistocene, 496–500
 plinth, 170
 pluvial, 496–97, 500
 pluvial lakes, 267
 potential evapotranspiration, 117, 127, 132, 143, 157
 assessing, 128
 prairie, 46, 260, 272, 398
 precipitation, 83, 115, 118, 366, 497
 interannual variability, 317
 intra-seasonal variability, 203
 spatial variability, 200
 temporal variability, 195–96
 predictability, 414
 predicting climate change, 504
 pressure systems, 67, 69
 primary production, 46, 437
 productivity, 57, 59, 134, 437
Prosopis, 49
 proxy records, 485
 pulses, 224–26
 Puna, 275, 283, 287
- Qaidam Desert, 351
 Qattara Depression, 174, 177, 460, 463, 486
- radiation, 100, 107, 109, 184, 448, 468
 radiation balance, 433
 radiation-limited, 127
 environment, 142, 156
 rain events, 226
 rain harvesting, 418, 455–56, 458
 rain shadow, 83–84, 276, 284, 367, 370, 374, 383
 rain splash, 32, 439
 rain-bearing systems, 85
 rainfall, 157, 170, 264–65, 267–70, 272, 285–88, 297, 304, 309, 311, 316–17, 324, 330, 334–35, 353, 361, 363–65, 368, 377, 379, 383–84, 388, 397, 400, 421,
 See precipitation
 frequency distribution, 189
 rainfall events, 204, 217
 rainfall gradient, 61, 258, 284–86, 329, 374
 rainfall regime, 188, 285
 rainfall seasonality, 85
- rainfall variability, 49, 196
 rainfall–dust storm relationship, 421
 rainfed cropping, 455
 rain-use-efficiency, 57, 442
 rainy season, 51, 85, 157, 195, 203, 301, 325
 Rajasthan Desert, 370
 recycling, 413, 418, 495
 Red Sea, 310, 331
 Red Sea Trough, 323
 reflectance, 12
 reflectivity, 12, 106, 173
 reg, 7, 26, 329
 regional evapotranspiration, 129
 regional wind systems, 327
 regosols, 370
 relative humidity, 84, 108, 264, 286–89, 304, 314, 320, 330, 334, 348, 362, 364, 366, 368, 390, 397–98, 401, 449
 remote sensing, 9
 data, 16
 dust, 18
 dust, smoke, fire, 16
 environmental, 11
 geology, 11
 hydrology, 15
 land use, 13
 rainfall monitoring, 15
 surface characteristics, 15
 vegetation, 12
 resilience, 440–41
 resistance, 143–44, 440
 reversing dune, 37
 Richardson number, 230
 riparian valleys, 175, 178
 ripples, 35
 river beds, 388
 rivers, 302
 Rocky Mountains, 257, 265
 root depth, 49, 60, 131, 216
 roughness, 11, 108, 173, 216, 230, 237, 241
 roughness elements, 32
 runoff, 115, 118–19, 124, 213–18, 226, 455
 controls, 215
 generation, 215
 influence of vegetation, 216
 types, 213
 runoff pools, 223
- S. sabulicola*, 169, 474
 sagebrush, 49, 137, 268, 469
 saguaro cactus, 270
 Sahara Desert, 85, 151, 303, 328, 495, 497
 Saharan air layer, 244
 impact, 250
 Saharan depressions, 91, 324, 330, 400, 421
 Saharan dust, 244, 246
 Saharan heat low, 299
 Sahel, 3, 104, 194, 222, 304, 432, 434, 436, 482–84, 495
 Sahel drought, 3, 199, 416, 434
 saline lakes, 337, 366
 salinity, 48, 50, 268
 salinization, 438, 457, 463
 salt pans, 364
- saltation, 30
 saltbush, 455, 469
 Salton Sea, 464–65
 salts, 43, 465
 salt-water intrusions, 458
 sand, 30
 sand dunes
 air flow, 40
 formation, 39
 forms, 35
 morphology, 37
 sand sea, 34, 101
 sand sheets, 34
 sand storms, 327, 330, 332, 335, 419
 Santa Ana wind, 232, 398
 savanna, 6, 46, 156, 315, 328, 332, 370, 384
 savannas, 154
 sclerophyllous vegetation, 54
 sea surface temperature, 267, 271, 290, 308, 313, 318, 347, 411, 415
 sea-breeze, 94
 seasonal cycle, 243, 268, 300, 317
 seasonality, 397, 483
 sebkhas, 27
secas, 290
 serir, 7, 26
 shading, 451
 shamal, 232, 332, 420
 Sharav Lows, 333
 shear velocity. *See* friction velocity
 shield deserts, 337
 shield-and-platform deserts, 24
 shoreline effects, 93–94
 short rains, 202, 310, 312–13, 484
 showers, 284, 365
 shrubland, 268, 337
 shrubs, 46, 49, 51, 270, 286, 360, 438
 Siberian High, 323, 351, 355–58, 361, 364–66, 368
 silt, 30, 234, 457, 465
 Sinai, 105, 332, 442
 sirocco, 232, 327
 snow, 157, 267, 269, 272, 284, 287–88, 298, 317, 325, 329, 332, 334–35, 358, 362–68, 383, 398, 426
 soil, 268, 270, 285–87, 302, 337, 370, 436, 440
 horizon, 42, 137
 order, 42
 saline, 12, 43, 270
 texture, 140
 soil moisture, 119, 124–25, 131–33, 140, 151, 165, 168, 178, 225
 soil moisture tension, 113, 116
 solar energy, 460
 solar radiation, 67
 solonchaks, 43, 302
 Somali Jet, 311
 Somali-Chalbi Desert, 4, 84, 308
 Sonoran Desert, 152, 191, 269, 398, 500
 Soudano-Saharan depression, 303
 South America
 biomes, 283
 campos, 289
 Caribbean coast, 291
 climate, 275

- Monte, 284
 Northeast Brazil, 289
 pampas, 289
 Patagonia, 286
 Puna, 287
 rainfall regime, 276
 xerophyllous forest and woodland, 288
 South American Convergence Zone, 283, 290
 South American Low Level Jet, 280, 282
 South American Monsoon, 279
 South Atlantic Convergence Zone, 90, 279
 South Atlantic High, 275–76, 284, 289, 294, 315, 394
 South Pacific High, 275–76, 378
 Southern Africa, 315
 southwest, 258
 southwestern USA, 497, 500
 spatial variability, 135, 157
 species diversity, 49, 170, 441
 spinifex, 337
 squalls, 305–06, 378, 420–22
 stability, 110, 425
 Stefan–Boltzmann law, 100
 stem flow, 59
 steppe, 6, 46, 154, 260, 268, 283, 323, 328, 331–32, 337, 351, 356, 360, 365
Stipa, 286, 331, 366, 388
Stipa grasses, 49, 337, 360
 stomata, 56, 134
 stomatal resistance, 56, 134, 144
 stone pavement, 7, 33
 stratiform rain, 188, 306
 stratus cloud, 376, 383–84
 stream channels, 11, 25, 28
 stream discharge, 15, 219, 221
 stream flow characteristics, 220
 streams, 7, 28
 Sua Pan, 173, 463
 sub-Saharan Africa, 293, 456
 subsidence, 70, 75, 83, 94, 101, 294, 303, 309, 311, 324, 367, 370, 374, 379–80, 433
 subsiding air. *See* subsidence
 subsistence, 454
 subtropical cyclones, 282
 subtropical high, 70, 76, 83, 85, 257–58, 271, 275–76, 293, 300, 315, 339, 357, 374–76, 378–80, 383, 395, 398, 494
 subtropical jet, 77, 88, 276, 282–83, 323, 346, 367, 397–98
 succulents, 46, 388, 470
 Sudan, 162, 303–06, 324
 sukhoi, 233
 sultriness index, 449
 summer rainfall, 53, 196, 258, 269–70, 277, 284, 310, 331, 344, 354, 365, 390
 sunspots, 411
 surface characteristics, 214–16, 495
 surface pressure, 332
 surface roughness, 31–32

T. hereroensis, 169, 470, 475
 Takla Makan, 85, 351, 357, 359–60
 Tarim Basin, 352, 357, 359–60
 teleconnections, 96, 411, 485

 temperature, 110, 157–58, 163–64, 173, 176, 178, 180, 263, 267–69, 272, 284, 288, 304, 307, 314, 327, 330–31, 334, 361, 363–66, 368, 371, 379, 383, 390, 394–95, 400
 range, 165
 temperature gradient, 29, 37, 67, 87, 111, 157, 163, 167, 263, 268, 394–95
 temperature inversion, 71, 108, 110, 164, 232, 370, 374, 376, 425
 temperature regime, 286
 temporal variability, 137, 139, 188
 tenebrionid beetles, 479
 terminal velocity, 32
 Thar Desert, 84, 354, 370
 thermal characteristics, 159
 thermal extremes, 174, 304
 thermal low, 271, 324
 thermal properties, 111, 136, 157
 conductivity, 111, 163, 173
 diffusivity, 111
 heat capacity, 111
 specific heat, 103, 111
 thermal regime, 163, 347
 thermal stability, 32, 230, 311
 thermal stress, 449
 thermoregulatory mechanisms, 48, 449, 468
 thicket, 51
 Thornthwaite, 117, 127, 131, 151–52
 threshold velocity, 33
 throughflow, 213
 thunderstorms, 265, 268–69, 271, 285, 287–88, 316–17, 327, 332, 334–35, 363, 369, 381, 398, 400, 422
 Tibesti, 93, 231, 301–02
 Tibetan plateau, 69, 75, 77, 231, 356, 358, 367
 upper air pattern, 77
 Tien Shan, 351, 358–59, 361–62
 tiger bush, 105, 135, 184
Tillandsia, 384, 398
 topographic influence, 93, 301, 351, 355
 tornadoes, 265–66, 268, 282
 Total Ozone Mapping Spectrometer, 17
 trade wind inversion, 71, 379, 395
 trade winds, 69–70, 72, 294, 316, 342, 345–46, 398
 transmission losses, 213–14, 220
 transpiration, 132, 137–38, 140–41
 tree–grass coexistence, 60
 tree-rings, 486, 497
 trends, 199, 497
Trianthema, 472
Triodia, 337, 339
 tropical cyclones, 92–93, 250, 282, 316, 339, 345–46
 tropical depressions, 92
 tropical disturbances, 87, 400
 Tropical Easterly Jet, 92, 275, 295, 303, 305–06, 308, 323–24, 367
 tropical rain belt, 293, 299
 Tropical Rainfall Measuring Mission (TRMM), 16, 188
 tropical wave disturbances, 91
 tropical/temperate troughs, 317–18, 333

 tropical–extratropical interaction, 282, 317
 tropics, 87, 194, 203
 Tsaidam basin, 361
 tundra, 125
 turbulence, 230
 turbulent transfer, 129, 158
 Turkana Jet, 311
 tussock grasses, 286
 tussock grasslands, 337

 universal soil loss equation, 33
 upscaling, 143
 upwelling, 71, 291, 331, 340, 374–76, 378, 380, 385, 389, 399, 499

 vapor pressure, 108, 127–28, 130
 varves, 486
 vegetation, 109, 284, 337, 364, 370, 384, 387, 398–99
 classification, 46
 desert, 49
 dryland, 47–48
 forest, 53
 grasslands, 52
 savanna, 50–52
 savannas, 50
 sclerophyll, 54
 sclerophyllous, 323
 vegetation canopy, 59, 107, 136, 142, 144, 178, 180
 vegetation–climate interaction, 59
 velocity pressure, 30
 ventifacts, 26
 ventilation, 448, 453
 vertical velocity, 79, 130, 230, 237
 vertisols, 42, 58
 viscosity pressure, 30
 visibility, 17, 239, 423
 volcanic dust, 240, 493
 vorticity, 237, 333

 wadis, 11, 329
 Walker circulation, 70, 83, 295, 494
 warm deserts, 6, 366
 warm fronts, 347
 water
 thermal properties, 468
 water balance, 115, 121–23, 156, 476
 water functions, 468
 water resources, 455
 water supply, 212
 water table, 125
 water-limited, 49, 127–28, 132–33, 140
 water-limited environment, 128, 142–43, 156
 water-use-efficiency, 55–57
 weather modification, 459
 weathering, 29
 Welwitschia, 180, 388, 474–75
 westerlies, 67, 69–70, 73, 90, 258, 267, 269, 275–76, 279, 286, 294, 297, 300, 303, 316, 339, 342, 361, 381, 397
 wet season, 85, 105
 Wien's law, 100
 wildfires, 427

- wilting point, 116, 133
wind, 6, 29, 172, 174, 264, 268–69, 284, 286,
288, 293, 295, 307, 314, 320, 332, 334–35,
356, 365, 368, 371, 376, 379, 384, 392,
398–99
wind erosion equation, 33
wind power, 460
wind profile, 108
wind regime, 26, 35, 37, 39–40
wind speed, 164, 177, 241, 264, 269, 286, 288
wind tower, 453, 460
windmill, 460
windstorms, 265
winter precipitation, 262, 359
winter rainfall, 258, 268–70, 277, 284, 310, 316,
324, 330–31, 335, 339, 344, 358, 390
woodland, 46, 52, 83, 283, 288, 315, 329, 337, 368
xerophyllous forest, 282–83, 288
xerophytes, 49, 472
yardangs, 26
Yucatan, 257, 272
yucca, 270, 470