

Index

- Acaena* spp., and vegetation change, 417–23
- Acaena-Brachytecium* complex, 421–2
- Ace Lake
light penetration, 183
picocyanobacteria, 178–83
temperature and salinity profile, 180
- Achnanthes* spp., 138, 145–9, 174
- Acodontaster* spp., 123–4
- actins, cytoskeletal, 253
- Adacnara* spp., 125
- Adamussium colbecki*, scallop
heavy metals, 409–11
shell growth patterns, 350, 353–4
- adaptive mechanisms
arthropods, terrestrial, 316–20
comparison with bryophyte life cycles, 321–5
atypical zinc-binding polypeptides, *Sterechinus neumayeri*, 305–8
ciliates, β -tubulin gene family, 300–4
diving behaviour of Weddell seal pups, 328–34
- Euphausia superba*
changes in lipids and fatty acids, 284–93
citrate synthase regulation, 295–8
- fish
antifreeze glycopeptides, 45–9, 57–61, 202–7, 209–15
cold environment, 251–8
Cu–Zn superoxide dismutase, 266–70
glucose-6-phosphate dehydrogenase, 261–5
immunoglobulins, 272–6
metabolic cold adaptation (MCA), 253–4
soft corals, 309–15
southern elephant seal, weaning mass, Sub-Antarctic islands, 335–8
summary, 249–50
- Adélie penguin, 405–8, 414
exposure to oil spill, 439–40
human disturbance, 445–52
- Aethotaxis mitopteryx*, Lazarev Sea, 30, 211
- Agassiz trawls, 27
- Agrostis* spp., 419–20
- Alaskozetes antarcticus*, oribatid mite, 316–20
- Alyonium paessleri*, population biology, 309–15
- algae
and bryophytes, cryoprotectants, 324
human impact, 398
ice algae
detritus import, 120
standing stocks, Weddell Sea, 121
UV radiation, 369–71
pigments, spectrophotometry, 163–5
Prasiola crispera
adaptations to freezing and UV radiation, 226–32
colonisation of seal-damaged sites, 432–6
photosynthesis, 234–9
soils and plants, King George Island, 162–8
tidal lagoon, Bratina Island, 170–6
- alien species, 340, 417–23
- amino acids
Cu–Zn superoxide dismutase in fish, 268–9
mycosporine-like, 370–1, 385
(*Prasiola crispera*), adaptations to freezing and UV radiation, 226–32
zinc-binding polypeptides, sea urchin, 308
- AMLR program, Elephant Island, 73–8
- Ampère Glacier forelands, 358–65
- Amphicteis* spp., 124
- amphipods, genera and species numbers, 7
- Amphiprora* spp., 174, 176
- Anatalanta aptera*, potential effects of alien insects, 424–31
- Andraea-Racomitrium* complex, 421
- Andriashev's bipolarity distribution concept, 22
- Anisakis* spp., bipolar distribution, 39–43
- Antarctic Convergence, 45, 251
- Antarctic islands *see* sub-Antarctic islands
- Antarctic Ocean *see* Southern Ocean
- Antarctic Peninsula
Anvers Island, maps, 68, 108
dimethyl sulphide studies, 94
southern elephant seal, 335–8
- Antarctic tern, 433
- Antarctic Treaty
Consultative Meeting (1964), 340
Protocol on environmental protection, 437–43, 453–4
- Antarctica, origins, 251
- Anthozoa *see* Cnidaria
- antifreeze glycopeptides and proteins (AFGPs and AFPs) in fish, 202–7, 209–15, 253
adsorption, molecular basis, 204–5
and age of fish, 214
characteristics, 213
chemical structure, 203
in evolution, 49
phylogenetic relationships, 214
sequences, 204
- Anvers Island, Antarctic Peninsula, coastal phytoplankton dynamics, 67–72
- Aptenodytes forsteri* *see* emperor penguin
- Archaeomonas* spp., 103
- Arctic and Antarctic species, bipolarity distribution concepts, 19, 22–5

- Arctocephalus gazella* *see* fur seal
- Arcturidae, number of Antarctic genera, 7
- Artedidraconidae
 genetic markers, 45–9
 haemoglobins, 255–6
 Lazarev Sea, 28, 31
 list of spp., 211, 252
- arthropods, terrestrial
 comparison with bryophyte life cycles, 321–5
 ecophysiological strategies, 316–20
Ectemnorhinus-group weevils, 152–9
- ascaridoid nematodes, bipolar
 distribution, 39–43
- asexual reproduction, and
 parthenogenesis, 322
- Askenasia* spp., 173, 174
- assimilation coefficients, 127
- Asteroidea, Weddell Sea, 123–4
- Astrotoma* spp., 124
- Austrollichthys* *see* *Pachycara brachycephalum*
- bacteria
 dynamics, pack ice of Weddell Sea, 101–5
 eicosapentaenoic acid, 199
 escape from UV radiation in non-marine habitats, 388–94
 hepatopancreatic, *Euphausia superba*, 194–5
 lipid analysis, 83–4
 molecular techniques and phylogenetics, 51–5
 soils and plants, King George Island, 162–8
 temporal variability, Kerguelen Islands, 86–90
 UV tolerance, 371
see also cyanobacteria; phytoplankton
- Bahia Paraiso*, environmental damage
 case study, 437–44
- Bathydraconidae
 AFGPs, 210–13
 genetic markers, 45–9
 haemoglobins, 255–6
 list of spp., 211, 252
- Bathyraja maccaini*, immunoglobulins, 272–6
- benthic invertebrates
 dominance plots, 8
 species numbers, 7
 species richness assessment, 3–6
- benthic shelf communities
 modelling approach, 119–26
 trophic flow(s), 118–32
- biodiversity
 dominance curves, 8–9
 and evolution 1–9
 indices
 fish, 9
 macrobenthos, 9
 meiobenthos, 9
 zooplankton, 9–10
 species numbers assessment, 5–8
 species richness assessment, 3–14
 suggestions for future work, 11–12
- biomass studies
 algae, tidal lagoon, 170–6
 phytoplankton, 122, 127
 phytoplankton carbon distribution, Elephant Island, 73–8
 soils, 162–8
- biomonitoring, Mollusca, heavy metal
 pollutants, 409–11
- bipolar distributions, 19, 22–5
- Blechnum* complex, 421
- Botryococcus* spp., 368
- Bovallia* spp., 124
- Bovichtidae
 genetic markers, 45–9
 haemoglobins, 255–6
 species, 252
- Brachiomonas* spp., 174
- Bratina Island, McMurdo Ice Shelf,
 tidal lagoon algae, 170–6
- brittle stars *see* Ophiuroidea
- brown skua, 403, 405–8
 effect on penguin breeding, 449
- bryophytes
 cryoprotectants, 324
 life cycles, comparison with terrestrial
 arthropods, 321–5
- Bryozoa, Weddell Sea, 125
- Bryum argenteum*
 genetic variation, East Antarctica, 33–8
 other areas, 34
- Bryum pseudotriquetrum*, 368
- Buellia* spp., photosynthetic activity, 221–4
- ¹⁴C labelling studies, phytoplankton, 94–5
- Calanoides* spp., biomass, 122, 277–82
- Calanus propinquus*
 biomass, 122
- MAAs, 371
 reproduction in summer Weddell Sea, 112–16, 277–82
- Calliargon* sp., 433–4
- Calliphora vicina*, potential effects on
 native insects, 424–31
- Callitriche–Poa* complex, 420–1
- Cameron Lake, cell counts of microbial
 loop components, 400
- Candelariella* spp., 163
- Cape petrel, organochlorine levels, 413–16
- Carnobacterium* spp., 16S rRNA
 sequences, 52, 53
- Catharacta* spp. *see* brown skua; south
 polar skua
- Cerastium fontanum*, 417–23
- Ceratodon* sp., 433–4
- Chaenocephalus* spp.
 AFGPs, 207
 Cu–Zn superoxide dismutase, 266
 G6PD, 262–3
 genomic DNA, 46, 47, 48
 immunoglobulins, 272–6
 myoglobin DNA, 57–61
- Chaetoceras* spp., 369, 382–3
- Challenger Expedition (1873), Marion
 Island, 419
- Champscephalus* spp.
 G6PD, 262–3
 myoglobin DNA, 57–61
- Channichthyidae (icefish)
 antifreezes, 202–7, 209–15
 genetic markers, 45–9
 glucose-6-phosphate dehydrogenase, 261–5
 glucose-6-phosphate synthesis, 254
 Lazarev Sea, 31
 list of spp., 211, 252
 myoglobin gene expression in heart
 muscle, 57–61
 oxygen transport, 254–6
- Charlotte Bay, dimethyl sulphide studies, 93–9
- chelicerata, Weddell Sea, 124–5
- chemical defence, soft corals, 309–15
- Chionodraco* spp., 27, 46–8, 126, 211
 G6PD synthesis, 254, 262–3
 immunoglobulins, 272–6
 MFO induction, pollution biomarker, 405–8
 myoglobin DNA, 57–61
 zinc-binding polypeptides, 305
- Chlamydomonas* spp., 174

- Chlorogonium* spp., 174
Chorismus antarcticus, 125
Chorisodontium sp., 433–4
 chromatography
 DEAE ion exchange, 210
 lipid analysis, phytoplankton taxa, 79–84
 reverse phase HPLC, 210
Chromulina spp., 174
Chroomonas spp., 173, 174, 176
Chrysococcus spp., 174
 chrysophytes, 69
 ciliates
 Euplotes focardii, β -tubulin gene family, 300–4
 oligotrophic lake, 401
 citrate synthase, regulation in *Euphausia superba*, 295–8
 Cladocera, 401
Clavularia frankliniana, population biology, 309–15
 climate change
 arthropods
 ecophysiological strategies, 316–20
 Ectemnorhinus-group weevils, 152–9
 dendrochronologies, 345–6
 and dimethyl sulphide release, 93
 expansion and regression of Polar Front, 48–9
 Little Ice Age, 344–5
 temperature observations, 345–7
 pre-Holocene climatic fluctuations, 343–4
 prediction of future temperature, 345–7
 recent climatic record, 343–7
 summary, 339–41
 see also ultraviolet radiation
 Cnidaria
 ecological bipolarity, 22–5
 Weddell Sea, 125
Cocconeis spp., 138, 144–5
 cohort analysis, variation in crabeater seals, 241–6
 Collembola, 316–20, 323
Colobanthus quitensis, microbial communities, 162–8
 common seal, anisakid endoparasites, 43
 community structure and function
 benthic shelf community, Weddell Sea, trophic flow(s), 118–32
 Bratina Island, McMurdo Ice Shelf, tidal lagoon algae, 170–6
 copepod reproduction in summer, Weddell Sea, 112–16
 dynamics of microorganisms, Weddell Sea, 101–5
 Ectemnorhinus-group weevils, 152–9
 larval krill, 107–11
 phytoplankton, 67–72, 73–8
 dimethyl sulphide studies, 93–9
 lipids, 79–84
 temporal variability, Kerguelen Islands, 86–90
 picocyanobacteria in Ace Lake, 178–83
 South Shetland Islands
 bacteria of soils and plants, 162–8
 Laternula elliptica, 142–50
 phytoplankton and particulate matter variation, 135–41
 summary, 63–5
Contracecum sp., anisakid nematode
 bipolar distribution, 39–43
 life cycle, 273–4
 Cooperation Sea, 187–8
 copepods see zooplankton
Corethron spp., 103, 127, 137, 140
 cormorant, exposure to oil-spill, 440
Coscinodiscus spp., 69, 71, 145
Cotula–*Crassula* complex, 422
 crabeater seal, cohort variation, 241–6
Crassula complex, 421
 Crinoidea, Weddell Sea, 124
 Crustacea
 Weddell Sea, 124–5
 see also zooplankton
Cryodraco spp., 31, 46–8, 211
 cryoprotectants
 algae and bryophytes, 324
 alga *Prasiola crispa*, 226–32
 antifreeze glycopeptides, 49, 202–7, 209–15, 253
Cryothernia spp., 213
 cryptomonads, 84
Cryptomonas spp., 368
 cryptophytes, 69
Cryptopygus antarcticus, springtail, 316–20
 cryptostigmatid mites, 316–20, 323
Ctenocalanus spp., biomass, 122
 Cu–Zn superoxide dismutase in fish, 266–70
 comparisons, 268
 N-terminal amino acid sequence, 269–70
 cyanobacteria
 Ace Lake, 178–83
 escape from UV radiation in non-marine habitats, 388–94
 grazer resistance, 391
 human impact, 398
 lichen communities, 222–3
 soils and plants, King George Island, 162–8
 tidal lagoon, 173, 174
Cygnodraco spp., 46, 47, 48, 211–13
 cytoskeleton
 Euplotes focardii, β -tubulin gene family, 300–4
 tubulins and actins in fish, 253
Dacodraco sp., 31, 211
Daphniopsis studeri, 401
Daption capense see Cape petrel
 DDT, Cape petrel, 413–16
 decapods, Weddell Sea, 125
Deleya spp., 16S rRNA, 53, 54
 dendrochronologies, and climate change, 345–6
Deschampsia antarctica
 microbial communities, 162–8
 in seal colonies, 435
 Devon Island, ice core data, 345
 diatom assemblages
 blooms, temporal dynamics, 67–72
 lipid analysis, 82–3
 sediment core evidence against UV-B induced changes, 381–7
 tidal lagoon studies, 173–5
 see also phytoplankton; species names
Dicentrarchus labrax, glucose-6-phosphate dehydrogenase, 261–5
 dimethyl sulphide (DMS)
 Ross Sea, 93–9
 as sulphur source, 372
Dissostichus mawsoni
 AFGPs, 203, 207, 211
 genomic DNA, 46, 47, 48
 glucose-6-phosphate dehydrogenase, 261–5
 diving behaviour of Weddell seal pups, 328–34
 DNA repair, post UV radiation, 392
 docosahexaenoic acid (DHA), 54
Dolloidraco spp., AFGPs, 210–11
 dominance curves, 8–9
Drepanocladus spp., 163, 164, 422, 433–4

- East Antarctic *see* Cooperation Sea; Lazarev Sea
- Echinodermata
 species numbers assessment, 7
 symbiotic *Hydractinia* spp., 22–5
 Weddell Sea, 124
- ecological determinants, life history correlates, 322
- Ectemnorhinus*-group weevils
 geographical and glacial histories of islands, 154
 species, structure and survival, 152–9
- eel pout (*Lycodichthys dearborni*), 46, 204, 206–7
- eicosapentaenoic acid, *Euphausia superba*, 196, 199
- Elephant Island, phytoplankton carbon distribution, 73–8
- elephant seal *see* southern elephant seal
- emperor penguin, Weddell Sea, 126
- Encalypta patagonica*, 434
- endemism, in species of Southern Ocean, 6
- energy balance, equation, 119
- Entomoneis* spp., 371
- environmental change *see* climate change
- environmental damage
 snow-clearing, 400
see also pollutants
- environmental impact, case study, *Bahia Paraiso*, 437–44
- enzyme polymorphisms, plants, 33–8
- Eocene, and Oligocene transitions, 251
- epifluorescent microscopy, 179
- Epimeriidae, number of Antarctic genera, 7
- Eucampia* spp., 137
- Euchaeta* spp., biomass, 122
- Euphausia crystallorophias*, krill, 31, 120–2
 spawning success and grazing impact, 187–91
- Euphausia superba*, krill
 biochemistry during starvation, 193–200
 citrate synthase regulation, 295–8
 and food reservoirs, 73–8, 120–2
 larval, abundance and distribution, winter, 107–11
 lipids and fatty acids, changes, 284–93
 MAAs, 371
- Euphausiacea, Weddell Sea, 120–1
- Euplates focardii*, β -tubulin gene family, 300–4
- Eusiridae, number of Antarctic genera, 7
- fatty acids
Euphausia superba, 193–200
Euphausia superba, spatial and life cycle changes, 284–93
- PUFAs, phytoplankton taxa identification, 79–84
- fish
 adaptive mechanisms
 antifreeze glycopeptides, 45–9, 57–61, 202–7, 209–15
 cold environment, 251–8
 Antarctic fauna, 252
 biodiversity index, 9
 bootstrap trees, 48
 Cu–Zn superoxide dismutase, 266–70
 cytoskeletal tubulins and actins, 253
 ecological parameters, comparison, 29
 endoparasites, bipolar distribution, 39–43
 glucose-6-phosphate dehydrogenase, 261–5
 haematological features, 251–8
 Lazarev Sea, 26–32, 209–15
 neutral buoyancy, 252
 phylogenetic relationships, antifreeze glycopeptides, 214
 survival mechanisms, visual and nonvisual senses, 217–19
 swim bladder, 252
 Weddell Sea, 8, 126, 209–15
 ‘whiteblooded’, 46
- Flavobacterium* spp., 16S rRNA sequences, 52, 53
- Flectobacillus* spp., 16S rRNA sequences, 52, 53
- flow cytometry, picocyanobacteria, 178–83
- food web, carbon flows, Weddell Sea, 128
- fossils, oxygen isotope geochemistry, Holocene, 354
- Fragilariopsis* spp., 75, 102–3, 145–9, 382–3
- free radicals, quenching, 392
- freezing avoidance *see* cryoprotection
- freshwater *see* lakes and ponds
- fulmarine petrel, organochlorine levels, 413–16
- fur seal, impact on plant communities, 432–6
- Gamasellus racovitzai*, 324
 genotypes, specialist and generalist, escape from UV radiation in non-marine habitats, 388–94
- Gerlachea* spp., 211
- Gersemia antarctica*, population biology, 309–15
- giant petrel *see* *Macronectes giganteus*
- glaciations, Little Ice Age, 344–5, 352–5
- glacier forelands, 358–65
- glucose-6-phosphate dehydrogenase in fish, 261–5
- Gnathiphimedia* spp., 124, 125
- Gobionotothen* spp.
 G6PD, 262–3
 genomic DNA, 46, 47, 48
 myoglobin gene, 57–61
- Gondwana, origins of Antarctica, 251
- grasses
 alien species, Marion Island, 417–23
 climate change in Kerguelen Islands, 358–65
- green algae *see* algae
- Greenland, climate change, 344–5
- grey seal, anisakid endoparasites, 43
- Grimmia antarctica*, 368
- gull, exposure to oil-spill, 440
- Gvozdarus* sp., 213
- Gymnodinium* spp., 174
- Gymnodraco* spp., 46, 47, 48
 AFs, 211
 intermediate haemoglobin, 47
- Gyrosigma* spp., 138
- Halichoerus grypus* *see* grey seal
- Halobacterium* spp., 16S rRNA sequences, 52, 53
- Halomonas* spp., 16S rRNA sequences, 52, 53
- Harpagiferidae
 haemoglobins, 255
 species, 252
- Heard Island
Poa spp., 359
 southern elephant seal, 336
- heavy metal pollutants, Mollusca, 409–11
- Hemichloris antarctica*, 390
- Hemichordata, Weddell Sea, 125
- Histiadraco* spp., genomic DNA, 46, 47, 48
- Holocene
 climatic fluctuations, 344

- environmental records, raised beaches, Victoria Land, 352–5
- Little Ice Age, 344–5, 352–5
- marine fossil taxa, 351
- Holothuroidea, Weddell Sea, 8, 123
- Homophiura* sp., 22, 23
- Hoplostethus* spp., 219
- house mouse, weevils in diet, 158
- human disturbance, Adélie penguin, 443–50
- human impact and environmental change/damage, 339–452
- summary, 339–41
- see also climate change
- Hydractinia* spp., ecological bipolarity, 22–5
- Hydrozoa see Cnidaria
- ice
- endogenous
- in benthic fish, 205–6
- in most Antarctic fish, 205
- ice cores
- dynamics of microbial communities, Weddell Sea, 101–5
- phytoplankton taxa identification using lipids, 79–84
- pre-Holocene climatic fluctuations, 343–4
- ice sheet
- grounded ice sheet recession, Ross Sea, 352–3
- pack ice, larval krill distribution, 107–11
- icefish see Channichthyidae
- Idotea baltica*, comparison with *Euphausia superba* citrate synthase regulation, 295–8
- IEE (Initial Environmental Evaluation), 437–44
- recommendations, 442–3
- immunoglobulins, structure and antibody sensitivity in fish, 272–6
- insects, aliens, potential effects, 424–31
- introduced species
- potential effects on native insects, 424–31
- vascular plants, Marion Island, 417–23
- invertebrates
- benthic, 3–6, 8
- land aquatic environments, 391
- Iphimediidae, number of Antarctic genera, 7
- iron, pollutants in Mollusca, 410
- iron enrichment studies, dimethyl sulphide, Ross Sea, 93
- irradiance
- extremes, 390–1
- PAR profiles, 399
- islands see sub-Antarctic islands
- isopods
- genera and species numbers, 7
- Weddell Sea, 125
- James Ross Island, glacier dating, 344
- Jukes–Cantor formula, 53
- Juncus–Blepharidophyllum* complex, 420–1
- kelp gull, exposure to oil-spill, 440–1
- Kelvin Effect, 205
- Kerguelen Islands
- alien insects, potential effects, 424–31
- climate change and *Poa* spp., 358–65
- Ectemnorhinus*-group weevils, 155
- plankton temporal variability, 86–90
- southern elephant seal, 335–8
- King George Island, South Shetland Islands
- bacteria of soils and plants, 162–8
- feeding ecology of *Laternula elliptica*, 142–50
- petrel, 413
- phytoplankton and particulate matter variation, 135–41
- southern elephant seal, 336
- krill see *Euphausia* spp.
- Laetmonice* spp., 124
- lake catchments
- cell counts of microbial loop components, 400
- human impact, 396–403
- lakes and ponds
- cyanobacteria in Ace Lake, 178–83
- oligotrophic, plankton, 401–2
- stratified ponds, Bratina Island, 176
- Larsemann Hills, lake catchments, human impact, 396–403
- Laternula elliptica*
- heavy metals, 409–11
- South Shetland Islands, feeding ecology, 142–50
- latitudinal clines, 10
- Lazarev Sea
- demersal fish fauna, 26–32
- comparison with Weddell Sea, 28–31
- frequency distribution, 28
- dominance plots, 8
- fish, 26–32, 209–15
- map, 113, 188
- lead
- ²¹⁰Pb profiling, 382, 384
- pollutant, 409–11
- Lepidonotothen* spp., AFGPs, 210–12
- Leptonychotes weddelli* see Weddell seal
- Leptosomia* sp., 443
- lichens, 15–21, 221–4
- ecology, 433–4
- photosynthetic activity, 221–4, 234–9
- symbiosis, *Mastodia* compared with alga *Prasiola*, 234–9
- taxonomy
- data and methods, 17
- main theories, 19–20
- origins, 18–20
- percentage occurrences, 19
- phytogeographic elements and species numbers, 18
- revision of Dodge's *Flora*, 16–17
- Usnea* spp., 162–8, 222–4
- Licmophora* spp., 145–8
- life history correlates, ecological determinants, 322
- Limacina* spp., 219, 371
- Limnopsis* spp., 125
- Liparididae, 211
- lipid analysis
- diatoms, 82–3
- Euphausia superba*, 193–200
- spatial and life cycle changes, 284–93
- phytoplankton taxa identification, 79–84
- Pleuragramma antarcticum*, 277–82
- Lissarca* spp., 125
- Litchfield Island, Adélie penguins, 445–52
- Little Ice Age, 344–5, 352–5
- liverworts, 433
- Lobodon carcinophagus* see crabeater seal
- Lophophora, Weddell Sea, 125
- LTER see Palmer Long Term Ecological Research Program (PAL-LTER)
- Lycodichthys dearborni*, 46, 204, 206–7
- Lyngbya* spp., 368

- Lysianassidae, number of Antarctic genera, 7
- Macquarie Island, southern elephant seal, 335–8
- macrobenthos
 biodiversity index, 9
 species richness assessment, 3–4
- Macronectes giganteus*, 433
- Macrourus* spp., 27
 AFGPs, 210–12
- Macrozoarces americanus*, AFGPs, 204–5
- Magnetic Island, lipid signatures of phytoplankton, 79–84
- Malvinus* spp., 154
- maps
 Antarctic exposed coastal areas, 350
 Anvers Island, 68, 108
 Cooperation Sea, 188
 Elephant Island, 74
 islands of Southern Ocean, 154
 Kerguelen Islands, 87, 359, 425
 King George Island, South Shetland Islands, 136, 143, 163
 Lazarev Sea, 113, 188
 Marion Island, 418
 McMurdo Sound, 310
 Morbihan Bay, 87
 Palmer Station vicinity, 68, 446
 Ross Island, 34
 Signy Island, 432–6
 Vestfold Hills, 179
 Weddell Sea, 113, 119
- Marchantia* sp., 433
- Margarella* spp., 125
- Marion Island
 house mouse, 158
 southern elephant seal, 335–8
 vegetation, introduced vascular plants, 417–23
- Mastodia tesselata*, photosynthesis, compared with alga *Prasiola*, 234–9
- McMurdo Ice Shelf, Bratina Island, tidal lagoon algae, 170–6
- McMurdo Sound
 antifreezes in fish, 202–7
 soft corals, 310
- Meganyctiphanes norvegica*, comparison with *Euphausia superba* citrate synthase regulation, 295–8
- meiobenthos, biodiversity index, 9
- Melicerita* sp., 9
- meltwater, estimation of volume, 353–4
- meromictic lakes, picocyanobacteria, 178–83
- metabolic cold adaptation (MCA), 253–4
- metallothionein, atypical zinc-binding polypeptides, 305–8
- metals *see* heavy metal pollutants
- Methanococcoides* spp., 16S rRNA sequences, 52, 53
- Metridia gerlachei*, reproduction in Weddell Sea, 112–16, 281
- microbial communities *see* bacteria; cyanobacteria; phytoplankton
- microbial niches, non-marine habitats, escape from UV radiation, 388–94
- Microcalanus* spp., biomass, 122
- Miocene
 Southern Ocean cooling, 214
 transitions, Oligocene, 251
- Mirounga leonina* *see* southern elephant seal
- mites, ecophysiological strategies, 316–20, 323
- mitochondrial DNA, notothenioid molecular phylogeny and evolution, 45–50
- mixed function oxidase activity, pollutant biomarker, 405–8
- modelling, Weddell Sea benthic shelf communities, 119–26
- molecular techniques
 mitochondrial DNA, 45–50
 myoglobin gene expression in icefish, 57–61
 RFLPS and RAPDs, bryophyte genetic variation, 33–8
see also ribosomal RNA
- Mollusca
 benthic, Weddell Sea, 125
 heavy metal pollutants, 409–11
 lamellibranchs, South Shetland Islands, 142–50
 oxygen isotopes, environmental records, 353–4
- Monostroma* sp., 442
- Monte Carlo techniques, crabeater seal cohort variation, 241–6
- Morbihan Bay, Kerguelen Islands, temporal variability of plankton, 86–90
- Morone saxatilis*, myoglobin gene, 57–61
- mosses
Bryum spp., 33–8, 368
- cryoprotectants, 324
 in plant communities, Marion Islands, 417–23
 life cycles, 321–5
- Mougeotia* sp., 398
- Muraenolepis marmoratus*, AFGPs, 210–12, 215
- Mycale acerata*, chemical attack by soft corals, 309–15
- mycosporine-like amino acids (MAAs), 370–1, 385
- Myctophidae, 211
- myoglobin gene expression, Channichthyidae (icefish), 57–61, 255
- N-acetyl- β -D-glucosaminidase (NAGase), euphausiids and isopods, 295–8
- Navicula* spp., 138, 145, 173, 174
- nematodes
 anisakid endoparasite
 bipolar distribution, 39–43
 life cycle, 273–4
 immunoglobulins in fish, 273–4
- Neobuccinum eatoni*, heavy metals, 409–11
- Neopagetopsis* spp., 210–12
- niche dimensions, specialist and generalist genotypes, 380
- nitrogen, limiting, 390–1
- Nitzschia* spp., 102, 138, 173, 174
 lipids, 79–84
 UV effects, 371, 385
- non-destructive sampling,
 organochlorine levels, Cape petrel, 413–16
- non-marine habitats, escape from UV radiation, 388–94
- nonlinear multidimensional scaling analysis (NMDS), 382–3
- Nostoc commune*, UV screening, 394
- Notasterias* spp., 123–4
- Nothofagus*, Sirius Formation, 54
- Notocrangon* spp., 125, 131
- Notothenioidei (Perciformes) including *Notothenia* spp.
 adaptive mechanisms, cold environment, 251–8
 AFGPs, 206–7
 antifreezes in icefish, 202–7, 209–15, 253
 distribution, 26–31
 genomic DNA, 46, 47, 48

- glucose-6-phosphate dehydrogenase, 261–5
- haemoglobins, 255–6
- immunoglobulins, 272–6
- list of spp., 211, 252
- molecular phylogeny and evolution, 45–50
- myoglobin gene expression in icefish, 57–61
- oxygen transport, 254–5
- visual and nonvisual senses, 217–19
see also Channichthyidae
- Nucella* sp., 443
- nuclear explosions, pre and post-bomb radiocarbon, 352
- Oceanites oceanicus* *see* Wilson's storm petrel
- Ochrolechia* spp., 163, 164
- Ochromonas* spp., 173, 174, 176
- Odontaster* spp., 123–4
- Odontella* spp., 137, 144–5
- oil spill and salvage, environmental case study of *Bahia Paraiso*, 437–44
- Oithona* spp., 219
- biomass, 122
- Weddell Sea, 277–82
- Oligocene
- Southern Ocean cooling, 214
- transitions, Eocene and Miocene, 251
- Oncaea* spp., 277–82
- biomass, 122
- Ooptyx soledadinus*, potential effects on native insects, 424–31
- Ophirolepididae, distance matrix, 47
- Ophiuroidea
- symbiotic *Hydractinia* spp., 22–5
- Weddell Sea, diet, 124
- Orchomene* spp., 124
- organochlorine levels, non-destructive sampling, 413–16
- oribatid mite, *Alaskozetes antarcticus*, 316–20, 323
- Oscillatoria* sp., growth versus temperature, 389–90, 393
- oxygen, toxicity, Cu–Zn superoxide dismutase, 266–70
- oxygen isotopes, environmental records, Victoria Land, 353–4
- ozone depletion, and ultraviolet radiation
- effects on Antarctic organisms, 367–73
- effects on primary production, 375–9
- Pachycara brachycephalum*, 46, 204
- Pagetopsis* spp., 31, 46, 47, 48
- AFGPs, 210–11, 213
- Pagothenia bernacchii*
- Cu–Zn superoxide dismutase, 266–70
- immunoglobulins, 272–6
- MFO induction, 405–8
- Pagothenia borchgrevinki*
- acetylcholinesterase, 254
- AFGPs, 203
- genomic DNA, 46, 47, 48
- haemoglobins, 257
- incapacitation of Hb, 255
- visual acuity, 217–19
- Palmaria* spp., 370
- Palmer Long Term Ecological Research Program (PAL-LTER)
- coastal phytoplankton, 67–72
- larval krill, 107–11
- Palmer Station, Antarctic Peninsula, maps, 68, 444
- Paraceradocus* spp., 124
- Parachaenichthys* spp., genomic DNA, 46, 47, 48
- Paraliparis* spp., AFGPs, 210–11
- paraphyletic fish families, 45–50
- parasite–host systems
- anisakid endoparasites, 39–43
- peripatric speciation, 39–43
- Parmaphorella* spp., 125
- parthenogenesis, and asexual reproduction, 322
- Pentarthrum carmichaeli*, 154–5
- Perciformes *see* Notothenioidei
- peripatric speciation, anisakid endoparasites, 39–43
- Perknaster* spp., 123–4
- petrel
- destroyed colonies, 433
- organochlorine levels, 413–16
- Phaeocystis antarctica*, 69, 71
- DMS production, 372
- lipid profile, 79–84
- sulphide, algal blooms, 93–9
- UV tolerance, 370
- Phaeocystis pouchetii*, 382
- Phaeodactylum* sp., 230, 370
- Phalacrocorax atriceps* *see* cormorant
- Philobrya* spp., 125
- Philodena* sp., 392
- Phoca vitulina* *see* common seal
- Phocascaris* spp., 43
- Phormidium* spp., 174, 231
- photosynthetic activity
- lichens, 221–4, 234–9
- PAR profiles, 399
- primary production, 119–20
- effects of UV radiation, 375–9
- phylogeny
- antifreeze glycopeptides in fish, 214
- prokaryotes, 51–5
- phytoplankton
- biomass studies
- assimilation coefficients, 127
- carbon distribution, Elephant Island, 73–8
- ¹⁴C labelling studies, 94–5
- identification
- using lipid signatures, 79–84
- using pigments, 94
- lakes, human impact, 401
- nanoplankton, PNAN and HNAN, 401–2
- and particulate matter, King George Island, 135–41
- photosynthetron, dynamics, 68
- picocyanobacteria, 178–83
- production of dimethyl sulphide, 93–8
- and sea-ice algae, 369–71
- temporal dynamics, 67–72
- temporal variability, Kerguelen Islands, 86–90
- picocyanobacteria, in Ace Lake, 178–83
- Pinnularia* spp., 145–9
- Placopsis* spp., 163
- photosynthetic activity, 221–4
- Plantago lanceolata*, 419
- plants
- aliens, Marion Island, 417–23
- impact of fur seals on plant communities, 432–6
- see also* algae; lichens; mosses; *specific names*
- Pleuragramma antarcticum*, 29–30, 126
- antifreeze glycopeptide (PAFGP), 209–15
- diet composition, 280
- haemoglobins, 257
- seasonality of feeding and lipid content, 277–82
- Pliocene, Southern Ocean cooling, 214
- Poa* spp.
- climate change in Kerguelen Islands, 358–65
- Poa annua*, Marion Island, 417–23
- Poa–Cotula* complex, 422

- Pogonophryne* spp.
 AFGPs, 210–11
 genomic DNA, 46, 47, 48
- Polar Front, expansion and regression, 48–9
- pollutants
 biomarkers, environmental damage, 405–8
 heavy metals, Mollusca, 409–11
 mixed function oxidase activity, 405–8
 oil spill, *Bahia Paraiso* case study, 437–44
- Polychaeta, Weddell Sea, 124
- polynyas, Cooperation Sea, 187
- polypeptides, zinc-binding, sea urchin, 305–8
- Polytrichum* spp., 163, 164, 433
- Ponthiothauma* spp., 125
- population cycles, crabeater seal, 241–6
- Porifera, Weddell Sea, 8, 125
- Pottia* spp., 434
- Prasiola crispa*
 adaptations to freezing and UV radiation, 226–32, 368
 colonisation of seal-damaged sites, 432–6
- Prince Edward Island, alien species, 423
- Proboscia* spp., 75
- production, primary
 effects of ultraviolet radiation, 375–9
 equations, 119
 trophic flow in benthic shelf communities, 118–32
 Weddell Sea, 119–20
- propionate, and dimethyl sulphide release, 93
- prostigmatid mites, 316
- Protozoa, *Euplotes focardii*, β -tubulin gene family, 300–4
- Prydz Bay, Cooperation Sea, 187–91
 Larsemann Hills, 397
- prymnesiophytes, 69, 79–84, 93, 369, 382
see also diatom assemblages
- Pseudobalanion* spp., 173, 174
- Pseudochaenichthys* spp.
 G6PD, 262–3
 immunoglobulins, 272–6
 myoglobin gene, 57–61
- Pseudonitzschia* spp., 75, 138
- Pseudoterranova* spp., anisakid endoparasite, bipolar distribution, 39–43
- psychrophily, and psychrotrophy, 389
- psychrosphere, 54
- Psychroteuthis glacialis*, Weddell Sea, 126
- Pygoscelis adeliae* *see* Adélie penguin
- Pyramimonas* spp., 173, 174, 176
- Racovitzia* spp., 211, 255
- radiocarbon isotopes
 environmental records, Victoria Land, 352–5
 nuclear explosions, pre and post-bomb radiocarbon, 352
- radium, $^{210}\text{Pb}/^{226}\text{Ra}$ profiling, 382, 384
- randomly amplified polymorphic DNA (RAPDs), bryophyte genetic variation, 33–8
- restriction fragment length polymorphisms (RFLPs), bryophyte genetic variation, 33–8
- Rhizophila* *see* *Lycodichthys dearborni*
- Rhincalanus* spp., biomass, 122, 277–82
- Rhizosolenia* spp., 75
- ribosomal RNA, 12S and 16S
 molecular clock, 53–4
 notothenioid molecular phylogeny and evolution, 45–50
 prokaryotes, 51–5
- RNA gel blot hybridization, 57–61
- Ross Island
 Adélie penguin, 405–8
Bryum argenteum, 33–8
- Ross Sea
 dimethyl sulphide studies, 93–9
 grounded ice sheet recession, 352–3
 McMurdo Ice Shelf, Bratina Island, tidal lagoon algae, 170–6
- Rumex acetosella*, 420
- Sagina procumbens*, 420
- salinity studies, 137
- scallop
 heavy metals, 409–11
 shell growth patterns, 350, 353–4
- Schistidium* sp., 434
- scytonemin, 392
- sea bass *see* *Dicentrarchus labrax*
- sea ice *see* sheet ice
- sea urchin *see* *Sterechinus neumayeri*
- sealing, 418
- seals
 anisakid endoparasites, 39–43
 satellite-linked time depth recording of dives, 328–34
see also common, crabeater, fur, grey, southern elephant, and Weddell seals
- sedge, *Uncinia compacta*, island populations, 158
- sediment cores, evidence against UV-B induced changes, diatom assemblages, 381–6
- sedimentation rates
 Lazarev Sea, 127
 Maxwell Bay, 144–5
- Senecio* sp., 419
- Serolidae, number of Antarctic genera, 7
- Serolis polita*, comparison with *Euphausia superba* citrate synthase regulation, 295–8
- Serolis* spp., 125
- Shannon–Wiener biodiversity index, 9
- shipborne tourism, Adélie penguin disturbance, 445–52
- ships, waste disposal, 442–3
- shipwreck, environmental damage case study, 437–44
- sibling species, 40
- Signy Island
 freeze–thaw events, 317
 fur seal damage, 432–6
- Siphonophora, Weddell Sea, 123
- Sirius Formation, *Nothofagus*, 54
- skeletal muscle, cytoskeletal tubulins and actins, 253
- skuas *see* brown skua; south polar skua
- soft corals, adaptive mechanisms, 309–15
- soils
 Ampère Glacier forelands, 358–65
 impact of seals on plant communities, 432–6
 impact of snow-clearing, 400
 nutrient supplies, 390–1
 and plants, King George Island, microbial assemblages, 162–8
- Sonchus* sp., 419
- South America, temperature observations and climate change, 345–7
- South Indian Province Islands, *Ectemnorhinus*-group weevils, 155–6
- South Orkney Islands
 freeze–thaw events, 317
 fur seal populations, 432–6
 temperature data, 345–7
- south polar skua, 405–8, 414
 exposure to oil-spill, 440

- South Shetland Islands
 bacteria of soils and plants, 162–8
 feeding ecology of *Laternula elliptica*, 142–50
 glacier dating, 344
 phytoplankton and particulate matter variation, 135–41
 southern elephant seal, weaning mass, sub-Antarctic islands, 335–8
- Southern Ocean
 islands, map, 154
 onsets of glaciation, 214
 species numbers
 endemism, 6
 as percentage of numbers, world oceans, 6
 species richness assessment, 3–6
 present estimates, 6
- Specially Protected Areas (SPAs), 445
- species numbers
 endemism, 6
 as percentage of numbers, world oceans, 6
 species richness assessment, 3–14
 suggestions for future work, 11–12
- Spirochaeta* spp., 16S rRNA sequences, 52, 53
- sponges
 contact effects, 312–13
Mycale acerata, 313
- springtail, *Cryptopygus antarcticus*, 316–20
- Stauastrum* spp., 368
- Stellaria media*, 420
- Stephos* spp., 122
- Sterechinus neumayeri*, atypical zinc-binding polypeptides, 305–8
- Sterechinus* spp., 124, 125
- Sterna vittata*, 433
- sterols, phytoplankton taxa
 identification, 79–84
- Strombidium viride*, 401
- Stylacteria* see *Hydractinia* spp.
- sub-Antarctic islands
 general descriptions, 153–4
 map, geographical and glacial histories, 154
 weevils, 152–9
 see also Kerguelen Islands
- sulphur circulation, dimethyl sulphide in Ross Sea, 93–9
- survival mechanisms
 alga (*Prasiola crispera*), 226–32, 234–9
 antifreeze glycopeptides and proteins (AFGPs and AFPs) in fish, 49, 202–7, 209–15
 crabeater seal, cohort variation, 241–6
Euphausia crystallorophias, 187–91
Euphausia superba, 193–200
 lichens, 221–4
 photosynthetic activity, 221–4, 234–9
 summary, 185–6
 visual and nonvisual senses in fish, 217–19
- Synechococcus* spp., Ace Lake, 178–83
- Synedra* spp., 145–9
- terrestrial communities
 arthropods, 316–20
 composition, 321–5
- Thalassiosira* spp., 112–16, 137, 145–9, 369, 382–3
- Theodorina* sp., 22, 23
- tidal lagoon, Bratina Island, 170–6
- time depth recorders (TDRs), diving
 behaviour of Weddell seal pups, 328–34
- tintinnids, 84
- tourism disturbance, Adélie penguin, 445–52
- Trachyneis* spp., 144, 145–9
- Trebouxia*, in lichen communities, 222
- Trematomus* spp.
 AFGPs, 206, 210–12
 genomic DNA, 46, 47, 48
 haemoglobins, 255–6
 Lazarev Sea, 27, 30–1
 myoglobin gene, 57–61
- trophic flow, in benthic shelf
 communities, Weddell Sea, 118–32
- tubulins
 β -tubulin gene family, *Euplotes focardii*, 300–4
 cytoskeletal, 253
- Tunicata, Weddell Sea, 125
- ultraviolet radiation
 adaptations of *Prasiola crispera*, 226–32, 368
 effects on primary production, 375–9
 escape in non-marine habitats, 388–94
 avoidance, 391–2
 quenching, 392
 repair, 392
 screening, 392
 evidence against UV-B induced changes, diatom assemblages, sediment cores, 381–6
 UV-B and ozone depletion, 367–73
 see also climate change
- Uncinia compacta*, sedge, island populations, 158
- United States, Antarctic Marine Living Resources (AMLR) program, Elephant Island, 73–8
- Usnea* spp.
 microbial communities, 162–8
 production, 222–4
- vegetation change, introduced vascular plants, 417–23
- '*Vesiculotum*' spp., 16S rRNA sequences, 52, 53
- Vestfold Hills area
²¹⁰Pb profiling, 382, 384
 Ace Lake, cyanobacteria, 178–83
 Magnetic Island, lipid signatures of phytoplankton, 79–84
 prokaryote studies, 52
 sediment core evidence against UV-B induced changes, 381–6
- Victoria Land
Bryum argenteum, 33–8
 emerged beaches, Holocene, 352–5
- visual and nonvisual senses in fish, 217–19
- vitamin D, and solar irradiation, 372
- waste disposal, ships, 442–3
- Weddell Sea
 antifreezes in fish, 209–15
 biodiversity, dominance plots, 8
 copepods
 reproduction in summer, 112–16
 seasonality of fish feeding, 277–82
 dynamics of microbial communities, pack ice, 101–5
 gyre reflow, 27, 119
 Hemichordata, 125
 map, 113, 119
 mixed trophic impacts, 130
 modelling
 benthic components, 129
 carbon flows, 128
 ecosystem attributes and goal functions (Odum), 130–2
 Lindeman trophic pyramids, 129
 summary statistics, 128
Pleuragramma antarcticum, feeding, 277–82

Cambridge University Press

978-0-521-11179-9 - Antarctic Communities: Species, Structure and Survival

Edited by B. Battaglia, J. Valencia and D. W. H. Walton

Index

[More information](#)

464

Index

Weddell Sea (*cont.*)
 trophic flow in benthic shelf
 communities, 118–32
 zooplankton, 9–10

Weddell seal, 126
 anisakid endoparasites, 43
 pups, diving behaviour, 328–34

weevils *see* *Ectemnorhinus*-group
 weevils

Wilson's storm petrel, 414

Windmill Islands, *Prasiola crista*,
 adaptations to freezing and UV
 radiation, 226–32

xenobiotics, mixed function oxidase
 activity in fish, 407–8

Yoldia eightsi, 409–11

Zhongshan Station, Larsemann Hills,
 396–403

zinc-binding polypeptides, *Stereochinus*
neumayeri, 305–8

Zoarcidae

AFP, 204, 211

haemoglobins, 255

zooplankton

amphipods, genera and species
 numbers, 7

biodiversity index, 9–10

composition, 120, 122

copepods

consumption by pelagic fish, 277–82

consumption and respiration, 123

reproduction in summer, 112–16

gelatinous types, 122–3

reproduction in summer, Weddell Sea,
 112–16, 120–3

temporal variability, Kerguelen
 Islands, 86–90