

# Index

*Note:* Page numbers in *italic* denote figures. Page numbers in **bold** denote tables.

- Acervulina inhaerens* **85, 86**  
acoustic facies, Loch Sunart 357, 364, 365  
*Adercotryma glomerata* **174**  
Ailort, Loch (Scotland) 306, 311, **312**, 317–318, 322  
Ainort, Loch (Scotland) 306, **312**, 342  
  seismic survey 318–319  
  terminal moraine 321  
Akselsundet 52  
Alaska  
  fjord regimes defined 7, **128**  
  fjord sedimentation rates 9  
Alleröd Period 348, 363, 365, 366  
*Alnus*, Holocene record  
  Loch Etive 334, 335, 336, **337**, 338  
  Loch Sunart 317, 361, 362  
Alpe Fjord (Greenland) **128**  
Amazon River, radiocarbon age 103  
Amazon shelf, organic carbon 104  
*Ammodiscus* spp. **86, 174**  
*Ammonia* spp.  
  *A. batavus* **85, 86**  
  *A. beccarii* 316, 345, 346, 347, 348  
  *A. tepida* 345, 346, 347, 348  
*Ammoscalaria runiana* **86**  
*Ammotium cassis* **174**  
amphidrome 20  
*Angulogerina fluens* **175**  
anisotropy of magnetic susceptibility (AMS)  
  Billefjorden **216**  
  Kongsfjorden 291–292, 294  
  Maxwell Bay 246, 247  
  Sassenfjorden 165, 179, 180, 181  
Annat Bay Formation 227, 228, 229, 236  
*Anomalina globulosa* **86**  
anoxic fjords 7, 8, 9, 23  
Antarctic fjord regimes, defined 7  
Antarctica, West *see* Maxwell Bay  
Arctic fjords  
  dinoflagellate palaeoceanographic proxy survey  
  methods 65  
  results 67–70  
  results discussed 70–72  
distribution 36, 37  
dynamical processes  
  polynyas 44–46  
  rotation 42–43  
  shelf exchanges 46–47  
  vertical mixing 41–42  
  wind forcing 43–44  
hydrographic survey  
  methods 51–53  
  results  
    currents 53, 56, 58, 59  
    salinity 53, 54, 56, 57  
    temperature 53, 55, 56  
    wind 55, 58, 59  
  physical oceanography  
    seasonality 39–41  
    stratification 36, 38–39, 40  
Arctic Front 290  
Ardessie debris lobe 225, 226, 228, 232, 235, **238**  
Arisaig Formation 365, 366  
arm, defined 17  
*Armorella* sp. **174**  
Assynt Glaciogenic Formation 227, 228, 229, **231**, 234, 235, 236  
*Astacolus hyalacrulus* **175**  
*Asterigerinata mamilla* **85, 86**  
*Astrononion* spp.  
  *A. gallowayi* **85, 86, 175**, 295, 296  
  *A. tumidum* **86**  
Atlantic Ocean, organic carbon content 103–104  
Atlantic Period 348–350, 363, 365, 366  
Axel Heiberg 36, 37  
  
Badcaul Slide 226, 229, 235, 236, **238**  
Baffin Island 36, 37, **128**  
Baird Inlet (Ellesmere Is.) **128**  
baroclinic form 18, 21–24  
barotropic form 18, 20–21  
  impact of barotropic tides **19**  
Barsnesfjord (Norway) 12, 272–273  
  climate proxy study  
  methods  
    coring 273  
    <sup>137</sup>Cs dating 273–274  
    diatom analysis 275–276  
    grain size 274  
    total organic carbon 274–275  
  results  
    core description 276–278, 281  
    meteorology 279, 280  
    sedimentation rates 278–279  
  results discussed 282–283  
    box model 285–286  
    cosmic influence 285  
    northern hemisphere influence 284–285  
    regional influence 284  
bathymetry, Kongsfjorden 94  
<sup>10</sup>Be in marine sediments 285  
Bellsund (Svalbard) 290, 299, 300  
Bering Sea, organic carbon 104  
*Betula*, Holocene record  
  Loch Etive 334, 335, 336, **337**, 338  
  Loch Sunart 317, 361, 362, 364  
Billefjorden (Spitsbergen) 45, 207–208  
  glacial activity survey  
  methods 208–210  
  results  
    core data  
      chronology 217  
      lithology 212–214, 215, **216**  
      mineralogy 217

- Billefjorden (Spitsbergen) (*Continued*)  
 landforms 210–212  
 morphology 209, 210  
 results discussed  
 Holocene 221  
 Post Holocene 221  
 Pre-Holocene 217–221
- biochemical oxygen demand (BOD) 23
- biogeochemistry 9
- biology *see* diatoms; dinoflagellates; foraminifera;  
 pollen
- bioturbation and carbon budget 116
- Bismark Sea, organic carbon 104
- Bitectatodinium tepikiense* 77, 80
- Black Loch (Scotland) 336
- Blairdrummond Shoreline 307
- Blomstrandhalvøya 196, 197
- Bolivina* spp.  
*B. pseudoplicata* 86, 346  
*B. pseudopunctata* 86, 175  
*B. skagerrakensis* 86  
*B. variabilis* 85, 86, 346
- Bölling Period 348, 363, 365, 366, 367
- Bonawe Narrows 321
- Boreal Period 348–350, 363, 365, 366
- box models 285–286
- British Columbia *see* Pacific Coast inlets
- Brøggerhalvøya 196, 197
- Broom, Little Loch 227–228, 311, 320–321, 322  
 slope instability survey  
 methods 228, 230–231  
 results  
 Ardesie debris lobe 235  
 Badcaul Slide 235  
 seismic profile 229  
 Slide Complex 231, 232, 233–234  
 stratigraphy 231, 235–236  
 swath bathymetry 230  
 results discussed  
 mass failure timing 239  
 mass failure triggering 239–240  
 mass transport 236–239
- Broom, Loch (Scotland) 227, 228, 320–321, 322
- Buccella* spp. 295, 297  
*B. frigida* 85, 86, 175  
*B. tenerrima* 175
- Bulimina* spp.  
*B. elongata* 86  
*B. marginata* 85, 86, 175, 345, 346, 347
- Buliminella elegantissima* 86
- bulk density of sediments  
 Billefjorden 216  
 Maxwell Bay 246  
 Sassenfjorden 165, 179, 180, 181
- Bute Inlet (BC) 128, 155–156
- $\delta^{13}\text{C}$  12  
 Gullmar Fjord 264, 265, 266–267
- $^{14}\text{C}$  dating  
 Billefjorden 210, 215, 217, 218  
 Gullmar Fjord 263  
 Kongsfjorden 291–292, 294  
 Loch Etive 334, 335, 336  
 Loch Sunart 343, 361
- Maxwell Bay 246, 247, 248  
 Sassenfjorden 165, 169, 182
- Cadail Slide 226
- California shelf, organic carbon 104
- Calluna*, Holocene record in Loch Etive 334, 335, 336, 337, 338
- Cambridge Fjord (Baffin Is.) 128
- Canada *see* Pacific Coast inlets
- Canadian shelf, organic carbon 104
- canal, defined 5
- carbon budgetting in Loch Creran 104–105  
 calculations 106–108  
 accumulation rates 117–118  
 budget  
 labile OM 120  
 lignin 119–120  
 organic carbon 118–119  
 refractory OM 120–121  
 flow rate 118  
 organic carbon flux 117  
 sedimentation rate/flux 117  
 method of study 105–106  
 results  
 C/O uptake 108  
 flow rate 109  
 overall budget 109–110  
 sedimentation rates 108–109  
 results discussed  
 flow rate 113  
 overall budget 113–114  
 particulates 113  
 sedimentation rates 110–113  
 summary  
 bioturbation 116  
 carbon cycling 114–115  
 global significance 116–117  
*see also* organic carbon
- carbon sinks 9  
 Carnach Slide 229, 232, 233
- Cassidulina* spp.  
*C. laevigata* 261, 265, 266, 267, 268  
*C. obtusa* 86, 345, 346, 347, 348  
*C. reniforme* 172, 173, 175, 295, 296, 299, 300, 301  
*C. terretis* 175
- Celtic Sea, organic carbon 104
- Cerealia, Holocene record in Loch Etive 335
- CFCs 12
- Chaetoceros* spp. 275
- Chernobyl isotope release 12, 273
- Chukchi shelf, organic carbon 104
- Cibicides* spp.  
*C. lobatulus* 85, 86, 175, 296, 314  
*C. pseudoungerianus* 85, 86
- Claish Moss, pollen record 332, 337
- climate archives 11–12
- Clyde Sea (Scotland) 83, 84, 85  
 foraminifera survey  
 methods 85  
 results 85–87
- Clyde Fjord (Baffin Is.) 128
- Coastal Current 290
- Cook Inlet (Alaska) 128
- Coriolis parameter 42, 51

- Cornuspira* spp. **174, 346**  
*C. involvens* **86**  
 Corran Narrows 321  
*Corylus*, Holocene record  
 Loch Etive 334, 335, 336, **337**, 338  
 Loch Sunart 317, 361, 362, 365  
 Creran, Loch (Scotland) 104–105, 311, 321, 323, 366  
 carbon budgetting  
 calculations 106–108  
 accumulation rates 117–119  
 budget  
 labile OM 120  
 lignin 119–120  
 organic carbon 118–119  
 refractory OM 120–121  
 flow rate 118  
 organic carbon flux 117  
 sedimentation rate/flux 117  
 method of study 105–106  
 results  
 flow rate 109  
 overall budget 109–110  
 sedimentation rates 108–109  
 results C/O uptake 108  
 results discussed  
 flow rate 113  
 overall budget 113–114  
 particulates 113  
 sedimentation rates 110–113  
 summary  
 bioturbation 116  
 carbon cycling 114–115  
 global significance 116–117  
*Cribostomoides jeffreysi* **85, 86**  
<sup>137</sup>Cs sediment record 12, 273–274  
 Cumberland Sound (Baffin Is.) **128**  
*Cuneata arctica* **174**  
 current-temperature depth profiling (CTD)  
 Kongsfjorden 291  
 Sassenfjorden 165, 170  
 Van Mijenfjorden 55–56, 59  
 cyclopels 11  
 cyclopsams 11  
 Cyperaceae, Holocene record in Loch Etive 335  
 deep water renewal **19**  
 delta, Gilbert-type 92  
*Dentalina* spp. **175**  
*D. flintii* **86**  
*D. guttifera* **86**  
*D. pauperata* **86**  
 diatoms 10  
 Norwegian fjords 275–276, 281, 282, 284  
 Vancouver Island inlets 150  
 dinoflagellates 10  
 ecology 63  
 as palaeoceanographic proxies 62  
 Svalbard survey  
 method 65  
 results 67–70  
 results discussed 70–72  
 Swedish survey  
 methods 75–77  
 results 77–78  
 results discussed 78–80  
 Disco Bay (Greenland) **128**  
*Discorbis* spp.  
*D. chasteri* **86**  
*D. wrightii* **86**  
 Disraeli Fjord (Ellesmere Is.) **128**  
 Don basin 314, 316  
 drumlins, Kongsfjorden 200–201  
 earth rotation 20, 24  
 Arctic fjord 42–43, 54  
 East Greenland Current 39  
 Effingham Inlet (BC) 152–155, 285  
*Egerella advena* **174**  
*Eggerelloides scabrum* **85, 86**  
 Ekman transport 43, 44, 55, 56, 79  
 El Niño Southern Oscillation (ENSO) 285  
 Ellesmere Island 36, 37, **128**  
*Elphidium* spp.  
*E. albiumbilicatum* **85, 86**, 295  
*E. bartletti* **175**, 295, 297  
*E. clavatum* 345, 346, 347, 348, 349  
*E. crispum* **85, 86**, 346  
*E. excavatum* 172, 173, **175**, 295, 296, 297, 299, 300, 346  
*E. frigidum* **175**  
*E. gerthi* **85, 86**, 346  
*E. hallandense* 295, 297  
*E. incertum* **175**  
*E. macellum* **85, 86**  
*E. margaritaceum* **85, 86**  
*E. subarcticum* **175**, 346, 347, 348  
*E. williamsoni* **86**, 346  
*Epistominella vitrae* **175**  
 erosion rates, Kongsvegen 92, **95**  
 estuarine circulation **19**, 21–22  
 estuary, defined 22  
 Etive, Loch (Scotland) 306, 311–313, 321, 331, 332, 366  
 foraminifera 313–314  
 geomorphology 313  
 pollen survey 314  
 methods  
 coring 332  
 dating 333  
 pollen separation 333  
 results **333**, 334  
 results discussed 334–336  
 summary 336, 338  
 sediment record 313  
 Holocene 322–323  
 Recent 323  
 Younger Dryas 322  
 eustasy *see* sea-level change  
 Ewe, Loch (Scotland) 322  
 exchange and mixing 23, 24–25  
 Arctic fjords 41–42, 46–47  
 firth, defined 5  
 fish kills 23  
*Fissurina* spp. **175**  
*F. danica* **85, 86**  
*F. elliptica* **85, 86**

- Fissurina* spp. (Continued)  
*F. lucida* **85, 86**  
*F. marginata* **85, 86**  
*F. quadrata* **86**  
*F. serrata* **86**  
*F. trigono-marginata* **85, 86**
- fjord overview  
classification 6–8  
definition 5, 17  
distribution 125  
origin 5–6  
processes 7, 8–10, 18–25  
sedimentary environment and climate  
archive 11–12  
topography 17–18  
*see also* Arctic fjords
- floating ice shelves 11
- foraminifera 9–10  
Clyde Sea survey  
methods 85  
results 85–87  
Gullmar Fjord survey  
methods 263–264  
results 264, 265  
results discussed 267–269  
Kongsfjorden survey  
methods 291  
results 294–295, 299  
Sassenfjorden survey  
methods 165  
results 172, **173, 175**, 186–187  
Scottish lochs 313, 316  
Loch Sunart 345, 346, 347–350
- Franz Joseph Land 36, 37  
Frazer Lowlands (BC) **128**  
Frobisher Bay (Baffin Is.) **128**
- gas generation 360, 366  
Generaljella Formation 197  
geochemistry  
Maxwell Bay 246, 249, 250, 251  
Sassenfjorden 165, 171–172  
geomorphology, fjord 117–18  
geostrophic control 46, 79  
glacial channels 201  
glacial deposition 11  
glacial erosion 5–6  
Kongsvegen 92  
glacial lineations  
Billefjorden 210  
Kongsfjorden 201  
glaciomarine sediments 11  
glaciomarine dynamics  
Kronebreen-Kongsvegen 95–99, 99–101
- Globobulimina* spp. **175**  
*Globulina aequalis* **86**
- granulometry  
Barsnesfjord 274, 278  
Billefjorden  
methods 210  
results 215  
Kongsfjorden  
methods 92, 291  
results 98, 293, 294
- Loch Sunart 343–345, 360–361  
Maxwell Bay  
methods 245  
results 248–249  
results discussed 252–253  
Sassenfjorden 165, 178, **183**
- gravity coring  
Billfjorden  
methods 209–210  
results 212  
Kongsfjorden 291  
Litle Loch Broom 230  
Maxwell Bay 245  
Sassenfjorden 165, 178, 179, 180
- Greenland **128**  
fjord distribution 36, 37  
fjord oceanography 39  
fjord regimes defined 7
- Gullmar fjord (Sweden) 24, 75, 76, 262–263  
dinoflagellate survey  
methods 75, 77  
results 77–78  
results discussed 78–80
- foraminifera survey  
methods  
 $\delta^{13}\text{C}$  analysis 264  
coring 263  
dating 263  
results  
 $\delta^{13}\text{C}$  record 264, 265  
organic carbon 266  
results discussed  
 $\delta^{13}\text{C}$  signal 266–267  
historical significance 268–269  
organic carbon 267–268
- Guttulina harrisi* **86**
- Hall Land (Greenland) **128**  
Hamilton Inlet (BC) **128**  
Hardangerfjord (Norway) **128**
- Haynesina* spp.  
*H. germanica* 345, 346, 348, 350  
*H. orbiculare* **175**
- Hinlopen Strait (Svalbard) 290, 299, 300
- Hippocrepina indivisa* **174**
- Holocene  
Billefjorden 221  
Kongsfjorden 297–299  
methods 291–292  
palaeoceanographic implications 299–302  
results  
foraminifera 294–295  
lithostratigraphy 293–294  
sedimentation rates 293  
significance of results 295–297  
Scottish lochs 314, 317, 322–323  
methods of analysis 333  
results **333**, 334  
results discussed 334–336  
summary 336, 338
- Hornsund (Spitsbergen) 37  
Hudson River 103  
hummocky moraine 322  
*Hyalina balthica* 345, 346, 347, 349

- hydrogen sulphide 9
- hydrography in fjords 8–9
- Gullmar fjord 262–263
  - Kongsfjorden 65–67
  - Pacific Coast inlets 145–146
  - Sassenfjorden 170
  - Van Mijenfjorden 37, 41, 51–53
- Hyperammina subnodosa* **175**
- hypoxia 23
- ice-influenced fjord regimes, defined 7
- ice-rafted debris (IRD) 11, 185, 207, 214, **216**, 221
- Kongsfjorden 291, 293, 294, 295, 297, 298, 299, 301
- iceberg plough marks, Billefjorden 212
- Impagidinium pallidum* 69, 70
- inlet, defined 17, 143
- intermediate water exchange **19**
- Inversaddle basin 314, 315
- inverse barometer effect 21
- Irminger Current 39
- Isfjorden (Spitsbergen) 37, 43, 45, 46, 207, 208
- Islandiella* spp.
- I. islandica* **175**
  - I. norcrossi/helenae* 172, 173, **175**, 295, 296
- Islandinium* spp.
- I. cesare* 77
  - I. minutum* 67, 68, 69, 70
- isostasy, modelling responses 126–127
- Itirbilung Fjord (Baffin Is.) **128**
- Jakobshavn fjord (Greenland) 39
- Jervis Inlet (BC) 155–156
- JulianeHaab (Greenland) **128**
- Juniperus*, Holocene record in Loch Etive 335, 336, **337**, 361, 362
- Kapisillit (Greenland) **128**
- Kattegat 104
- Kelvin wave 56, 59
- Kentallen basin 314, 315, 321, 322
- Kentra Moss, pollen record 332, **337**
- Knight Inlet (BC) **128**, 155–156
- Kongsfjorden (Spitsbergen) 37, 42, 43, 44, 46, 64, 90, 91, **128**, 196, 197, 290–291
- dinoflagellate survey
    - methods 65
    - results
      - cyst flux 67, 69, 70
      - species 68
      - results discussed 70–72
  - glacier system study
    - methods 91–92
    - results
      - landforms 92–94
      - retreat rate 92
      - sediment flux 95–99
      - water column stratification 94–95
    - results discussed
      - sediment flux 99–101
      - water column stratification 99
- Holocene climate survey 297–299
- methods 291–292
  - palaeoceanographic implications 299–302
  - results
    - foraminifera 294–295
    - lithostratigraphy 293–294
    - sedimentation rates 293
    - significance of results 295–297
- hydrographic survey
- methods 65
  - results 65–66, 67
- submarine landforms
- bedform succession 201–202
  - deglaciation sequence 203–204
  - drumlins 200–201
  - glacial channels 201
  - glacial lineations 201
  - icestream dynamics 202–203
  - ridges and moraines 197–200
  - zooplankton 64–65
- Kronebreen-Kongsvegen glacier system 91
- methods of study 91–92
  - results
    - erosion and sedimentation 92–94
    - retreat rate 92
    - sediment flux 95–99
    - water column stratification 94–95
  - results discussed
    - sediment flux 99–101
    - water column stratification 99
- Krossfjorden (Spitsbergen) 196, 197, 290
- submarine landforms
    - bedform succession 201–202
    - deglaciation sequence 203–204
    - drumlins 200–201
    - glacial channels 201
    - glacial lineations 201
    - icestream dynamics 202–203
    - ridges and moraines 197–200
- Kyllaren fjord (Norway) 12
- Labrospira crassimargo* 172, 173, **175**
- Lagen* spp. **175**, 346
- L. laevis* **86**
  - L. perlucida* **86**
- Lamarckina halioidea* **86**
- laminites 11
- landforms
- Kongsfjorden/Krossfjorden 92–94, 197–202
- landslides 8
- Laudale Narrows 357, 366, 367
- Lenticulina* spp. **86**
- lignin budget 119–120
- Lilliehöökfjorden (Spitsbergen) 197, 198
- Lingulodinium polyedrum* 77, 78, 79, 80, 81
- Linnhe, Loch (Scotland) 23, 306, **312**, 321
- facies analysis 314–315, 321
  - Holocene deposits 322–323
  - seismic survey 314
  - Younger Dryas deposits 322
- lipid biomarkers 12
- lithology of cores *see* granulometry
- Lismore basin 314, 316
- Little Ice Age evidence
- Gullmar Fjord 261, 265, 267–268
  - Loch Sunart 367
  - Maxwell Bay 255–257
  - Norwegian fjords 285

- Little Loch Broom Slide 226, 228, 231–234, **238**  
 Loch Broom Till Formation 227, **228**  
 Loch Lomond Readvance 309, 310, 355, 357  
 Lochan a' Bhuilg Bith 332, **337**, 338  
 Lomond, Loch, pollen record 332, **337**  
 Lorne, Firth of 307, 321
- maerl, defined 83  
 Main Postglacial Shoreline 307  
 Maktak Fjord (Baffin Is.) **128**  
 Malangen Fjord (Norway) **128**  
 Mallaig Formation 317  
 mass flow and sliding 231–240  
*Massilina secans* **85**, **86**  
 Maxwell Bay (South Shetland Islands) 244  
   climate proxy survey  
     methods 245–246  
     results  
       AMS 247  
       <sup>14</sup>C record 247  
       core characteristics 246  
       geochemistry 249–250  
       granulometry 248–249  
       <sup>210</sup>Pb 247  
       stratigraphy 246–247  
     results discussed  
       global climate records compared 253–254  
       granulometry 252–253  
       Little Ice Age 255–257  
       Medieval Warm Period 254–255  
       seasonality 253  
 Medieval Warm Period  
   Gullmar Fjord 261, 265, 267–268  
   Maxwell Bay 254–255  
*Milionella subrotunda* **85**, **86**  
 Minch Formation 365, 366  
 mineralogy, Billefjorden sediments **216**  
 mixing and exchange 23, 24–25  
   Arctic fjords 41–42, 46–47  
 modelling *see* numerical modelling  
 Möllerfjorden 197, 198  
 moraine ridges  
   Billefjorden 210–211  
   Kongsfjorden 197–200  
 morphology, fjord 8  
 Muck Formation 317, 321, 365, 366
- N-Pangnirtung Fjord (Baffin Is.) **128**  
 Nansen Fjord (Greenland) 285  
*Nematosphaeropsis labyrinthus* 69, 70  
 Ness, Loch (Scotland) 285, 366  
 Nevis, Loch (Scotland) 306, **312**, 317–318, 322  
 Nevis Formation 317  
*Nonion* spp.  
   *N. depressulus* **85**, **86**  
   *N. pauperatus* **85**, **86**  
*Nonionella* spp.  
   *N. auricula* **86**  
   *N. ladorica* 172, 173, **175**, 295, 296, 299,  
     300, 301  
   *N. turgida* 346  
 Nordaustlandet 36, 37  
   *see also* Rijpfjorden  
 North Atlantic Drift 308  
 North Atlantic Oscillation (NAO) 11, 78, 79,  
   284–285, 308  
 North Sea, organic carbon 104  
 Norway  
   meteorological records **276**, **277**, 280, 281, 282  
   *see also* Barnesfjord; Sogndalsfjord  
 Norwegian Atlantic Current 39, 208  
 Novaya Zemlya 36, 37  
 numerical modelling  
   fjord circulation  
     box 29–30  
     three-dimensional 27–29  
     two-dimensional 26–27  
     two-layer 26  
   fjord stratigraphy  
     factors affecting  
       isostasy and sea-level change 126–127, **128**  
       timing of deglaciation 127, 129–130  
     methodology  
       geometry 131–132  
       relative sea level 132  
       sediment supply 132  
     results  
       stable sediment supply 132–137, 138  
       variable sediment supply 137, 138  
     results discussed 139  
   sediment transport 155–156
- Observatory Inlet (BC) **128**  
 Older Dryas Period 317, 348, 363, 365, 366  
*Oolina* spp. **175**  
   *O. borealis* **85**, **86**  
   *O. hexagona* **85**, **86**  
   *O. lineata* **86**  
   *O. melo* **85**, **86**  
   *O. squamosa* **86**  
   *O. williamsoni* **85**, **87**  
 organic carbon, riverine export 103–104  
 organic carbon flux  
   Gullmar Fjord 263, 265, 266, 267–268  
   Norwegian fjords 274–275, 281, 282  
   Sassenfjorden 165, 172  
   *see also* carbon budgeting  
 Oslo Fjord (Norway) **128**  
 overturning 8–9, 25  
   Arctic fjords 51
- Pacific Coast inlets  
   archaeology 149–150  
   future research 156–157  
   geographical setting 144  
   geological setting 147–148  
   glacial history 148–149  
   history of research 146–147  
   hydrography 145–146  
   oceanography 149  
   Vancouver Island anoxic inlets 150  
     Effingham Inlet 152–155  
     Saanich Inlet 151–152  
   Vancouver Island oxygenated inlets 155–156  
 Pacific Decadal Oscillation (PDO) 155, 285  
 Pacific Ocean, organic carbon content 103–104  
 palynology *see* pollen record  
 Parker River, radiocarbon age 103

- particle size analysis *see* granulometry  
 particulate organic matter (POM) 22–23  
*Patellina corrugata* **87**  
<sup>210</sup>Pb  
   Gullmar Fjord 75, 263  
   Maxwell Bay 246, 247, 248  
<sup>206</sup>Pb/<sup>207</sup>Pb fingerprinting 12  
 PCBs 12  
*Pentapharsodinium dalei* 68, 69, 70, 77  
 Phillips Inlet (Ellesmere Is.) **128**  
*Pinus*, Holocene record  
   Loch Etive 334, 335, 336, **337**, 338  
   Loch Sunart 317, 361, 362, 364  
 piston coring  
   Gullmar fjord 263  
   Loch Sunart 358  
   Sassenfjorden 165, 178, 181  
*Planorbulina distoma* **85, 87**  
 Poaceae, Holocene record  
   Loch Etive 335, **337**  
   Loch Sunart 362, 363  
 pockmarks 8  
 polar fjords 6, 9, 11  
 pollen record  
   Holocene of Loch Etive 314  
     methods of analysis 333  
     results **333**, 334  
     results discussed 334–336  
     summary 336, 338  
   Holocene of Loch Sunart 317  
   *see also under named species*  
 pollution 12  
   history in Gullmar Fjord 78, 79, 268  
*Polykrikis schwartzii* 77  
*Polymorphindae* sp. **87**  
 polynyas, Arctic fjord 44–46  
*Polypodium*, Holocene record in Loch Etive 335  
*Populus*, Holocene record from Loch Sunart 361, 362  
 Porsanger Fjord (Norway) **128**  
*Portatrochammina karica* **174**  
 Preboreal Period 348, 363, 365  
*Protoceratium reticulatum* 77  
*Protoperidinium* spp. 67, 68, 69, 70, 77  
   *P. avellana* 77  
   *P. concooides* 77  
   *P. conicum* 77  
   *P. pentagonum* 77  
*Pseudopolymorphina suboblona* **87**  
*Pteridium aquilinum*, Holocene record in Loch Etive 335  
*Pyrgo* spp.  
   *P. depressa* **85, 87**  
   *P. williamsoni* **85, 87, 174**  
 pyrite 9  
  
*Quercus*, Holocene record  
   Loch Etive 334, 335, 336, **337**, 338  
   Loch Sunart 317, 361, 362, 364  
*Quinqueloculina* spp.  
   *Q. aspera* **87**  
   *Q. bicornis* **85, 87**  
   *Q. cliarensis* **87**  
   *Q. dunkerquiana* 345, 346  
   *Q. duthiersi* **87**  
   *Q. lata* **85, 87**  
  
   *Q. seminula* **174, 345, 346**  
   *Q. seminulum* **85, 87**  
   *Q. stalkerii* 172, 173, **174**  
  
 raised beaches, Scotland 307  
*Recurvoides turbinatus* 172, 173, **174**  
*Reophax curtus/scorpiurus* 172, 173, **174**  
 rhythmites 11  
 Rjipfjorden (Nordaustlandet) 37, 64  
   dinoflagellate survey  
     method 65  
     results 70  
     results discussed 70–72  
   hydrographic survey  
     methods 65  
     results 66–67  
   zooplankton 65  
 Rireavach Member 227, 233–234, **238**  
 Rireavach Slide 229, 231, 232  
 river-influenced fjord regimes, defined 7  
 rivers  
   impact on fjords **19**  
   sedimentation 11  
*Robertina arctica* **175**  
 Roman Warm Period 261, 265  
*Rosalina* spp. **175**  
   *R. anomala* **85, 87**  
   *R. bradyi* **85, 87**  
   *R. neapolitana* **87**  
   *R. praegeri* **85, 87**  
   *R. williamsoni* **85, 87**  
 Rossby radius 42, 54  
 rotation of earth 20, 24  
   Arctic fjords 42–43, 54  
  
 Saanich Inlet (BC) 147, 151–152, 285  
 Sagami Bay, organic carbon 104  
 Saguenay fjord (Canada) 12  
 St Lawrence (Canada) **128**  
 salinity gradients  
   Arctic fjords 38, 41  
   Gullmar fjord 262  
   Sassenfjorden 170, 187  
   Van Mijenfjorden 53–54, 56, 57  
 Sam Fjord (Baffin Is.) **128**  
*Salix*, Holocene record in Loch Etive 335, 336, **337**  
 Sassenfjorden (Spitsbergen) 164–165, 166  
   sedimentary environment analysis  
     methods 165–166, **167, 168**  
     results  
       core data  
         chronology 182, 184–185  
         lithology 178–181, 183  
         mineralogy 185  
       foraminifera 172, **173, 174**  
       hydrography 170  
       landforms 172–173, 176, 177, 178  
       sediment composition 170–171  
       sediment geochemistry 171–172  
     results discussed  
       modern environments 186–188  
       past environments 188–189  
       processes 185–186

- Scoraig Slide 229, 232, 233  
 Scoresby Sund (Greenland) 6, 37, 42  
 Scotland, west coast  
   climate 308–309  
   currents 308  
   deep water renewals 310–311  
   environment classification 309–310  
   fjord postglacial history  
   Ailort, Loch 317–318  
   Ainort, Loch 318–319  
   Etive, Loch 313–316  
   Linnhe, Loch 314–316  
   Nevis, Loch 317–318  
   Summer Isles 319–320  
   Sunart, Loch 316–317  
   geology 306  
   physiography 306–307  
   sea-level change 307  
   sediments 307–308  
   shelf morphology 307  
   Younger Dryas ice cap 309  
   *see also* Clyde Sea; lochs Broom; Creran; Etive;  
   Ewe; Ness; Sunart  
 sea-level change 21, 125, 307  
   modelling responses 126–127  
 sea-loch, defined 5, 17, 305, 331  
 seasonality  
   Arctic fjords 39–41, 253  
   Kongsfjorden 291  
 sediments and sedimentation rate 9  
   Barnesfjord 273, 278–279  
   Creran, Loch 105–106, 108–109, 110, 117  
   Kongsfjorden 95–99, 99–101, 293–294  
   Norwegian fjords 278–279  
 seismic survey, Loch Sunart 358–360  
 Sepik River, organic carbon 104  
 Severnaya Zemlya 36, 37  
 Shuna basin 314, 315, 321, 322  
*Sigmoilina* sp. **174**  
*Silicosigmoilina groenlandica* **174**  
 Sionascaig, Loch, pollen record 332, **337**  
*Siphonaperta agglutinata* **174**  
 Skagerrak 79, 80, 104, 262, 267  
*Skeletonena costatum* 275, 276  
 sliding and mass flow 231–240  
 slope failure in fjords 7  
   Little Loch Broom slope instability survey  
   methods 228, 230–231  
   results  
     Ardessie debris lobe 235  
     Badcaul Slide 235  
     seismic profile 229  
     Slide Complex 231, 232, 233–234  
     stratigraphy **231**, 235–236  
     swath bathymetry 230  
   results discussed  
     mass failure timing 239  
     mass failure triggering 239–240  
 Sogndalsfjord (Norway) 272–273  
   climate proxy study  
   methods  
     coring 273  
     <sup>137</sup>Cs dating 273–274  
     diatom analysis 275–276  
     grain size 274  
     total organic carbon 274–275  
   results  
     core description 276–278, 281  
     meteorology 279, 280  
     sedimentation rates 278–279  
   results discussed 283  
     box model 285–286  
     cosmic influence 285  
     northern hemisphere influence 284–285  
     regional influence 284  
 solar forcing 285  
 Sondre Stromfjord (Greenland) **128**  
 sound, defined 5, 16  
 South Shetland Islands *see* Maxwell Bay  
 sparker profiles, Sassenfjorden 166, 172, 177  
 Spelve, Loch (Scotland) 311  
*Sphagnum*, Holocene record  
   Loch Etive 335  
   Loch Sunart 361, 362  
*Spiniferites* spp.  
   *S. bentorii* 77  
   *S. elongatus* 77  
   *S. frigidus* 67, 69, 70  
   *S. mirabilis* 77  
*Spiroloculina depressa* **85, 87**  
*Spiroloculina rotunda* **85, 87**  
*Spirophthalmidium* sp. **87**  
*Spiroplectammina* spp.  
   *S. biformis* **174**  
   *S. earlandi* **87**  
   *S. wrightii* **85, 87**  
 Spitsbergen 36, 37, 43  
   climate 52  
   *see also* Billefjorden; Isfjorden; Kongsfjorden;  
   Krossfjorden; Sassenfjorden; Storfjorden;  
   Tempelfjorden; Van Mijenfjorden  
 spring bloom 23  
*Stainforthia* spp.  
   *S. fusiformis* **87**  
   *S. loeblichi* **175**, 295, 296  
 Stephens Passage (Alaska) **128**  
 Storegga Tsunami Shoreline 307  
 Storfjorden (Spitsbergen) 37, 39, 40, 44, 45  
 storm surges 21  
 stratification 18, 20, 22  
   Arctic fjords 36, 38–39, 40, 51  
   Gullmar fjord 262  
   Kongsfjorden 94–95, 99, 291  
 Sub-atlantic Period 348–350, 363, 365, 366  
 Sub-boreal Period 348–350, 363, 365  
 subpolar fjords 6, 9  
 Suess Effect 12, 268  
 Summer Isles (Scotland) **312**, 319–320, 322  
 Summer Isles Formation 227, 228, 229, **231**,  
   235–236, **238**  
 Sunart, Loch (Scotland) 306, **312**,  
   341–342, 356  
   acoustic facies 357, 364, 365  
   facies analysis 316–317, 321  
   foraminifera 316  
   Holocene deposits 322–323  
   palaeoenvironmental analysis  
   methods



- dating 343
  - foraminifera 345
  - grain size 343–345
- results
  - foraminifera 345–347
  - grain size 345
- results discussed 347–348
  - Alleröd 348
  - Atlantic 342, 345, 348–350
  - Bölling 348
  - Boreal 342, 345, 348–350
  - Older Dryas 342, 345, 348
  - Preboreal 348
  - Sub-Atlantic 342, 348–350
  - Sub-boreal 348–350
  - Younger Dryas 342–343, 348, 350
- pollen record 331, 347
  - methods 358
  - results
    - dating 361
    - lithology 360–361
    - pollen spectrum 361–365
  - results discussed
    - Alleröd 365, 366
    - Atlantic 365, 366
    - Bölling 365, 366, 367
    - Boreal 365, 366
    - Older Dryas 365, 366
    - Preboreal 365
    - Sub-atlantic 365, 366
    - Sub-boreal 365
    - Younger Dryas 365, 366, 367
- seismic survey 358–360
  - Younger Dryas deposits 322
- Sundalls Fjord (Norway) **128**
- Svalbard 36, 37, 38, 40, 63
  - see also* Billefjorden; Isfjorden; Kongsfjorden; Krossfjorden; Rijpfjorden; Sassenfjorden; Tempelfjorden; Van Mijenfjorden
- Svalbard fjord regimes, defined 7
- Svensden, Harald vii
- swath bathymetry
  - Billefjorden survey
    - methods 208–209
    - results 210–212
  - Kongsfjorden 196, 197
  - Little Loch Broom 228, 236
  - Sassenfjorden 166, 176
- Sweden *see* Gullmar Fjord
- Tabellaria flocculosa* 275
- Tana Fjord (Norway) **128**
- Tempelfjorden (Spitsbergen) 164–165, 166, 208
  - sedimentary environment analysis
    - methods 165–166, **167**, **168**
    - results
      - core data
        - chronology 182, 184–185
        - lithology 178–181, 183
        - mineralogy 185
      - foraminifera 172, **173**, **174**
      - hydrography 170
      - landforms 172–173, 176, 177, 178
      - sediment composition 170–171
      - sediment geochemistry 171–172
      - results discussed
        - modern environments 186–188
        - past environments 188–189
        - processes 185–186
- temperate fjords 6–7
- temperature gradient, Arctic fjords 38
  - see also* current-temperature depth profiling (CTD)
- Texularia* spp.
  - T. torquata* **174**
  - T. truncata* **85**, **87**
- Thalassiosira* spp. 275
- tide-influenced fjord regimes, defined 7
- tides and tidal choking 20–21
- tidewater glaciers 11
- topography, fjord 17–18
- total inorganic carbon (TIC), Sassenfjorden 165, 172
- total nitrogen (TN), Sassenfjorden 172
- total organic carbon (TOC)
  - Maxwell Bay 246, 250
  - Sassenfjorden 165, 172
- transmissivity, Sassenfjorden 170, 187
- Trifarina angulosa* **87**
- Triloculina* spp.
  - T. trigonula* **87**
  - T. trihedra* **85**, **87**
- Trochammina* spp.
  - T. adaptera* **85**, **87**
  - T. helgolandica* **87**
  - T. intermedia* **87**
  - T. ochrea* **87**
- Trochammina* spp.
  - T. atlantica* **174**
  - T. bullata* **174**
- Trochoculina rhedra* **174**
- Trondhjem Fjord (Norway) **128**
- Ullapool Gravel Formation 227, 228
- Ulmus*, Holocene record in Loch Etive 335
- upwelling record, Gullmar Fjord 78, 79
- Uvigerina peregrina* 346
- Van Mijenfjorden (Spitsbergen) 37, 41, 51–52
  - hydrographic survey
    - methods 51–53
    - results 53
      - currents and wind 56, 58, 59
      - salinity 53, 55, 56, 57
      - stratification 54
      - temperature 53, 55, 56
  - varves 11, 150–151
  - vibrocoring, Little Loch Broom 230
  - Viking Age, Gullmar Fjord 261, 265, 267
  - Villaroya Basin (Spain) 285
  - voe, defined 17
  - Washington shelf 104
  - wave- and tide-influenced fjord regimes, defined 7
  - West Spitsbergen Current 36, 39, 46, 63, 208, 290

Wester Ross Advance 320  
Whaler's Bay Polynya 46  
Wigtown Shoreline 307  
Wijdefjorden (Spitsbergen) 36, 37  
wind forcing, Arctic fjord 43–44  
wind mixing 24  
wind-driven circulation **19**, 23  
Winter Water 41, 45, 46  
Wrath, Cape 307

XRD  
  Billefjorden  
    methods 210  
    results 217

  Sassenfjorden 166  
XRF, Maxwell Bay 246

Yakutat Bay (Alaska) **128**  
York River 103  
Younger Dryas Period 348, 363, 365,  
  366, 367  
  Kongsfjorden 295–297  
  Scotland 307, 309, 310, 313, 314, 315,  
    321–322, 355, 357

zooplankton  
  Kongsfjorden 64–65  
  Rijpfjorden 65