Contents

General: the treatment of the ecozones and global overviews of selected characteristics

1 Distribution 7

2 Climate 11
   2.1 Solar radiation ............................................................... 11
   2.2 The growing season and conditions for plant growth .......... 14

3 Relief and drainage 17
   3.1 Geomorphological processes ........................................... 17
   3.2 Drainage and water balance ............................................ 17

4 Soils 21
   4.1 Soil fertility ................................................................. 21
   4.2 Soil water budget .......................................................... 23
   4.3 Soil units and soil zones ............................................... 26

5 Vegetation and animals 35
   5.1 Structural characteristics of the vegetation ...................... 35
   5.2 Ecosystem model of ecozone ........................................... 38
   5.3 Available supply of organic matter in the ecosystem .......... 40
   5.4 Primary production ....................................................... 40
      5.4.1 Photosynthesis and respiration .................................. 40
      5.4.2 Primary production from plant stands ......................... 42
      5.4.3 Production capacity of the world's plant cover .......... 43
   5.5 Consumption by animals and secondary production .......... 48
   5.6 Waste and decomposition ............................................... 49
   5.7 Turnover of minerals .................................................... 51

6 Land use 55
Regional section: The individual ecozones

7 Polar subpolar zone

7.1 Distribution .................................................. 63
7.2 Climate ..................................................... 64
  7.2.1 Temperature, length of day, precipitation .............. 64
  7.2.2 Annual temperature changes in the soil and air layer
       next to the soil ........................................... 65
  7.2.3 Summer solar radiation and heat budget ................. 67
7.3 Relief and drainage in periglacial areas .................... 68
7.4 Soils ....................................................... 72
7.5 Vegetation and fauna in the tundra and polar deserts ....... 73
  7.5.1 Distribution of vegetation ............................... 74
  7.5.2 Biomass and primary production ......................... 75
  7.5.3 Animals and animal feed ................................ 76
  7.5.4 Decomposition and turnover of minerals ................. 77
  7.5.5 Model of a tundra ecosystem ............................ 78
7.6 Land use .................................................. 80
Synoptic diagram for the tundra ................................. 81

8 Boreal zone

8.1 Distribution .................................................. 83
8.2 Climate ..................................................... 84
8.3 Relief and drainage ......................................... 87
8.4 Soils ....................................................... 89
8.5 Vegetation and animals ..................................... 91
  8.5.1 Boreal coniferous forest ................................ 91
  8.5.2 Peat bogs ............................................... 92
  8.5.3 Forest tundra, polar and forest tree lines ............... 93
  8.5.4 Biomass and primary production ......................... 94
  8.5.5 Decomposition, organic soil matter and mineral reserves 94
  8.5.6 Boreal coniferous forest ecosystems ..................... 98
8.6 Land use .................................................. 98
Synoptic diagram for the Boreal zone ........................... 100

9 Temperate midlatitudes

9.1 Distribution .................................................. 103
9.2 Climate ..................................................... 103
9.3 Relief and drainage ......................................... 105
9.4 Soils ....................................................... 107
9.5 Vegetation and animals ..................................... 108
  9.5.1 Seasonality in deciduous forests ......................... 109
  9.5.2 Water budget in forests ................................ 111
  9.5.3 Biomass and primary production, growth
       and litter production .................................... 112
12.5.2 Available supply and turnover in a semi-evergreen oak forest in the southeastern United States .................. 162
12.6 Land use .......................................................................................... 165
Synoptic diagram for the Subtropics with year-round rain .......... 165

13 Dry tropics and subtropics ................................................................. 169
13.1 Distribution .................................................................................. 169
13.2 Climate .......................................................................................... 170
13.3 Relief and drainage ........................................................................ 172
  13.3.1 Weathering processes and crusts ........................................... 172
  13.3.2 Aeolian processes ................................................................. 172
  13.3.3 Stream erosion and wash denudation ................................. 173
13.4 Soils .................................................................................................. 174
13.5 Vegetation and animals ................................................................. 175
  13.5.1 Vegetation and soil water budget .......................................... 176
  13.5.2 Adaptation to drought and stress ........................................... 180
  13.5.3 Animals in the desert .............................................................. 183
  13.5.4 Biomass and primary production ......................................... 184
13.6 Land use .......................................................................................... 185
  13.6.1 Pastoral nomadism ................................................................. 185
  13.6.2 Oasis agriculture ................................................................. 187
Synoptic diagram for tropical thorn savannas and subtropical thorn steppes in the semi-arid Dry tropics and subtropics ........... 189

14 Tropics with summer rain ................................................................. 193
14.1 Distribution .................................................................................. 193
14.2 Climate .......................................................................................... 194
14.3 Relief and drainage ........................................................................ 195
  14.4 Soils .................................................................................................. 198
    14.4.1 General characteristics of soils in the subtropics and tropics with summer and year-round rain ..................... 198
    14.4.2 Soil types ............................................................................... 200
14.5 Vegetation and animals ................................................................. 202
  14.5.1 Structural characteristics of savanna vegetation .............. 202
  14.5.2 Animals .................................................................................. 203
  14.5.3 Savanna fires ......................................................................... 204
  14.5.4 Biomass and primary production ......................................... 204
  14.5.5 Zoomass and animal feed ...................................................... 206
  14.5.6 Decomposition of litter ......................................................... 208
  14.5.7 Mineral supplies and turnovers ............................................. 209
14.6 Land use .......................................................................................... 210
Synoptic diagram for the Tropics with summer rain .................. 213

15 Tropics with year-round rain ............................................................ 215
15.1 Distribution .................................................................................. 215
15.2 Climate .......................................................................................... 216
Contents

15.3 Relief and drainage................................................................. 217
15.4 Soils ................................................................................. 218
15.5 Vegetation and animals ....................................................... 221
  15.5.1 Structure of the tropical rainforest ..................................... 221
  15.5.2 Dynamics of the vegetation .............................................. 224
  15.5.3 Animals ........................................................................ 224
  15.5.4 Biomass and primary production ...................................... 225
  15.5.5 Animal feed .................................................................... 226
  15.5.6 Litter, the litter layer, decomposition and humus .............. 226
  15.5.7 Mineral supplies and turnovers ....................................... 227
  15.5.8 Rainforest ecosystem ...................................................... 229
15.6 Land use ............................................................................. 230
Synoptic diagram for the Tropics with year-round rain ................. 235

References ............................................................................... 237
http://www.springer.com/978-3-540-20014-7

The Ecozones of the World
The Ecological Divisions of the Geosphere
Schultz, J.
2005, XII, 252 p. 288 illus., 144 illus. in color.,
Hardcover
ISBN: 978-3-540-20014-7