

Contents

<i>Tables</i>	<i>page</i> xi
<i>Illustrations</i>	xiii
<i>Preface</i>	xvii
1 Introduction	1
Outline	3
Terms and Definitions	3
2 Development of ideas	6
Evolutionary processes	6
Ecological processes	35
Quaternary research	39
Discussion	42
3 Orbital-forcing of climatic oscillations	44
Orbital parameters	45
Insolation	48
Climate models	51
4 Geological evidence for orbital-forcing	65
Cenozoic	66
Mesozoic	74
Paleozoic	82
Proterozoic	84
Continental glaciation in Earth history	85
Discussion	89
5 Biological response: distribution	92
The physical background	92
The terrestrial record	94
The marine record	145
Discussion	148

x · Contents

6 Biological response: evolution	154
Geological time	155
Ecological time	168
Discussion	173
7 Biological response: extinction	178
Animals	178
Plants	181
Discussion	183
8 Evolution and ecology: synthesis	184
Biological responses	184
Post-modern evolutionary synthesis	184
Difficulties	195
<i>References</i>	199
<i>Index</i>	226