## Contents

1 Introduction
   1.1 Approaches to Late Quaternary research 1
   1.2 Historical review 3

2 Present and past climates of Southern Africa 12
   2.1 Present day climates 12
   2.2 Palaeoclimatic models 18

3 Sources of palaeoclimatic evidence in Southern Africa 29
   3.1 Introduction 29
   3.2 Geomorphic and sedimentary sources 29
   3.3 Biological and archaeological evidence 36

4 Palaeoenvironments in the desert and semi-desert ecozones 47
   4.1 Introduction 47
   4.2 The Namib 48
   4.3 Chronological summary 56
   4.4 The Karoo and Bushmanland 56
   4.5 Chronological summary 59

5 Palaeoenvironments in the summer rainfall ecozones 60
   5.1 The Kalaharian Ecozone 60
   5.2 The northern Kalahari 66
   5.3 The southern and south-western Kalahari 69
   5.4 The south-eastern Kalahari 73
   5.5 Chronological summary for the Kalaharian Ecozone 78
   5.6 The Transvaalian Ecozone 79
   5.7 Chronological summary for the Transvaalian Ecozone 93
   5.8 The Basutolian Ecozone 94
   5.9 Chronological summary 108

6 Winter and all-year rainfall regions: the Cape Ecozone 109
   6.1 Dune reactivation and stabilization episodes 110
   6.2 Evidence for former sea levels in the western and southern Cape 113
6.3 Alluvial deposits of the southern and western Cape 122
6.4 Slope deposits in the southern and western Cape 122
6.5 Coastal caves and cave deposits 123
6.6 Caves and cave deposits in the southern Cape interior 130
6.7 Vegetation changes in the Cape Ecozone 135
6.8 Faunal changes in the Cape Ecozone 138
6.9 Isotopic evidence from the Uitenhage aquifer and Cango speleothem 141
6.10 Archaeological proxy data 144
6.11 Chronological summary 145

7 Summary and conclusions 148
7.1 c. 130 000–80 000 BP 148
7.2 c. 80 000–50 000 BP 152
7.3 c. 50 000–24 000 BP 153
7.4 c. 24 000–16 000 BP 155
7.5 c. 16 000–10 000 BP 156
7.6 c. 10 000–0 BP 157
7.7 Summary of radiocarbon dated primary evidence 161

8 Explaining the palaeoenvironmental patterns 162
8.1 The nature, scale and timing of changes in Late Quaternary palaeoenvironments 162
8.2 Biogeographic implications 168
8.3 Implications for human population distributions 171
8.4 Implications for palaeoclimatic models 174

Appendix: List of sites with radiocarbon dated evidence for palaeoclimatic conditions in Southern Africa 177

References 187

Author index 211

Subject index 217