Contents

Preface to the first edition	page xi
Preface to the second edition	XV
Acknowledgements to the first edition	xvi
Acknowledgements to the second edition	xviii
Introduction	1 Rubiton etrontium /
References and bibliography	3
ChC	
Tectonics on a sphere: the geometry of	plate tectonics 5
Plate tectonics	5
A flat Earth	11 Samuran acodymium 2
Rotation vectors and rotation poles	14
Present-day plate motions	15
Plate boundaries can change with time	24
Triple junctions	26
Absolute plate motions	32
Problems	37
References and bibliography	40
and a state the symbols	
Past plate motions	43
The role of the Earth's magnetic field	43
Dating the oceanic plates	54
Reconstruction of past plate motions	67
Problems	93
References and bibliography	94
Seismology Measuring the interior	100
Waves through the Earth	100
Earthquake seismology	111
Refraction seismology	140
Reflection seismology	157
Problems	178
References and bibliography	186

Contents

Gravity	
Introduction	193
Gravitational potential and appalantic	193
Gravity of the Earth	on 193
The shape of the Earth	196
Gravity anomalies	198
Observed gravity and goold anomal'	202
Flexure of the lithographics and the site of the lithographics	
Problems	cosity of the mantle 218
References and hibliographic	228
references and bionography	230
Geochronology	Preface to the second edition
Introduction	233
General theory	233
Rubidium-strontium	234
Uranium-lead	244
Thorium-lead	247
Potassium-argon	249
Argon-argon	251
Samarium-neodymium	252
Fission-track dating	254
The age of the Earth	258
Problems	262
References and bibliography	265
	207
Heat	360
Introduction	269
Conductive heat flow	209
Calculation of simple geotherms	270
Worldwide heat flow: total heat loss from	m the Earth 285
Oceanic heat flow	285
Continental heat flow	200
The adiabat and melting in the mantle	303
Metamorphism: geotherms in the contin	ental crust 308
Problems	308
References and bibliography	323
01	
The deep interior of the Earth	326
The internal structure of the Earth	326
Convection in the mantle	353
The core	371
References and bibliography	381

The oceanic lithosphere: ridges, transforms, trenches and	
oceanic islands	391
Introduction	391
The oceanic lithosphere	397
The deep structure of mid-ocean ridges	409
The shallow structure of mid-ocean ridges	417
Transform faults	440
Subduction zones	458
Oceanic islands	487
Problems	492
References and bibliography	494
The continental lithosphere	509
Introduction	509
The growth of continents	517
Sedimentary basins and continental margins	557
Continental rift zones	584
The Archaean	595
Problems	601
References and bibliography	602
Appendix 1 Scalars, vectors and differential operators	615
Appendix 2 Theory of elasticity and elastic waves	620
Appendix 3 Geometry of ray paths and inversion of earthquake	
body-wave time-distance curves	630
Appendix 4 The least-squares method	636
Appendix 5 The error function	638
Appendix 6 Units and symbols	640
Appendix 7 Numerical data	648
Appendix 8 The IASP91 Earth model	650
Appendix 9 The Preliminary Reference Earth Model, isotropic	
version – PREM	651
Appendix 10 The Modified Mercalli Intensity Scale (abridged	
version)	654
Glossary	655
ndex	666

The colour plates are situated between pages 398 and 399.