

Contents

1 Elastic Properties of the Lithosphere	1
1.1 Elastic Thickness of the Lithosphere	1
1.2 Estimation of Elastic Thickness	6
References.	16
2 Plumes and Hotspots	19
2.1 Introduction	19
2.2 The Plume Hypothesis	20
2.3 Characteristics of Plumes	22
2.4 Classification of Plumes	24
2.4.1 Superplumes	28
2.4.2 Secondary and Tertiary Plumes	31
2.5 Plume-Related Lithospheric Uplift	32
2.6 Morphology of Hotspot Tracks	34
2.7 Moat and Arch	37
References.	39
3 Dynamic Crustal Uplift Due to Plume Activity	43
3.1 Ascent of a Mantle Plume	43
3.2 Dynamic Uplift and Topography	45
3.3 Timeframe and Factors for Dynamic Uplift	49
3.4 Estimation of Dynamic Uplift	51
References.	59
4 Permanent Crustal Uplift Due to Plume Activity	63
4.1 Plume-Related Volcanism	63
4.2 Permanent Uplift	63
4.2.1 Factors for Permanent Uplift	65
4.2.2 Identification and Estimation of Permanent Uplift	65
References.	71
5 Effects of Plume-Related Thermal Anomaly	73
5.1 Plume Heat Flow	73

5.2	Thermal Uplift	77
5.2.1	Thermal Rejuvenation Model	78
5.3	Thermal Subsidence	81
5.4	Plume-Ridge Interactions	82
5.4.1	Ridge-Centred Plumes.	82
5.4.2	Off-Ridge Plumes	83
5.4.3	Migrating Ridges	84
5.4.4	Ridge Jump.	85
	References.	88
6	Morphology of Hotspots	91
6.1	Growth of Submarine Volcanoes	91
6.2	Morphogenesis of Eruption Centers	92
6.3	Hotspot Volcano Spacing	96
6.4	Magma Flux Variation	99
6.5	Heat Flow and Hydrothermal Circulation	102
6.6	Flexural Moat and Arch—Spatial and Temporal Development.	108
6.6.1	Deposition in Flexural Moat	111
6.6.2	History of Moat Deposition.	118
	References.	119
7	The Great Plume Debate	125
7.1	Brief History.	125
7.2	Problems/Critiques	126
7.3	Plate Tectonic Considerations.	132
	References.	133

Mantle Plumes and Their Effects

Choudhuri, M.; Nemčok, M.

2017, X, 137 p. 72 illus., 18 illus. in color., Softcover

ISBN: 978-3-319-44238-9