

GRANITES AND BASALTS

QUESTIONABLE PARADIGMS

CONTENTS



1. INTRODUCTION: THE POWER OF THE PARADIGMS.....	9
2. BASIS FOR A NEW SIALIC-DENSE UPPER MANTLE	13
2.1 THE BEGINNINGS	13
2.1.1 New Interpretation of Spanish Mafic-Ultramafic Rocks	13
2.1.2 The Oldest Rocks: Granites-Gneisses.....	16
2.1.3 Origin and Growth of the Crust.....	22
2.2 THE VOLUME OF GRANITIC ROCKS IN THE CRUST.....	24
2.2.1 Granitic Rocks in Continents	24
2.2.2 Granitic Rocks in the Atlantic Ocean	26
2.2.3 Granitic Rocks in the Pacific Ocean	34
2.2.4 Granitic Rocks in the Indian Ocean	38
2.2.5 Upper Mantle-Crust Geochemical Balance.....	41
2.3 PHYSICAL-GEOPHYSICAL DATA AND THEIR RELATIONSHIP TO PHYSICAL CHANGES.....	46
2.3.1 Reflectivity	46
2.3.2 Isostasy	50
2.3.3 Low Velocity Zones	53
2.3.4 High Electric Conductivities.....	55
2.4 DENSIALITE: A NEW SIALIC-DENSE UPPER MANTLE	58
2.4.1 Possible Crystalline-Dense minerals	58
2.4.2 Presence of Dense-Amorphous-Sialic Matter?.....	62
2.4.3 On the Presence of Fluids in the Upper Mantle.....	66
2.4.4 Physical-Energetic Considerations on the Upper Mantle	71
3. NEW ORIGIN OF THE GRANITIC ROCKS.....	74
3.1 WHEN AND HOW THE UPPER MANTLE IS CONVERTED INTO A GRANITIC CRUST	74
3.1.1 Impacts: Possible Thermal Activators of the Upper Mantle	76
3.1.2 Gravitational Pulling: The main activation mechanism	78
3.1.3 Initial Granitic Manifestations: The Birth	81
- <i>Diffusivity of the Moho</i>	81
- <i>First Granitic Manifestations in Oceans, swells, plateaus, arcs, etc.</i> ..	83

3.2 GROWTH-EMPLACEMENT-ACCOMMODATION OF THE GRANITIC ROCKS.....	85
3.2.1 Global emplacement: Growth in Depth and Isostatic Uplifting.....	85
3.2.2 Examples of Growth in Depth and Isostatic Uplifting	87
<i>-Fennoscandia case study.....</i>	87
<i>-Colorado Plateau.....</i>	89
3.2.3 Meaning of Arcuate Reflectors.....	94
3.2.4 The Space-Accommodation Problem.....	99
3.2.5 Solid Versus Melting Growth-Emplacement	102
3.2.6 Stages of Granitic Growth	108
3.2.7 Are Granitic Rocks Still Growing Today?	109
3.2.8 Tectonic Settings and Diversity of Granitic Rocks	112
4. THE ORIGIN OF THE BASALTS	118
4.1 CURRENT THEORIES AND CERTAIN QUERRIES	118
4.1.1 Types and Diversity of Basalts	120
4.1.2 Volume of Basalts compared with the Granitic Rocks.....	124
4.1.3 Other important questions.....	127
4.2 ARE THE MANTLE PERIDOTITES THE FOOD OF BASALTS?	130
4.2.1 Some geological data	130
4.2.2 New Petrogenetic Model	132
4.3 NEW ORIGIN OF THOLEIITIC BASALTS: BASIS FOR A NEW MODEL.....	141
4.3.1 Presence of Carbonate-Marly-Evaporites on Active Sialic Basements.....	143
4.3.2 Release of Thermal and Chemical Sources from the Active Sialic Basements.....	147
4.4 NEW MEANING OF THE MAGMATIC CHAMBERS.....	151
4.4.1 The Baking Place Episode.....	151
4.4.2 Formation of High P-T Conditions in the Baking Place	154
4.4.3 Formation of Doughy-Gabbroid rocks during the Baking Place Episode	159
4.4.4 Partial Melting: Eruption of Basaltic Magmas.....	162
4.5 OCEANIC BASALTS	169
4.5.1 Island Basalts: Hawaii.....	169
4.5.2 Basalts in Ophiolite Complexes	177
4.6 OCEANIC-CONTINENTAL BASALTS: ICELAND.....	185
4.6.1 Nature of the Crust in Iceland.....	185

4.6.2	Origin of the Iceland Basalts	188
4.6.3	Meaning of Icelandic Rhyolites	191
4.6.4	A Simplified Crustal Evolution	194
4.7	CONTINENTAL BASALTS	198
4.7.1	The Etna Volcano	198
4.7.2	Deccan Basalts	207
4.7.3	Paraná Basalts	217
4.8	PRECAMBRIAN BASALTS.....	227
4.8.1	Komatiites and Mg-Basalts.....	227
4.8.2	The Pilbara Block: An example of Archean-Granite-Greenstone-Komatiite Association	229
4.8.3	The Midcontinent Rift: An example of Proterozoic Mg-Basalts	233
4.9	PLANETARY IMPLICATIONS: MARS BASALTS	240
4.9.1	Some General Features	241
4.9.2	Basis for a New Origin of Martian Basalts.....	242
	- <i>Presence of Granitic-Ignimbritic Rocks</i>	242
	- <i>The Presence of Water and Suitable Sediments</i>	245
4.9.3	Martian Basalts in the Nili Fossae region.....	247
4.9.4	Duration of the Geological Activity and Petro-Structural Evolution .	248
	REFERENCES	250