TABLE OF CONTENTS

Chapter 1 - Post- to late-Hercynian evolution in western central Europe

1.1 Introduction 1

1.2 Plate tectonic models 2

1.3 The Hercynian magmatism 7

1.4 Geochemical signatures of late- to post-collisional magmatism 13

1.4.1 Late- to post-collisional magmatism in the Calabria-Peloritani Orogen 15

1.4.2 Post-collisional magmatism in the Sicilian - Maghrebian chain 17

Chapter 2 - Geological background and field features

2.1 Introduction 19

2.2 The Calabria-Peloritani Orogen 19

2.2.1 The Serre Massif 21

2.2.2 Field features of Serre dykes 25

2.3 The Sicilian - Maghrebian Chain 29

2.3.1 Field features of Sicily dykes 34

Chapter 3 - Petrographic features

3.1 Serre dykes 37

3.1.1 "*Mammola – Piani di Limina*" dykes (PDL – LMA samples) 37

3.1.2 "*Fosso foletti*" dykes (F samples) 41

3.1.3 "*Antonimina*" dykes (A samples) 43

3.1.4 "*Villaggio Zomaro*" dykes (VZ samples) 45

3.1.5 "*San Todaro*" dykes (ST samples) 48

3.2 Sicilian dykes 50

3.2.1 "*Leonforte*" dyke (VG samples) 50

3.2.2 "*Roccapalumba-Margana-Lercara*" area dykes 52

3.3 Remarks on hydrothermal metamorphism 56

Chapter 4 - Mineral chemistry

4.1 Results 58
4.1.1 Pyroxene 58
4.1.2 Amphibole 62
4.1.3 Feldspar 64
4.1.4 Biotite 66
4.1.5 White mica 67
4.1.6 Accessory minerals 69

Chapter 5 - Whole-rock major and trace-element geochemistry

5.1 Introduction 70
5.2 Calabrian dykes 70
5.2.1 Tectono-magmatic discrimination of Calabria dykes 81
5.3 Sicilian dykes 84
5.3.1 Alkaline intrusion 87
5.3.2 Tholeiitic intrusions 92
5.3.3 Tectono-magmatic discrimination of the Sicilian dykes 93

Chapter 6 - Sr-Nd isotopic data

6.1 Introduction 94
6.2 Calabrian dykes 96
6.3 Sicilian dykes 98

Chapter 7 - Petrogenetic models

7.1 Calabrian dykes 101
7.1.1 Serre basaltic andesites 102
7.1.2 Serre andesites 105
7.1.3 Serre dacites-rhyodacites 108
7.2 Sicilian dykes 110
7.2.1 Magmatic sources 111
7.2.2 Role of crustal contamination 113
7.3 Remarks on geodynamic context 117

Conclusions 118

References 123

Appendices: 143

Appendix 1 - List of samples 144

Appendix 2 – Tables 149

Appendix 3 - Analytical methods 171

Acknowledgements 173