

CONTENTS

Abstract	i
Acknowledgements	iii
List of Tables	iv
List of Figures	v
Symbols and Abbreviations	ix
CHAPTER ONE INTRODUCTION	1
1.1 Tectonic Settings of the Study Area	1
1.2 Instrumental Seismicity of the Study Area	2
1.3 Installation of Seismic Network	5
1.4 Previous Work	7
1.5 Objectives of the Study	8
CHAPTER TWO METHODOLOGY	9
2.1 Phase Identification of Seismic Waves	9
2.2 Determination of Velocity Structure	9
2.3 Determination of Hypocenter	11
2.4 Determination of Magnitude	13
2.5 Macroseismic Intensity and Isoleismals	16
2.6 Focal Mechanism Solution	17
2.7 Multiple Regression	17
CHAPTER THREE SEISMOLOGICAL ANALYSIS OF SIGNIFICANT EARTHQUAKES OF THE STUDY AREA	20
3.1 Astor Valley Earthquakes	20
3.1.1 Hypocentral parameters of Astor Valley earthquakes and aftershocks	20

3.1.2	Fault plane solution of Astor Valley earthquakes	26
3.1.3	Damage due to Astor Valley earthquakes	27
3.2	Kaghan Valley Earthquake	29
3.2.1	Aftershocks of Kaghan Valley earthquake	30
3.2.2	Fault plane solution of Kaghan Valley earthquake	30
3.2.3	Intensity distribution of Kaghan Valley earthquake	33
3.3	Fatehjang Earthquake	35
3.3.1	Fault plane solution of Fatehjang earthquake	37
3.3.2	Intensity distribution of Fatehjang earthquake	38
3.4	Kohat Earthquake	39
3.4.1	Aftershocks of Kohat earthquake	40
3.4.2	Fault plane solution of Kohat earthquake	40
3.4.3	Intensity distribution of Kohat earthquake	41
3.5	Mangla Earthquake	43
3.5.1	Fault plane solution of Mangla earthquake	44
3.5.2	Intensity distribution of Mangla earthquake	45
CHAPTER FOUR	SEISMICITY, MACROSEISMIC INTENSITY AND ENVIRONMENTAL EFFECTS OF MUZAFFARABAD EARTHQUAKE	46
4.1	Seismotectonics of the Area	47
4.2	Location and Fault Plane Solution of Mainshock	48
4.2.1	Fault plane solutions of selected aftershocks	48
4.3	Post Earthquake Seismicity	53
4.4	Intensity Distribution of Muzaffarabad Earthquake	56
4.5	Surface Faulting	65

CHAPTER FIVE	DEVELOPMENT OF AN ATTENUATION RELATIONSHIP FOR THE ESTIMATION OF PEAK GROUND ACCELERATION	68
5.1	Acceleration Data	68
5.2	Development of the Attenuation Relationship	77
5.3	Comparison of Proposed Model with Other Models	80
CHAPTER SIX	CONCLOUTIONS	84
6.1	Conclusions	84
REFERENCES		86
ANNEXURE: PUBLISHED SCIENTIFIC PAPERS		98