

Contents

1	Introduction	1
	1.1 Problem Statement	1
	1.2 Research Objectives	2
	1.3 Thesis Outline	3
	References	4
2	Theoretical Background	7
	2.1 Landslide Processes	7
	2.1.1 Definitions and Classifications	7
	2.1.2 Principles of Slope Stability	8
	2.1.3 Systems Theory Considerations	14
	2.1.4 Landslide Triggering	16
	2.2 Landslide Investigation and Monitoring	19
	2.2.1 Mapping and Inventory Approaches	20
	2.2.2 Displacement Measurements	22
	2.2.3 Hydrological Measurements	25
	2.2.4 Geophysical Measurements	26
	2.3 Landslide Modelling	28
	2.3.1 Regional Models	28
	2.3.2 Local Models	30
	2.4 Landslide Early Warning Systems	35
	2.5 The ILEWS Project	54
	References	56
3	Study Area	85
	3.1 Regional Setting	85
	3.1.1 Geology	85
	3.1.2 Climate	91
	3.1.3 Hydrology	92
	3.1.4 Geomorphology	92

3.1.5	Landslides	94
3.2	Local Study Area	97
3.2.1	Geology	98
3.2.2	Geomorphology	98
3.2.3	Previous Investigations	99
	References	99
4	Data	103
	References	110
5	Methodology	113
5.1	Local Scale	113
5.1.1	Field Work	113
5.1.2	Data Analysis	115
5.1.3	Landslide Early Warning Modelling	116
5.2	Regional Scale	124
5.2.1	Inventory Analysis	124
5.2.2	Threshold Verification	124
5.2.3	Early Warning	125
	References	126
6	Results	129
6.1	Local Scale	129
6.1.1	Field Work	129
6.1.2	Data Analysis	131
6.1.3	Landslide Early Warning Modelling	167
6.2	Regional Scale	202
6.2.1	Inventory Analysis	202
6.2.2	Threshold Verification	205
6.2.3	Early Warning	212
	References	214
7	Integrative Early Warning	215
	References	219
8	Discussion	221
	References	225
9	Perspectives	227
	References	229
10	Summary	231
	References	235

Appendix I: Borehole Plots for Lic04 and Lic05 Drillings 237

Appendix II: Inclinometer Measurements for Lic01 239

Appendix III: Inclinometer Measurements for Lic04 241

Appendix IV: Inclinometer Measurements for Lic03 243

Appendix V: Slip Search Grid Location Definition 245

**Appendix VI: ArcGIS RASTERCALCULATOR Commands
for Computation of the Subsurface Model 247**

**Appendix VII: Soil Suction Curves Defined by Spaw Model
in Comparison to Laboratory Measurements
with Interpolated Values. 249**

**Appendix VIII: English Tutorial for Web-Based Chasm
Decision-Support System 251**

Appendix IX: English Frequently Asked Questions (FAQ) 253

Index 257



<http://www.springer.com/978-3-642-27525-8>

Landslide Analysis and Early Warning Systems
Local and Regional Case Study in the Swabian Alb,
Germany

Thiebes, B.

2012, XXII, 266 p., Hardcover

ISBN: 978-3-642-27525-8