Contents

| | ocesses and change | |
|-----|--|------------|
| | About the authors | page ix |
| | Preface | xi |
| | Acknowledgments | xiv |
| 188 | Extracting information from spectral images | ha of th |
| 1.1 | Introduction | ished that |
| 1.2 | Field studies and spectral images | 3 |
| 1.3 | Photo interpretation of spectral images | 7 |
| 1.4 | Spectral analysis of images | 19 |
| 1.5 | Testing and validating results | 27 |
| 1.6 | Summary steps for extracting information | 35 |
| 2 | Spectroscopy of landscapes | 39 |
| 2.1 | Basics of spectroscopy for field investigators | 39 |
| 2.2 | Spectroscopy at landscape scales | 52 |
| 2.3 | Spectroscopy applied to images | 60 |
| 3 | Standard methods for analyzing spectral images | 65 |
| 3.1 | Initial evaluation | 65 |
| 3.2 | Calibration | 70 |
| 3.3 | Enhancement for photo interpretation | 81 |
| 3.4 | Data reconnaissance and organization | 84 |
| 3.5 | Physical modeling with spectral data | 112 |
| 4 | Spectral-mixture analysis | 126 |
| 4.1 | Endmembers, fractions, and residuals | 128 |
| 4.2 | Shade | 135 |
| 4.3 | Fraction images | 137 |
| 4.4 | Finding endmembers | 145 |
| 4.5 | Calibration feedback | 159 |
| 4.6 | Nonlinear mixing | 164 |

165

168

168

183

Thermal-infrared images

Fraction images of landscapes

What to do with fraction images

Classification using endmember fractions

4.7

5

5.1

5.2

| 6 | Target detection | 192 |
|-----|--|-----|
| 6.1 | Spectral contrast and target detection | 192 |
| 6.2 | Detection limits | 224 |
| 6.3 | Spectral contrast and spatial scale | 237 |
| 7 | Thematic mapping of landscapes | 244 |
| 7.1 | Field maps and image-derived maps | 244 |
| 7.2 | Thematic mapping with spectral images | 250 |
| 8 | Processes and change | 298 |
| 8.1 | Process pathways in spectral images | 298 |
| 8.2 | Reference pathways | 312 |
| 0 0 | | |
| 8.3 | Mapping changes in landscapes | 324 |
| 8.3 | Mapping changes in landscapes | 324 |
| 8.3 | Glossary | 324 |
| 8.3 | | |