

# Contents

<b>14 Geophysics</b>	<b>2</b>
14.1 Geophysical methods: Overview	2
14.2 Passive Methods	2
14.2.1 Gravimetry	2
14.2.2 Magnetics	3
14.2.3 Seismology	3
14.3 Active Methods: Basics	5
14.3.1 Principles	5
14.3.2 Waves	6
14.3.3 System set-up in the field	10
14.3.4 Modes of radar operation	11
14.3.5 Medium and system parameters	12
14.4 Data Acquisition and Processing	14
14.4.1 Further analyses	21
14.5 Seismics Applications in Ice	22
14.5.1 Ice thickness	22
14.5.2 Subglacial structure	22
14.5.3 Subglacial properties	22
14.5.4 Rheological properties	24
14.5.5 Ice-internal properties	24
14.6 Radar Applications in Ice	24
14.6.1 History	27
14.6.2 Internal layer architecture	27
14.6.3 Subglacial conditions	27
14.6.4 Intraglacial conditions	28
14.6.5 Ice dynamics	33
.1 Appendix: Wave propagation	35
.1.1 General wave equation and solution	35
.1.2 Seismic Waves	35
.1.3 Electromagnetic Waves	36
E Exercises	41
E1 Travelttime curves: reflection	41
E2 Travelttime curves: critically refracted wave (refraction)	41
E3 Reflection of radar waves	41
E4 Interaction of radar waves with sea water	41
E5 Seismic wave types	42
E6 Seismic events	42
S Solutions	43
S1 Travelttime curves: reflection	43
S2 Travelttime curves: refraction	44
S3 Reflection of radar waves	45
S4 Interaction of radar waves with sea water	45
S5 Seismic wave types	46
S6 Seismic events	47