

Contents

List of figures xi

List of tables..... xiii

About the authors xv

Foreword..... xvii

Ocean Futures and the study: *Shipping in Arctic Waters*..... xxi

Summary: Shipping in Arctic Waters
A comparison of the Northeast, Northwest and Transpolar Passages xxiii

Introduction: An operational view of Arctic Waters 1

1 The transportation passages of the Arctic Ocean and connecting corridors
in southern waters 11

1.1 The transportation passages of the Arctic Ocean 12

1.1.1 The Northeast Passage and the Northern Sea Route 13

1.1.2 Intra-Arctic, destination-Arctic and transit routes of the Northern
Sea Route 18

1.1.3 The Northwest Passage..... 22

1.1.4 Intra-Arctic, destination-Arctic and transit routes in the Northwest
Passage..... 27

1.1.5 The Transpolar passage..... 30

1.1.6 Intra-Arctic, destination-Arctic and transit routes in the High Seas
of the Arctic Ocean 33

1.1.7 Connecting corridors in southern waters 35

1.1.8 The Northern Maritime Corridor 35

1.1.9 The Northern Pacific Corridor 37

1.1.10	The “Fram Corridor”	41
1.1.11	The “Davis Corridor”	42
2	Geopolitics and power constellations in the Arctic	47
2.1	The state of the Arctic: The six features combined	48
2.1.1	Western attitudes and lack of Arctic-specific knowledge	53
2.1.2	Lack of adequate applied shipping technology	54
2.1.3	Subordination of civil needs to military interests	56
2.1.4	The rise of new economic interests in Arctic energy	58
2.1.5	Availability of ocean space and extended security	59
2.2	The big Arctic insiders: The USA and Russia	61
2.2.1	US Arctic policy	61
2.2.2	Russian Arctic policy	64
2.3	The small Arctic insiders	66
2.3.1	The Arctic Five and the Arctic Three	67
2.4	The Arctic insider and outsider: The EU	68
2.4.1	EU Arctic policy	69
2.5	The Arctic outsiders: Asian states	72
2.5.1	China	72
2.5.2	Japan	75
2.5.3	South Korea	75
2.5.4	India	76
2.6	Geopolitics and the regional informal operational regime	76
3	Shipping, resources, economic trends and alternative means of transport	83
3.1	Introduction	83
3.2	A note on data, information, terms and definitions	84
3.3	World economic and shipping trends	86
3.3.1	Shifting patterns of trade	89
3.3.2	Trade by destination	90
3.3.3	World oil and gas production and consumption	94
3.3.4	International shipping trends	96
3.4	Arctic resources	98
3.4.1	Oil and gas	98
3.4.2	Undiscovered oil and gas resources in the Arctic	101
3.4.3	Other mineral resources	105
3.4.4	Forests and forestry	107
3.4.5	Fish and fisheries	109
3.5	NWP: Economies, resources, shipping and competing modes of transport	112
3.5.1	The economy and resources of the North American Arctic	112
3.5.2	NWP: Shipping and Arctic resources	113
3.6	NEP: Economies, resources and competing modes of transport	117
3.6.1	Economy and resources of Arctic Russia and Norway	117
3.6.2	Transportation infrastructure of the Russian Arctic	121

3.7	NEP: Shipping	126
3.8	Arctic shipping routes, Arctic shipping, and Arctic resources	129
3.9	Arctic cruise activity	133
3.9.1	Cruise activity around Greenland and Svalbard	135
3.9.2	Ships used in Arctic expeditions	136
3.9.3	Main specialist operators	137
3.9.4	The current status of cruises and expeditions in Arctic passages	140
3.9.5	Arctic cruises in the future	140
3.10	Some concluding remarks	141
4	Environmental challenges and other operating conditions	147
4.1	Natural conditions of the Arctic significant for shipping	147
4.2	Pollution in the Arctic and shipping as an independent source of pollution	149
4.2.1	Ship pollution	150
4.3	Arctic ecosystems and the impact by shipping activities	151
4.3.1	Marine ecosystems on the Northeast Passage	153
4.3.2	Marine ecosystems on the Northwest Passage	156
4.3.3	Marine ecosystems on the Transpolar Passage	158
4.4	Effects of oil spill in Arctic waters	159
4.4.1	Oil spill response in the Arctic	160
4.4.2	Oil spill response systems on the Northeast Passage	161
4.4.3	Oil spill response systems on the Northwest Passage	162
4.5	Variability of natural conditions and shipping possibilities in the Arctic ...	163
4.5.1	Natural conditions and navigation through the Northeast Passage .	164
4.5.2	Natural conditions and navigation through the Northwest Passage	168
4.5.3	Natural conditions and navigation through the Transpolar Passage	172
4.6	Some concluding remarks	172
5	Shipping and Arctic infrastructure	177
5.1	Technical requirements for ships operating in the Arctic	177
5.1.1	National technical requirements	182
5.2	Crew training and competence requirements in Arctic waters	189
5.2.1	National crew training and competence requirements	193
5.2.2	Current practices on the Northern Sea Route, the Northwest Passage and the Transpolar Passage	195
5.3	Search and rescue in Arctic Waters	197
5.3.1	Communication and support to navigation on the Northeast Passage	200
5.3.2	Communication and support to navigation on the Northwest Passage	204
5.3.3	Communication and support to navigation on the Transpolar Passage	206
5.3.4	Communication and support to navigation on connecting sea routes	208

5.4	Arctic ports and terminals	209
5.4.1	Russian ports and terminals on the Northeast Passage/Northern Sea Route	209
5.4.2	Canadian ports on the Northwest Passage	218
5.5	The costs and bureaucratic procedures of Arctic shipping	220
5.5.1	Costs and fees on the Northern Sea Route	220
5.5.2	Costs and fees on the Northwest Passage	223
5.6	Marine insurance in Arctic waters	224
5.6.1	Marine insurance aspects of the Northern Sea Route/Northeast Passage	224
5.6.2	Marine insurance aspects of the Northwest Passage	229
5.6.3	Marine insurance aspects of the Transpolar Passage	230
5.7	Information needed in order to make further risk assessments	230
5.8	Some concluding remarks	232
6	Ocean law, coastal waters, jurisdictional controversies – indigenous peoples’ rights	241
6.1	International ocean law, IMO Guidelines, “Soft Law” including corporate governance and Arctic initiatives	242
6.1.1	International ocean law: Coastal maritime zones	242
6.1.2	The Polar Code: IMO Guidelines	244
6.1.3	“Soft law”, including corporate governance and social responsibility	246
6.1.4	An Arctic Treaty: Still of interest and relevance?	248
6.2	The Northeast Passage	250
6.2.1	Northern Norway and Svalbard: Coastal waters	250
6.2.2	Russian Federation: Coastal waters	251
6.2.3	Historical sectorial controversies and the legal uncertainties of sea ice: Still relevant?	253
6.3	The Northwest Passage	263
6.3.1	Greenland: Coastal waters	263
6.3.2	Canada: Coastal waters	263
6.3.3	United States – Coastal waters	266
6.3.4	Jurisdictional controversy	266
6.4	The Transpolar Passage	269
6.5	Indigenous peoples’ rights	269
6.5.1	International conventions and declarations	271
6.5.2	Regional cooperation	274
6.5.3	The Northeast Passage: Indigenous peoples	275
6.5.4	The Northwest Passage: Indigenous peoples	279
6.5.5	The Transpolar Passage	287
7	The Northeast, Northwest and Transpolar Passages in comparison	299
7.1	The operational relevance of definition	300
7.2	Geopolitics and power constellations	300

- 7.2.1 The location of the Arctic Ocean 301
- 7.2.2 The water spaces of transportation within the passages 302
- 7.2.3 Operational spaces of military and civil activities 305
- 7.2.4 Connecting corridors in southern waters 308
- 7.3 Shipping, resources, economic trends and alternative means of transport 309
 - 7.3.1 The resources and the economies of the Arctic 309
 - 7.3.2 Developments in the world economy 309
 - 7.3.3 Some reflections on the future of resources and shipping routes 313
 - 7.3.4 Cruise shipping 315
- 7.4 Environmental challenges and other operating conditions 316
 - 7.4.1 Arctic shipping and impacts on marine ecosystems 316
 - 7.4.2 Oil spill response on Arctic transportation passages 318
 - 7.4.3 Natural conditions and shipping on the Arctic transport passages 319
- 7.5 Shipping and Arctic infrastructure 321
 - 7.5.1 Technical requirements for ships operating in Arctic waters 321
 - 7.5.2 Crew training and competence requirements in Arctic waters 324
 - 7.5.3 Search and rescue in Arctic waters 325
 - 7.5.4 Arctic ports and terminals 328
 - 7.5.5 The costs and bureaucratic procedures of Arctic shipping 329
 - 7.5.6 Arctic marine insurance 331
- 7.6 Ocean law, coastal waters, jurisdictional controversies and indigenous peoples' rights 333
 - 7.6.1 International ocean law, recommendations and governance 333
 - 7.6.2 Indigenous peoples' rights 335
- 7.7 Commercial comparisons of Arctic transit routes 340
 - 7.7.1 Benchmark Route 1: General cargo ship from Yokohama to Hamburg via Suez 340
 - 7.7.2 Benchmark Route 2: Container ship from Shanghai to Hamburg via Suez 341
 - 7.7.3 Northeast Passage comparisons 341
 - 7.7.4 Northwest Passage comparisons 346
 - 7.7.5 Transpolar Passage comparisons 346
 - 7.7.6 Some comments on some of the assumptions 348
 - 7.7.7 Advantages not quantified 351
 - 7.7.8 The Passages in comparison 351
 - 7.7.9 Endnote: The commercial development of the NSR 352
- Bibliography** 355
- Other sources** 374
- Index** 381