

Contents

Introduction (RAINER LEHFELDT)

KLAUS SCHWARZER, KLAUS RICKLEFS, ALEXANDER BARTHOLOMÄ and MANFRED ZEILER Geological Development of the North Sea and the Baltic Sea	1
DIRK MEIER The Historical Geography of the German North-Sea Coast: a Changing Landscape	18
MANFRED ZEILER, KLAUS SCHWARZER and KLAUS RICKLEFS Seabed Morphology and Sediment Dynamics	31
CHRISTIANA LEFEBVRE and GUDRUN ROSENHAGEN The Climate in the North and Baltic Sea Region	45
HOLGER KLEIN and ALEXANDER FROHSE Oceanographic Processes in the German Bight	60
WOLFGANG FENNEL and TORSTEN SEIFERT Oceanographic Processes in the Baltic Sea	77
JÜRGEN JENSEN and SYLVIN H. MÜLLER-NAVARRA Storm Surges on the German Coast	92
BERND PROBST and FRANK THORENZ Allocation of Administrative Responsibilities and Legal Framework Conditions	125

Coastal Protection (BERND PROBST)

BERND PROBST Coastal Protection along the North Sea and Baltic Sea Coasts	131
JACOBUS HOFSTEDE Coastal Flood Defence and Coastal Protection along the North Sea Coast of Schleswig-Holstein	134
KLAUS BEDNARCZYK, ANNE HEELING, DETLEF SCHALLER and ULRICH VIERFUSS Coastal Protection at the North and Baltic Sea: Helgoland Island	143
FRANK THORENZ Coastal Flood Defence and Coastal Protection along the North Sea Coast of Niedersachsen	158
JACOBUS HOFSTEDE Coastal Flood Defence and Coastal Protection along the Baltic Sea Coast of Schleswig-Holstein	170
BIRGER GURWELL Coastal Protection along the Baltic Sea Coast – Mecklenburg-Vorpommern	179

Coastal Protection Works (HOLGER SCHÜTTRUMPF)

HOLGER SCHÜTTRUMPF Sea Dikes in Germany	189
ANDREAS KORTENHAUS, THOMAS BUSS, OLIVER SULZ, JEFF MARENGWA and HANS-ANDREAS LEHMANN Storm Surge Protection Walls in Germany	200

HANS-ANDREAS LEHMANN and HEINZ JASPER Tidal Barriers at the North and Baltic Sea Coast	212
PETER FRÖHLE Detached Breakwaters	234
FRANK WEICHBRODT Coastal Groynes in Germany	241
Estuaries and Fairways (HARRO HEYER)	
MARTIN KREBS and HOLGER WEILBEER Ems-Dollart Estuary	252
AXEL GÖTSCHENBERG and ANDREAS KAHLFELD The Jade	263
DIETRICH LANGE, HELMUT MÜLLER, FRIEDERIKE PIECHOTTA and REINER SCHUBERT The Weser Estuary	275
MARCUS J. BOEHLICH and THOMAS STROTMANN The Elbe Estuary	288
KLAUS BEDNARCZYK, DETLEF SCHALLER and ULRICH VIERFUSS The Eider Estuary	307
JÖRG BROCKMANN, ANNE HEELING, MARTIN POHL and KLEMENS ULICZKA The Kiel Canal (Nord-Ostsee-Kanal)	317
ANNETTE ERNST, HERWIG NÖTHEL and HOLGER RAHLF Access Routes to Baltic Sea Ports	333
Ports (BIRGIT BRINKMANN)	
HANS-JOACHIM UHLENDORF and DÖRTE SCHMITZ Ports in Lower Saxony	347
STEFAN WOLTERING and IVEN KRÄMER Bremen and Bremerhaven	356
MICHAEL BÖLTING The Port of Hamburg	368
GESAMTVERBAND SCHLESWIG-HOLSTEINISCHER HÄFEN The Ports of Schleswig-Holstein	379
ULRICH BAUERMEISTER Ports in Mecklenburg-Vorpommern	390
PETER FRÖHLE Marinas in German Coastal Areas	404
JADEWESERPORT REALISIERUNGSGESELLSCHAFT The Construction of JadeWeserPort A Deepwater Container Terminal in Wilhelmshaven	411