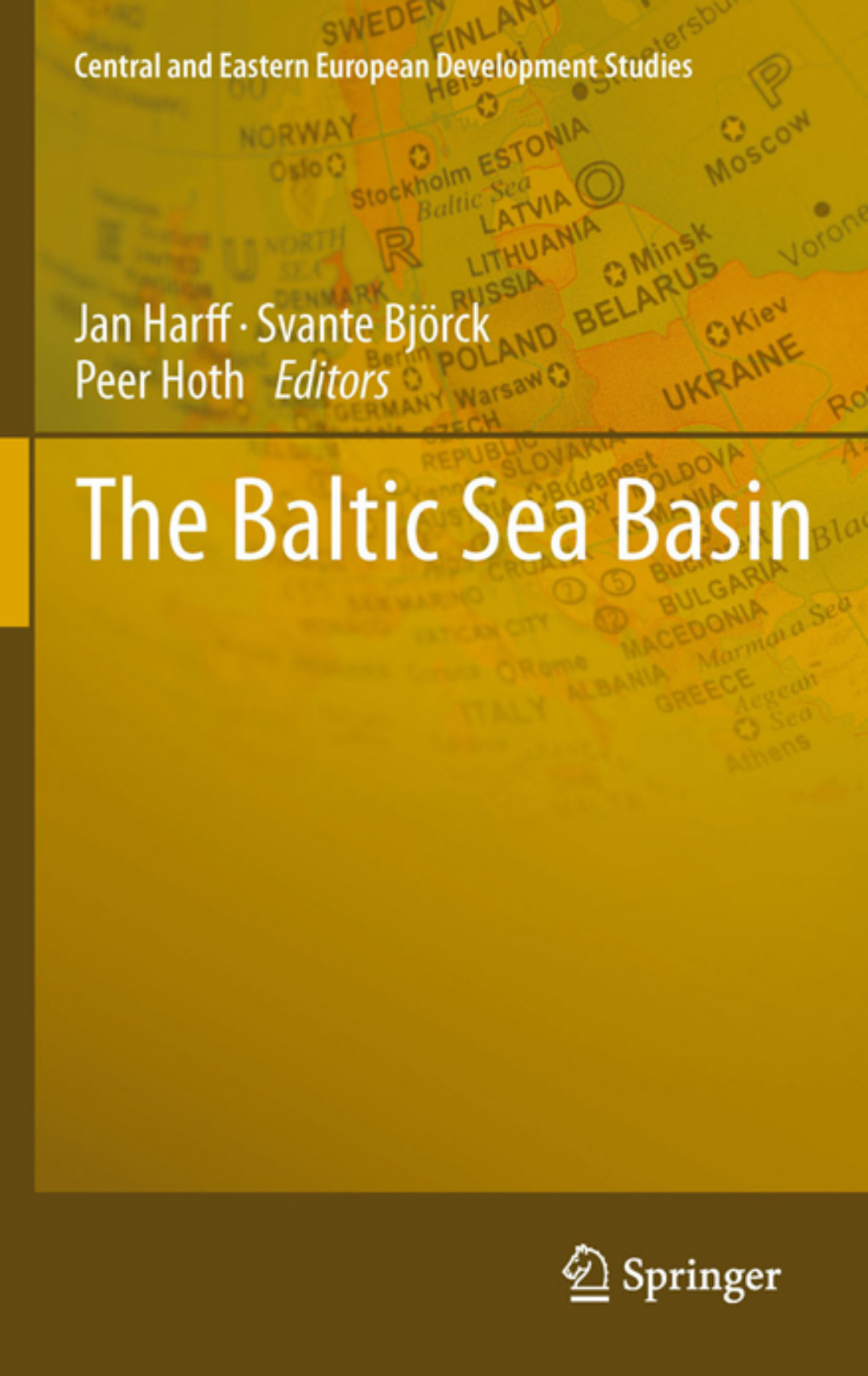
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The Baltic Sea Basin

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Part I
Introduction

Chapter 1
The Baltic Sea Basin: Introduction

Jan Harff, Svante Björck, and Peer Hoth

Abstract The Baltic Sea Basin serves as an example of a region where the use of natural resources and the need of environmental protection require a comprehensive and holistic approach in terms of geosciences, environmental sciences, and socio-economics. In this book, authors from countries around the Baltic Sea and overseas shed light on the Baltic Sea Basin with respect to (1) the formation of the Baltic Basin and its geological resources, (2) the stratigraphic record – mirror of climatic changes during the last glacial cycle, (3) coastal processes and sediment dynamics including aspects of coastal engineering, (4) interaction between socio-economic driving forces and the natural environment since the prehistoric colonization, (5) management of the marine ecosystem, and (6) monitoring strategies, respectively remote sensing. The editors intend not only to provide a record of the current state of the art in the investigation of the Baltic Sea Basin, but also to initiate innovative interdisciplinary and international research activities.

Keywords Baltic basin · Geology · Tectonics · Climate history · Sea level change · Coastal dynamics · Socio-economy · Archaeology · Coastal zone management · Anthropogenic impact · Monitoring · Remote sensing

The Baltic Sea, connected to the North sea and the North Atlantic via the Danish straits, is the largest brackish water basin in the world. Geologically, the basin is confined to the northwest by the highlands of the Scandinavian Caledonides, situated between two major tectonic regional units: the eastern and the western European platforms. The Baltic basin serves as a natural laboratory for a variety of geological structures and key processes crucial in the exploration of mineral resources and engineering, the formation of intra-continental sedimentary basins, and the interaction of hydrosphere, geosphere, and biosphere in basinal and coastal environments.

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Additionally, Baltic Sea sediments provide high-resolution records of climate and environmental changes during the Quaternary for the eastern North Atlantic realm. That record allows tracing back not only the change in the natural environment for the last 130,000 years but also the human impact and therefore socio-economic developments for at least the last 10,000 years.

The densely populated Baltic drainage area and the exploitation of the Baltic Sea resources cause permanent conflicts between economic interests and the protection of the unique ecological environment of the Baltic Sea. Therefore, the design of an effective interface between the different stakeholders is of vital importance for the community in the Baltic area and of great methodological interest for scientists, managers, and politicians not only in Europe but also worldwide.

The 33rd International Geological Congress (IGC) did provide the unique opportunity to discuss questions related to the points listed above in a very general way with the international geological scientific community. Therefore, a special symposium "The Baltic Sea Basin" was held on August 11, 2008, within the frame of the 33rd IGC at Oslo, Norway, in order to foster the understanding of the Baltic basin as a unit in terms of genesis, structure, ongoing processes and utilization. At the symposium, geoscientists, climate researchers, biologists, archaeologists, and computer scientists discussed questions regarding

- the formation of the Baltic basin and geological resources,
- the stratigraphic record – mirror of climatic changes during the last glacial/interglacial cycle,
- coastal processes and sediment dynamics,
- the feedback between socio-economic driving forces and the natural environment since the prehistoric colonization,
- the management of the marine ecosystem, and
- monitoring strategies and technical device design, including satellite observation methods.

In this book we report the results of the symposium. It is the first time that in a joint publication, scientists from different disciplines give a comprehensive and general overview about the Baltic Sea basin.

After this introduction, Part II is devoted to the *geological and tectonic evolution* of the Baltic basin. Sliaupa and Hoth give an overview about the geological history of the Baltic Sea basin from the Precambrian to the Quaternary, including the genesis of geological resources. The chapter gives a summary of the evolution and the known resources of the Baltic sedimentary basin focusing on its central part. According to new evidence for the origin of the Baltic Sea, the basin was formed during Late Ediacaran–Early Cambrian time caused by the reactivation of the weakest lithosphere part of the East European craton. All the following stages of basin subsidence were dominated by extensional tectonics. However, the crust was most intensively structured in NW–SE-directed compression during Late Silurian and Early Devonian time due to the collision of Laurentia and Baltica. The Permo-Carboniferous period is mainly marked by magmatic intrusions in the southern part