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Title of doctoral dissertation: **Holocene changes in marine sediment accumulation conditions in the Bornholm and Gdańsk Basins based on lithological and geochemical research results**

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### Summary of the doctoral dissertation

The subject of this doctoral dissertation involved studying two approximately 10-meter-long marine sediment cores collected from the deepest parts of the Bornholm Basin and the Gdańsk Basin. High-resolution laboratory analyses of samples taken at 1 cm intervals from both cores included grain size determinations using laser diffraction, as well as content analyses for the following: loss on ignition at 550°C, total carbon, organic carbon (TOC), inorganic carbon, nitrogen, and sulfur. Additionally, with slightly lower resolution, the content of selected metals (Na, K, Ca, Mg, Fe, Mn, Cu, Zn, Pb, Co, Ni, Cr) was measured using atomic absorption spectrometry. Furthermore, a comprehensive chemical composition analysis of the sediments was conducted using XRF scanning for both cores. The age of the analyzed sediments was determined through radiocarbon dating by measuring the age of bivalve shells found at various depths within each core; these dating results were then used to construct age-depth models for both sediment cores. This approach enabled the calculation of marine sediment accumulation rates and allowed for the presentation and interpretation of laboratory results on a calibrated age scale (cal. years BP).

As a result of the research, unique insights were obtained regarding:

- Changes in sediment accumulation rates at the seafloor of these deep-water sedimentary basins in the Southern Baltic Sea during the Middle and Late Holocene;
- Variations in the granulometric and chemical composition of the deposited sediments.

The findings enabled the reconstruction of several processes and conditions present during bottom sedimentation, such as:

- The frequency of saline water inflows from the North Sea into the Bornholm and Gdańsk Basins;
- Variations in surface water salinity inferred from the presence of diatoms with different environmental requirements;
- Fluctuations in redox conditions prevailing in the benthic zone;
- The origin of mineral and organic matter, distinguishing between autochthonous components (formed within the Baltic Sea water column) and allochthonous components (derived from terrestrial sources related to river inflow or coastal erosion);
- Variability in the intensity of erosive-denudation processes in adjacent land areas and their relation to climatic conditions, the historical Baltic Sea level changes, as well as anthropogenic activity.

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