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Title of the doctoral thesis**: „THE SEISMO-GEOLOGICAL MODEL OF THE SOUTH-EAST BALTIC BASIN"**

Summary:

The aim of this study is to reconstruct the tectonic processes taking place in the south-western part of the Baltic Basin based on the interpretation of the seismic and well log data.

The following seismic data from the Baltic Basin were used in the thesis: Opalino 3D, Kochanowo-Tępcz-Częstkowo 3D, Wysin 3D, Kościerzyna-Gdańsk 2D, Somonino-Przywidz 2D, Żelazna Góra 2D and Górowo Iławieckie-Bartoszyce 2D, as well as well log data available in the research area (geophysical and geological), published results of seismic data interpretation - PolandSPAN and a wide set of literature discussing the early Paleozoic evolution of the Baltic Basin.

The first part of the thesis focuses on processing and preparation of seismic data to structural interpretation. The high attenuation of Permian sediments caused drop of seismic data resolution especially in the thin-layered Ordovician formation. The inverse Q filtering was used to remove this effect. Application of this algorithm improved the continuity of sub-Permian reflections and allowed for better imaging of tectonic zones. The obtained data was used as auxiliary in structural interpretation. The next stage included the well correlation of borehole data for 2 correlation cross-sections Opalino-2 – Darżlubie IG-1 and Opalino-2 – Kościerzyna IG-1. The analysis enabled determination of the nature of changes in seismic signatures of the waves reflected from the individual lithostratigraphic boundaries. Well cross-correlation provided a framework for seismic interpretation of seismic sections located near or crossing the well correlation profiles. The well tied and initially interpreted in the time domain seismic data were time-depth converted using a three-dimensional model of complex velocities.

A detailed analysis of seismic sections, as well as structural and thickness maps, allowed the interpretation of dislocations documenting the tectonic evolution of this part of the Baltic Basin. Based on the structural interpretation of seismic data, the evolution of the Baltic Basin in period of the late Ediacaran – Lower Palaeozoic can be divided into the following stages: (1) late Ediacaran - Early Middle Cambrian, associated with the process of the break-up of the

supercontinent Pannotia and rifting process along the southwestern edge of Baltica; (2) late middle Cambrian - Ordovician, reflecting the development of the continental passive margin; (3) Silurian, related to the development of a convergent margin between Baltica and Avalonia and the flexural bending of the Baltica slope, characterized by particularly high tectonic subsidence and sedimentation rate. The last stage of the thesis is an attempt to reconstruct the bottom of the Baltic Basin during the Lower Paleozoic time along 210 km profile of Kościerzyna IG-1 - Wyręba-2.

The analyzed seismic data proved that the development of the Baltic Basin is the result of overlapping mechanisms and interactions related to the formation of the western and northern margin of Baltica. The individual stages of the tectonic evolution of the Baltic Basin are reflected in seismic data.