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PLEJSTOCEN KUJAW I DYNAMIKA LOBU WISŁY W CZASIE OSTATNIEGO ZLODOWACENIA

Materiały konferencyjne pod redakcją naukową

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INFLUENCE OF THE MESOPROTEROZOIC FAULTS OF THE SMALAND-BLEKINGE DEFORMATION ZONE ON THE PLEISTOCENE SEDIMENTATION AND THE PRESENT TOPOGRAPHY

Combined information from topographical maps, air photographs and satellite images indicate a remarkable linear arrangement of landforms here called "lineaments". These lineaments can often to be related to fault zones of the crystalline basement. A good example of this relationship is Småland-Blekinge Deformation Zone (SBDZ) in southern Sweden. This is one of the numerous fault zones in the Precambrian crust of the East European Craton, which was formed at ca. 1.5–1.4 Ga (Bogdanova et al., 2006).

The degree of inheritance of the present topography from past geological events in the eastern part of the SBDZ area has been assessed by GIS modeling of the crystalline basement upper paleosurface, the present topography surface and basement-present topography correlation, as well as topolineaments identification.

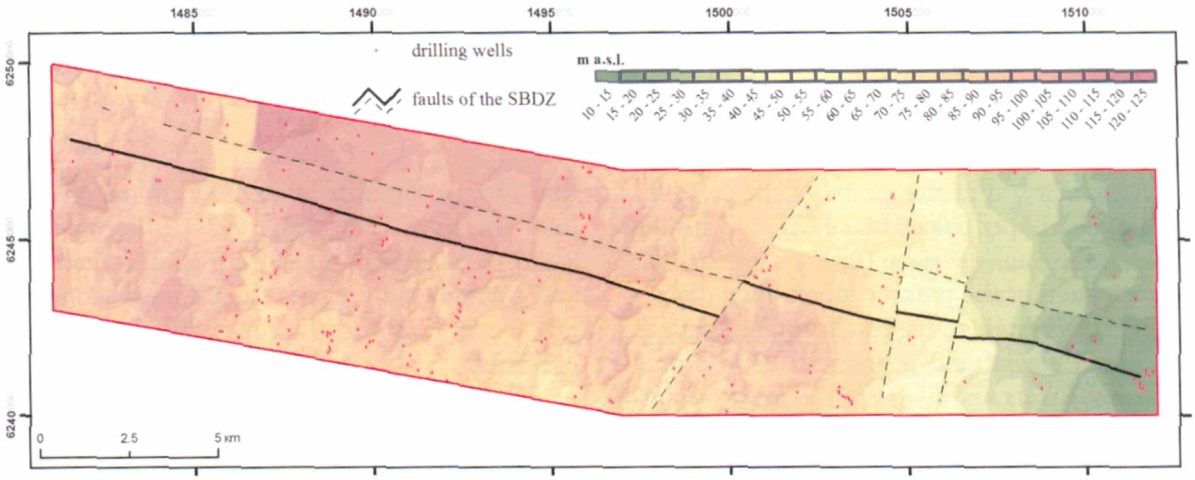

Fig. 1. A model of the crystalline basement upper paleosurface in the eastern part of the SBDZ area (as based on the Well archive of the Swedish Geological Survey and the DTM of the area)

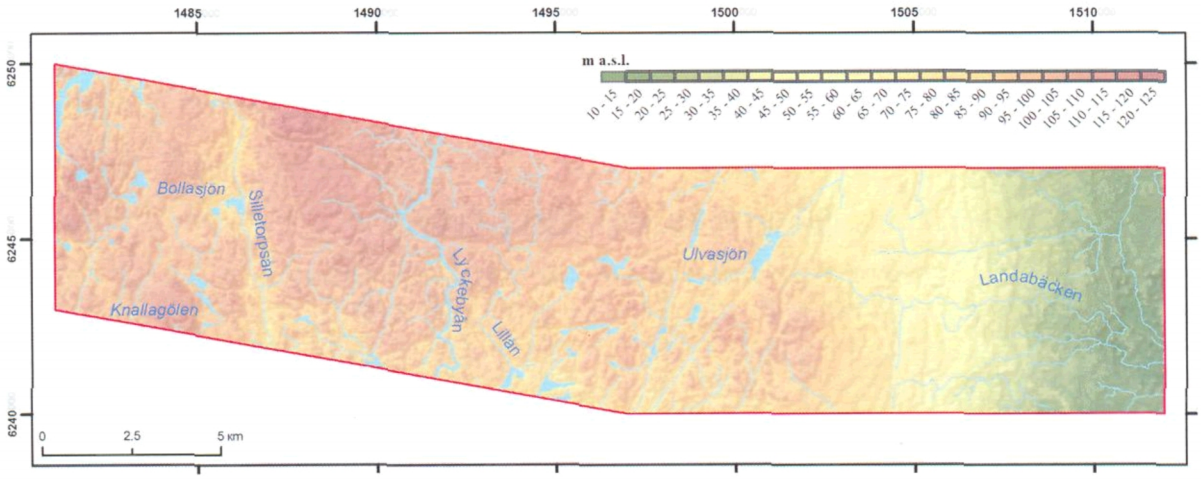

Fig. 2. The digital terrain model (DTM) in the eastern part of the SBDZ area (as based on topographical maps: Karlskrona 3F NO, Kristianopel 3G NV, scale 1:50 000)

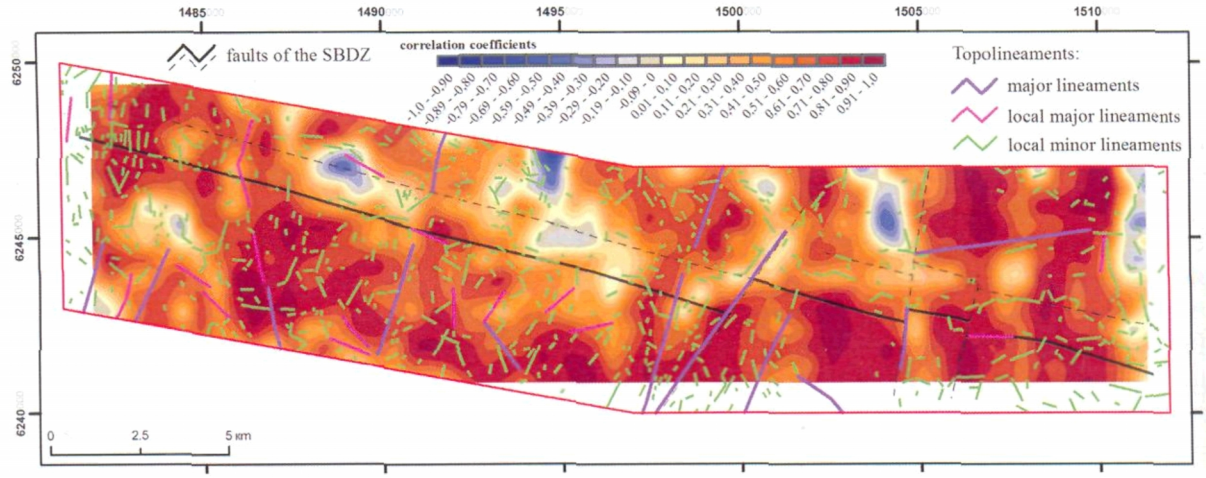

Fig. 3. Map of correlation coefficients between the crystalline basement paleosurface and the present topography in the eastern part of the SBDZ area

A comparison of the model of the crystalline basement upper paleosurface (fig. 1) with the present topography surface (fig. 2) suggests that the formation of the present topography depended on the crystalline basement topography, as well as on glacial and postglacial depositional processes. Rivers and likes are the most respondent elements of the present landscapes, reflecting the faults of the SBDZ. The majority of the recognized topolineaments (fig. 3) atop the faults are the rectified parts of rivers and lakes. The map of correlation coefficients between the crystalline basement upper paleosurface and the present topography (fig. 3) suggest that the present surface is mostly inherited form the crystalline basement. The correlation coefficients field is mostly positive in the eastern part of the SBDZ area. Within the areas of the thinnest sedimentary cover the correlation coefficients reach +8.5–9.0.

Those relations allow us to suggest that the SBDZ was still active after its formation in the Mesoproterozoic. The displacement of the major WNW–ESE-trending fault system has occurred later along the linked NE–SW faults. Possible accumulation of sedimentary deposit, laid down before the Pleistocene glaciations within the area, must have been eroded away during

the Pleistocene ice advances. The stress in the basement, caused by the thickness of the inland ice during full glaciations (during the Last Glacial Maximum (LGM) estimated to 1750 m (the "maximum" model reconstruction after Siegert et al., 2001) and 750 m (the 'minimum' model reconstruction after Siegert et al., 2001)) would cause a neotectonic subsidence of the territory during the glacial advances, changing to neotectonic uplift during the glacial retreats within the Pleistocene. Such rapid changes of neotectonic regimes must have affected the faults of the SBDZ. We suggest that there were seismic activity and neotectonic deformations along the Zone during this time. After the last retreat of the SIS, one part of the area (below the highest shoreline) was hidden by water of the Baltic Ice Lake, and the second part (above the highest shoreline) was covered by stagnant debris-rich ice. As a result of following uplift and melting of dead ice, two types of landscapes were formed within the key area (Björck & Möller, 1987). The formation of the present landforms and the river networks in the study area depended on the topography of the crystalline basement, as well as on the glacial/postglacial environment.

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