ment NNW regional Upper Carboniferous to Permian extension associated with the emplacement of the Land's End granite, involving NW or SE-dipping ductile zones and listric normal faults, and NW–SE-striking strike-slip faults. A detailed field mapping revealed a complex magmatic flow pattern defined by the grain size, abundance and alignment of alkali-feldspar phenocrysts exhibiting metre-scale variations. These variations are often connected with the presence of stoped blocks and local turbulences generated by thermal convection.

We provide information on the relationship of internal structures of the Land's End granite with respect to the country rocks. The work is essentially focused on the anisotropy of magnetic susceptibility (AMS), feldspar and biotite shape preferred orientation (SPO) determined by textural reflexion goniometry in comparison with mesoscopic fabric pattern.

Two main textural varieties occur within the Land's End granite: coarse-grained, megacrystic biotite granite in the upper part of the intrusion and medium- to fine-grained, sparsely megacrystic granite mingled with tourmaline granite representing the innermost part of the pluton. Generally subhorizontal, homogeneous and well developed magmatic fabric of the megacrystic granite is defined by the preferred orientation of subhedral K- feldspar and biotite within fine-grained matrix. The dominant feature is the NW or SE moderately dipping foliation bearing subhorizontal magmatic lineation. Foliations become parallel to the stoped blocks within one metre from the contact. Magmatic fabrics are cut by later aplite and subvertical tourmaline–quartz dykes. The sparsely megacrystic granite shows apparently weak magmatic fabric defined by preferred orientation of alkali-feldspar, plagioclase and biotite. Numerous features related to local thermal convection disturb the zones of relatively stable moderate to subvertical NW–SE- or NE–SW-striking magmatic foliations.

The granite shows low degree of AMS (carried by the biotite as proved by thermomagnetic curves) and predominantly oblate shapes of magnetic ellipsoid. Magnetic foliations are mostly subhorizontal, bearing either NNW–SSE- or ENE–WSW-orientated magnetic lineations. The variations in lineation directions are related to the intensity of magmatic fabric or to the margins of stoped blocks.

Based on the above mentioned assumptions, we suggest that magmatic fabric of the intrusion in the roof represented by megacrystic carapace is controlled by regional extensional tectonics. The movements of the roof were completely coupled with the flow of underlying granite; as a result, both tensional and strike-slip movements are reflected by flowing magma. In addition, homogeneous magmatic fabric is locally perturbed by stoped blocks. The inner part of the pluton represented by sparsely megacrystic granite shows unclear relationship to the regional tectonic pattern. This part was decoupled from the host-rock deformation, thus reflecting internal magmatic processes (thermal convection, magmatic surges) without any relationship to regional tectonics. According to the AMS and goniometry data, we assume that the individual subfabrics defined by preferred orientation of each mineral reflect different increments of strain and crystallization history of cooling magma.

# Structural Styles of Basin Formation and Inversion – Introduction

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Although studies on development and inversion of the sedimentary basins could rely on very different datasets and methods they share common goal – as complete as possible understanding of various tectonic processes that control subsidence and uplift within the basin. In the following paper selected examples derived from the on-going studies of various sedimentary basins in Poland will be used in order to visualise various approaches to the studies of sedimentary basin's development and inversion. Detailed accounts of particular research projects will be given in separate presentations.

Tectonic zones responsible for sedimentary basin's subsidence and inversion could be often observed on gravity and magnetic data, and regional analysis of potential fields could yield important information on location of crustal fault zones. Recently completed integration of gravity and magnetic data with results of seismic interpretation provided crucial information on the role of the SW margin of the East European Craton (EEC) for the Mesozoic development and inversion of the Mid-Polish Trough (MPT). EEC SW margin, clearly defined – at least at the upper crustal level – by potential field data, focused both extension and inversion in Mesozoic times.

Numerous examples of different structural styles of subsidence, inversion and related syn-kinematic depositional patterns were provided by seismic reflection data. Within the Mid-Polish Trough, numerous structures were identified that point to different processes for MPT's subsidence and inversion. Within the Pomeranian (NW) MPT's segments, due to the presence of thick Zechstein evaporates, significant decoupling between the pre-Zechstein basement and post-Zechstein sedimentary infill led to development of various structures within the Mesozoic succession only partly related to the basement fault zones. Identified examples include e.g. Oświno structure located along the SW MPT's margin and Bielica structure located along the NE MPT's margin. In central MPT's segment (Kłodawa region), due to more intense basement's extension less significant decoupling took place, and more direct relationship between basement fault zones and Mesozoic structures could be observed. Within the SE MPT's segment, due to lack of Zechstein evaporates, direct relationship between subsidence and inversion zones within the basement and sedimentary infill could be documented using seismic reflection data. Some of these fault zones were subsequently reactivated within the Carpathian foredeep basin during Miocene collision of the Outer Carpathians.

Formation and inversion of sedimentary basins could also be studied using well data. In particular, dipmeter data could

provide detailed information on structural and sedimentary features related to these processes. To study Carboniferous fold-thrust belt in the basement of Wielkopolska (Variscan externides), an analysis of directional data acquired with six-arm dipmeter from c. 40 exploratory petroleum wells has been undertaken. The preliminary results revealed that the dominant structural trends related to the latest stages of inversion of external Variscan basins present within the basement of the Fore-Sudetic homocline are NW-SE to WNW-ESE, that is the same as in the West Sudety Mts. The folds are recumbent, NE-verging structures, with local axial-plane cleavage. Their recumbent attitude is probably due to late tilting on a slope of the uplifted Leszno-Wolsztyn basement high. Apart of well data, also cores could be very effectively used for studies of development and inversion of sedimentary basins. Sedimentological and structural studies of cores from c. 20 wells provided new information of various aspects of development of the Variscan externides. The preliminary results have revealed a relatively intense deformation of the Carboniferous succession in the south of the area and its considerable decrease towards the north. The inversion of the southern part of the basin involved thrust tectonics, as confirmed by extensive stratigraphic duplications. On the other hand, the Carboniferous rocks in the northern part of the basin bear no clear evidence of thrusting and tight folding. The contrasting tectonic styles observed in the southern vs northern parts of the Carboniferous basin may reflect a transition from the overthrust Variscan accretionary prism to the foreland basin only weakly deformed under transpressional regime. According to preliminary palaeontological data, the final inversion of the Carboniferous basin seems to have taken place not earlier than in the Late Westphalian. It may overprint, however, effects of the previous deformation events that are suggested by the presence of a stratigraphic gap between the Namurian A and Westphalian in the southern part of the basin.

Apart from geophysical data and cores also outcrops could provide important data necessary for better understanding of formation and inversion of sedimentary basins. Recently completed outcrop studies of selected formations from the Moravo-Silesian segment of the Variscan externides proved that they were subjected to at least four or three stages of deformations.

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# Late Cretaceous Strike-slip Tectonics and Sedimentation within the SW Baltic Sea and Their Relationship to the Inversion of the Mid-Polish Trough

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The SW Baltic Sea occupies area where crustal-scale regional tectonic zones of different age merge and overlap, creating a complex tectonic pattern (Fig. 1). This pattern influenced the evolution of the Mesozoic sedimentary basin in this area. Interpretation of new high-resolution seismic data from the SW Baltic Sea provided new information both on modes of the Late Cretaceous inversion of this part of the Danish – Polish Mesozoic basin system as well as on relationship between tectonic processes and syn-tectonic depositional systems (Kramarska et al., 1999; Krzywiec et al., 2002). Within the Bornholm – Darłowo Fault Zone, located between the Koszalin Fault and Christiansř Block, both strike-slip and reverse faulting took place during the inversion-related activity. The faulting was related to reactivation of extensional pre-Permian fault system. Syn-tectonic sedimentary features include a prominent,


**Fig. 1.** Tectonic map of the Bornholm – Darłowo Fault Zone (according to Kramarska, Krzywiec & Dadlez, 1999, modified and supplemented). Thin lines: shallow high-resolution seismic lines, A – A': location of seismic from Fig. 2.