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Some geological problems of the Southern Baltic Basin

ABSTRACT: On the basis of seismic results in the Polish offshore sector and of geological knowledge of the surrounding countries, a general outline of the geology of the Southern Baltic Basin is given. Both tectonic subdivision and stratigraphic sequence are discussed as well as the most important geological problems so far unsolved are enumerated. A comparison with the North Sea Basin is made at the conclusion.

INTRODUCTION

An intensive seismic surveying was carried out from 1964 until 1967 in the Southern Baltic Basin in a belt c. 50 km wide along the Polish coast. More than 4,400 km of profile lines were measured by use of reflection method. Almost whole sedimentary cover has been investigated in the eastern part of the area studied, with the main reflectors in the Upper Permian (or, partially, at the top of Silurian) and in the Ordovician (Fig. 1*a*). In the western part, due to the deterioration of the reflections below the Upper Permian (Zechstein), only the upper part of the sedimentary cover has been penetrated. Several marker horizons have been traced within this cover (Fig. 1*b*, *c*).

No deep well has been so far drilled offshore, nor any other geophysical method has been applied. The geological interpretation of seismic results must have been based upon the data from adjoining land areas as well as upon observations of the dynamic character of seismic horizons. In view of considerable variability of both the geological sequences and the facies on the southern slope of the Baltic Shield, this interpretation remains, however, very hypothetical (Figs 2—4).

In spite of these deficiencies the seismic results, together with the numerous geophysical and geological onshore data, have conspicuously enlarged our knowledge of the Southern Baltic Basin. It is evident that, apart from the explanation of some problems, there has appeared at least the same number of new questions which wait for solution. The bulk of

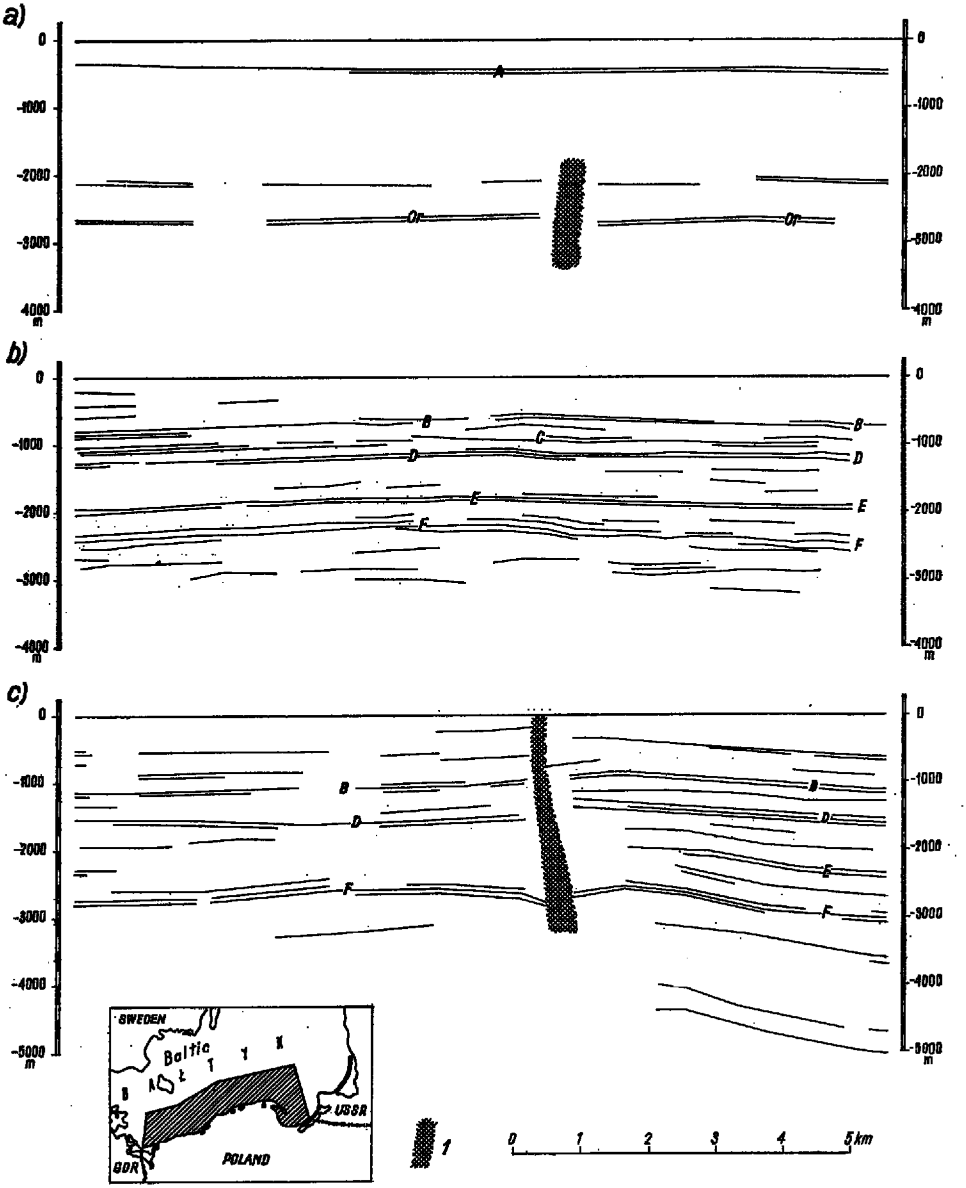


Fig. 1

Examples of the reflection seismic depth sections

a) in the eastern part of the area. Seismic reflectors: *Or* — in the Ordovician, *A* — in the Zechstein or at the top of the Silurian.

1 — faults

b, c) in the western part of the area. Seismic reflectors: *F* — in the Zechstein, *E* — at the top of Lower Buntsandstein, *D* — in the Muschelkalk, *C* — at the boundary Keuper/Rhaetic, *B* — at the top of Triassic

Map shows the area of seismic survey

them is of essential importance for the possible exploration for hydrocarbons. This paper is an attempt to compile the data so far received as well as to outline the aims of the future geological studies in this area.

Reference is made to a few Polish papers on the same subject (Dadlez & Młynarski 1967, 1972; Pożaryski 1970; Żardecka 1973).

TECTONIC PROBLEMS

The Southern Baltic Basin belongs to two tectonic units of the first order. Its greater, central and eastern part constitutes without doubt a fragment of the East European Precambrian Platform. The tectonic position of the smaller, western part as well as the question of the boundary between both parts remain disputable. That is the most important problem of the area in question.

The situation of the south-western boundary of the Precambrian Platform has been extensively discussed in the European geological literature of the last two decades. It is beyond the scope of this paper to review this discussion. It should be only stated here that the majority of Polish authors (Znosko 1964, 1966; Modliński 1968; Pożaryski 1969; Teller 1969) is of opinion that the well known Tornquist-Teisseyre Line (or, more exactly, Tornquist-Teisseyre Zone), at least in the territory of Western Pomerania, is generally an equivalent of the discussed boundary. The present author shares this opinion (Dadlez 1967b, 1973).

Between Koszalin and Chojnice (Western Pomerania) the Tornquist--Teisseyre Zone can be easily traced in the configuration of high velocity refraction horizons. Along this zone the strongly disturbed Ordovician and Silurian strata have been encountered in numerous deep wells. These strata, consisting of shales and siltstones, occasionally interlayered by sandstones, are believed to be several thousand metres thick. On account of the facies, thickness and the high degree of tectonic disturbance these beds are regarded as the miogeosynclinal sediments of the south-eastern branch of the Caledonides. The direct extension of this zone has been in all probability proved by the deep wells in the northernmost Rügen (Jaeger 1967), although the sequence revealed there is interpreted in a different way by some German authors (Franke 1967).

North-east of the supposed folded belt the epicontinental sediments of the youngest Precambrian and Cambro-Silurian are known in the area of the Łeba Uplift. These sediments spread northwestward through south--western Bornholm as far as Scania (Gry 1960, Regnéll 1960). The Ludlovian deposits show particularly great thickness in this zone, thus indicating a rapid subsidence and quick (synorogenic?) sedimentation in the external, mobile belt of the Precambrian Platform.

Taking these facts into consideration it can be assumed that the south-western boundary of the Precambrian Platform runs offshore towards WNW of Koszalin and farther about midway between Rügen and Bornholm (Fig. 2). However, this assumption is not yet confirmed by the geophysical investigations.

The tectonic subdivision of the south-western part of the area is only partly recognized, mainly due to the lack of seismic information from below the base of the Zechstein. In the Zechstein-Mesozoic cover (Fig. 3). a complex system of faults exists with displacements up to 1,500 m (Dadlez & Młynarski 1967). The principal fault zones (Świnoujście, Kamień, Trzebiatów and Koszalin) divide the area into four blocks (Wolin, Gryfice, Kołobrzeg and Darłowo). These fault zones cut the whole Zechstein-Mesozoic cover. Hence we may infer that they were definitely formed in the Latest Cretaceous or post-Cretaceous times. Nevertheless, these zones, or at least some segments of them, originated much earlier. It results, for instance, from the essential difference in the onshore pre--Zechstein sequences at the both sides of the Koszalin fault zone as well as from the distinct influence this zone had on the rate of sedimentation in the Zechstein and Mesozoic times.

The problem of northern and north-western continuation of all these fault zones is not quite clear as yet (Fig. 3). Judging from the Mesozoic sequences, the Koszalin fault zone runs fairly close to Bornholm. The faults of the western and south-western part of this island may be directly connected with this zone. The Trzebiatów fault zone seems to continue in the faults which cut off the external horsts of the Precambrian basement in Scania (Romeleasen horst — Magnusson 1958). Finally, the Kamień fault zone runs undoubtedly east of Rügen. The regional trend of the discussed fault zones is generally oblique to the presumed boundary of the Precambrian Platform. This trend reflects the compartively young movements which have caused the complex pattern of faulted blocks at the outer edge of the Platform, so distinctly visible in the Scania area.

Due to the post-Cretaceous movements which have deeply obliterated the course of earlier tectonic events, the reconstruction of older faults is extremely difficult. Their directions are probably nearly W-E. Late Variscan fault systems of such directions have recently been proved to exist on Rügen (Albrecht 1967). They throw down the pre-Zechstein formations southwards. It seems reasonable to assume that these fault systems continue east of Rügen. The traces of the same regional trend may be represented offshore by an almost W-E strike of some apparently subordinate faults in the Gryfice and Kołobrzeg Blocks (Mrzeżyno and Mielno fault zones — Fig. 2). A complicated arrangement of the tectonic blocks consisting of various Devonian and Carboniferous strata, similar to that revealed in the onshore part of the Kołobrzeg Block, is probably characteristic for this part of the basin. The interpretation of these pre--Zechstein blocks (Figs 2, 4*a*, *b*) is necessarily based mainly upon the

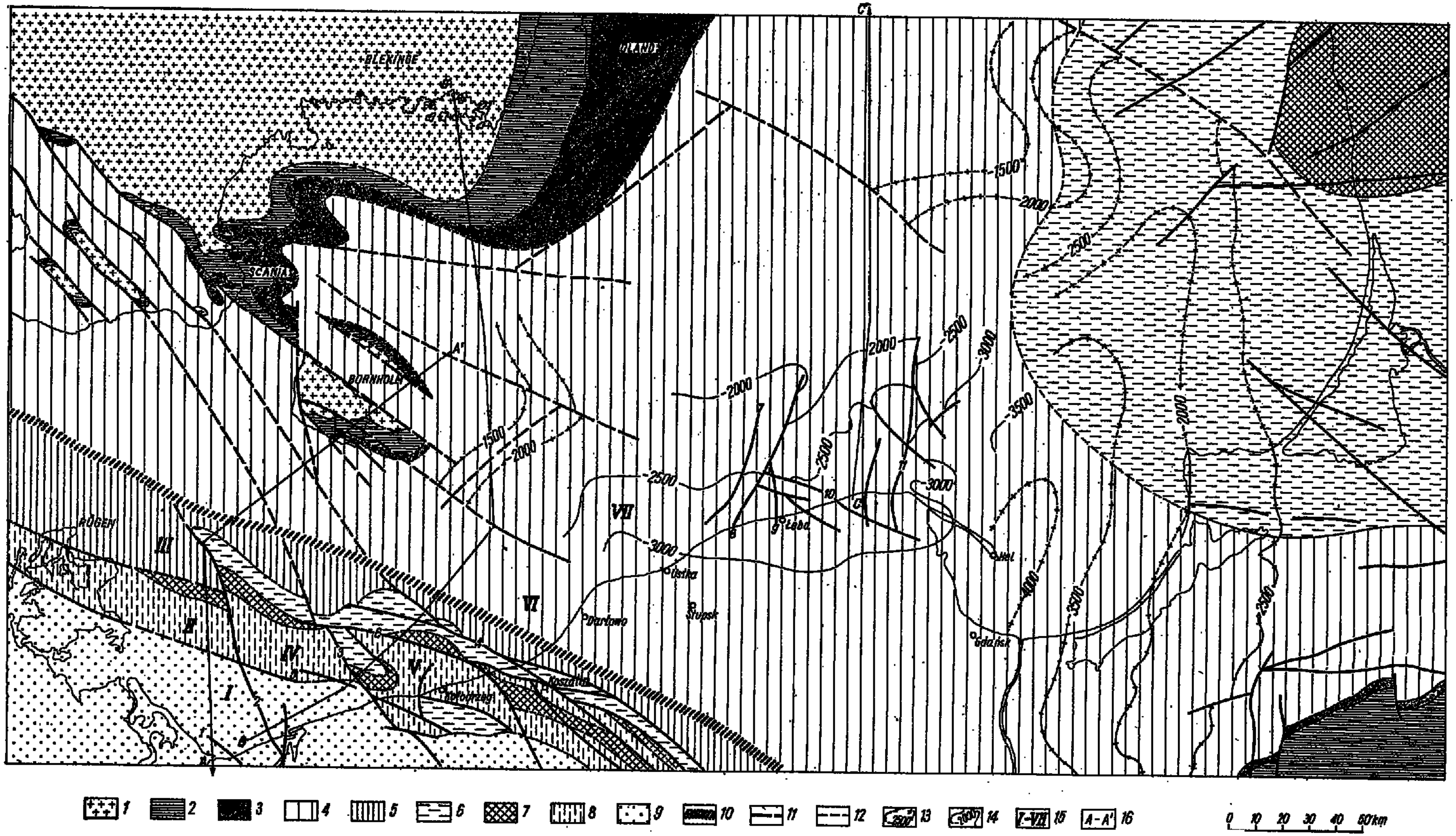


Fig. 2

Outline geological map of the pre-Zechstein formations

1 Precambrian, *2* Cambrian (on Bornholm also Nexo sandstone), *3* Ordovician, *4* Silurian, *5* folded Ordovician and Silurian, *6* Devonian, *7* Lower Carboniferous, *8* Upper Carboniferous, *9* Lower Permian, *10* presumed south-western boundary of the Precambrian Platform, *11* main faults and fault zones (1 — Świnoujście, 2 — Kamień, 3 — Trzebiatów, 4 — Koszalin, 5 — Mrzeżyno, 6 Mielno, 7 — Gardno, 8 — Smołdzino, 9 — Łeba, 10 — Białogóra, 11 — Rozewie), *12* geological boundaries, *13* contours of the top of the crystalline basement in metres (*11—13* dashed when supposed), *14* contours of the seismic reflector in the Ordovician in metres, *15* tectonic blocks (I — Wolin, II — Trent, III — Arkona, IV — Gryfice, V — Kołobrzeg, VI — Darłowo, VII — Bornholm-Ustka), *16* lines of cross sections shown on Fig. 4

tectonic features of the Zechstein-Mesozoic cover, supposing their posthumous nature.

In the Zechstein-Mesozoic cover of the area so far discussed no manifestations of the salt tectonics have been ascertained. Block anticlines appear along the faults (Fig. 1c). Some of these anticlines are entirely or partly buried, owing their origin to the vertical, contemporaneous with sedimentation, movements of the pre-Zechstein basement. Strong movements of the Latest Cretaceous and Early Tertiary times, followed by denudation, have caused the various Jurassic and Triassic stages to appear at the pre-Cainozoic surface on the crests of anticlines Fig. 3).

The tectonic subdivision of the central and eastern parts of the basin is fairly simple. In the east the central depression of the Peribaltic Syneclise extends from the Gdańsk Bay northwards along the coast of the Baltic Soviet Republics. Thickness of the sedimentary cover exceeds 4,000 m near Gdańsk (Fig. 2). In the north-west the crystalline rocks of the Fennoscandian Shield crop out on the coasts of Southern Sweden and Bornholm. A broad and gently tilted slope spreads between these outcrops and the central depression mentioned above, the sedimentary cover thickening gradually towards south and south-east. The crystalline basement of this slope is probably broken by the faults of various strikes (Golub & Sidorov 1971, *see* also Fig. 4c). In the Polish offshore area several fault zones have been ascertained in the Ordovician seismic horizon (Fig. 1*a*), their throw being generally not more than 250 m. The Rozewie fault zone represents presumably the western border of the central depression of the Peribaltic Syneclise (fig. 2). Very flat anticlines adjacent to the faults have also been found. They are of post-Silurian — pre-Zechstein age. The existence of buried anticlines of Cambrian or pre--Ordovician age can not be excluded since such anticlines, connected with mobile blocks of the Precambrian basement, are known on the southern and eastern slope of the Peribaltic Syneclise (Goldberg & Rukhovetz 1970; Bałaszow, Knieszner & Poleszak 1972; Tyski 1973).

The question of south-eastern extension of the Bornholm horst remains unsolved as yet. An uplift of crystalline basement along the line Bornholm-Ustka (Fig. 2) may be probably indicated by the configuration of the Ordovician reflector. This reflector is, however, fragmentary and problematic in this region.

The Zechstein-Mesozoic cover of the Precambrian Platform is very gently disturbed. Some of the faults observed in the Early Palaeozoic horizons may pass upwards either in posthumous faults or in monoclinal folds with displacements of not more than some scores of metres. An elongated uplift (Słupsk-Rozewie, Fig. 3), extending W-E along Polish coast, is of regional importance. The base of the Mesozoic cover lies on its crest at the depth of about 250 m.

Fig. 3

Outline geological map of the pre-Cainozoic formations

1 Precambrian, *2* pre-Zechstein Palaeozoic, *3* Zechstein, *4* Triassic, *5* Jurassic, *6* Cretaceous, *7* boundary of Zechstein under Mesozoic formations, *8* boundary of Zechstein salt, *9* boundary of Triassic under younger Mesozoic formations, *10* boundary of Jurassic under Cretaceous deposits, *11* main faults and fault zones, *12* geological boundaries on the pre-Cainozoic surface (*7—12* dashed when supposed), *13* contours of the seismic reflectors in the Zechstein (north of the Zechstein boundary in the top of pre-Zechstein) in kilometres, *14* tectonic units (A — Wisełka syncline, B — Kamień anticline, C — Kamień-Sea anticline, D — Trzebiatów syncline, E — Kołobrzeg-Sea anticline, F — North Kołobrzeg-Sea anticline, G — Sarbinowo syncline, H — Słupsk-Rozewie uplift, I — Łeba Uplift)

PALAEOGEOGRAPHIC PROBLEMS

Fundamental problems of the Early Palaeozoic palaeogeography are obviously closely related to the problems of the Precambrian Platform boundary as well as of the transition zone between epicontinental and miogeosynclinal facies. These problems have been discussed above.

Epicontinental deposits in the area of the Precambrian Platform begin with the conglomerates, sandstones and arkoses regarded as the youngest Precambrian (Vendian?). They crop out on Bornholm (Gry 1960) and are revealed by drilling on the Łeba Uplift (Lendzion 1970, Bednarczyk 1972), their thickness varying between 30 and 150 m. These sediments are believed to wedge out offshore north of the line: Hel Peninsula — Bornholm.

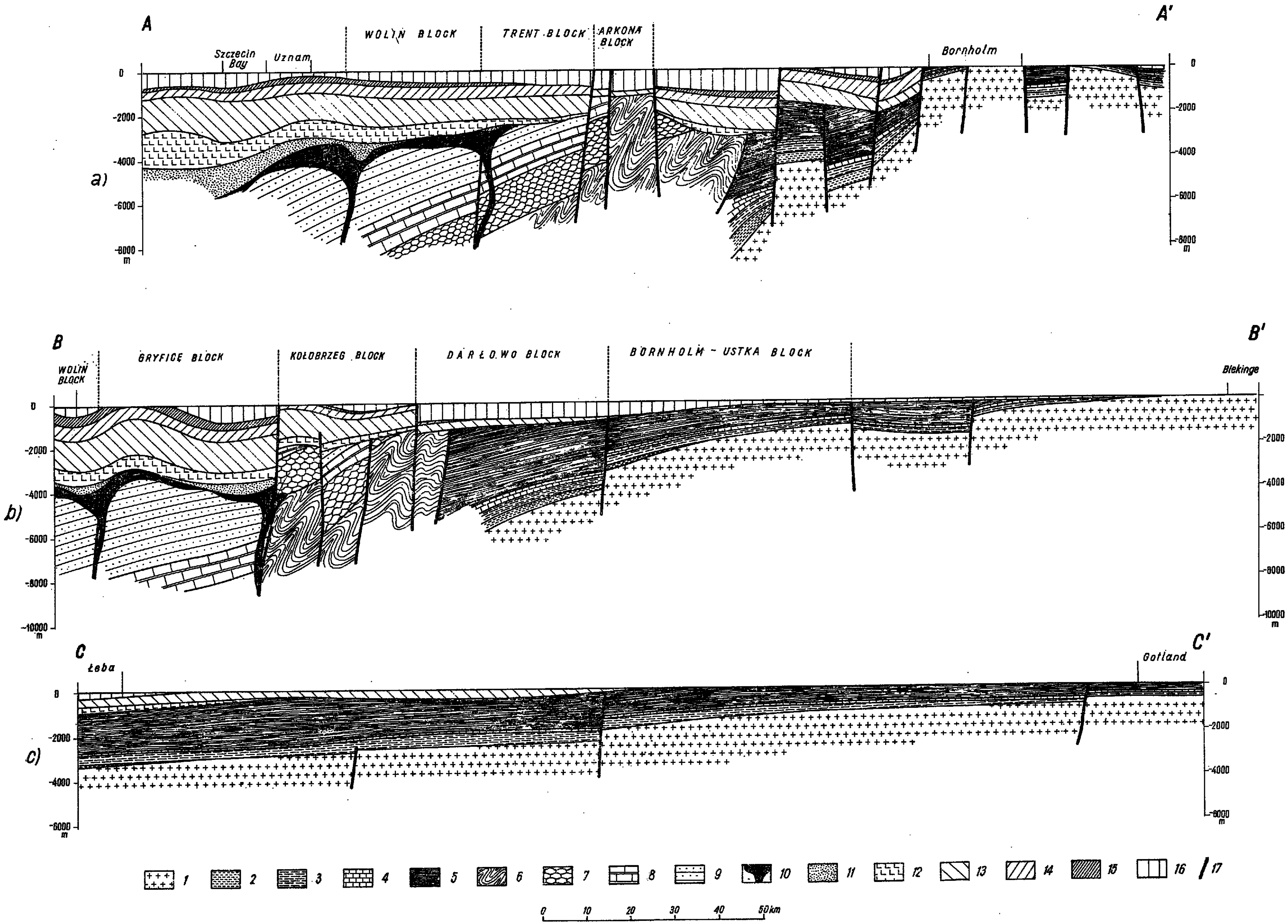
The Cambrian sediments are developed in the whole area in an almost homogenous sandy-silty facies and reach their maximum thickness of about 500 m on the Łeba Uplift (Lendzion 1970, Bednarczyk 1972). The question, whether the thickness increases gradually southwards of Blekinge and Öland or is reduced locally on the buried anticlines mentioned above, seems to be very essential.

The Ordovician on Gotland consits of limestones whereas in the zone of Scania-Bornholm-Łeba Uplift it is represented by shales, marls and limestones (Sorgenfrei 1969a, Modliński 1973). Their thickness does not exceed 100 m.

A total of 300 m of Silurian shales and limestones occur on Gotland while in the zone of Scania-Łeba Uplift the shales prevail in the sequence, their thickness being much more greater, up to 2,000 m in the Łeba area (Teller 1969). According to the offshore seismic cross sections the reduction in thickness northwards of the Polish coast is gradual (Fig. 4c). In spite of the unconformity at the top of the Silurian, it may be mostly the primary reduction since the sequence both on Gotland and on the Łeba Uplift includes all the Silurian stages. Offshore cross sections also prove that the Silurian thickness increases remarkably towards the central depression of the Peribaltic Syneclise as well as towards the margin of the Precambrian Platform.

The principal problem of the Ordovician-Silurian palaeogeography in the offshore area lies in the examination of a transition zone between calcareous and clayey facies and in detecting of the possible reef barriers.

The Devonian is developed in Western Pomerania in two main facies, the formation thickness exceeding 1,100 m (Fig. 4*a*, *b*). The succession in the neritic facies (western part of the Kołobrzeg Block) consists entirely of claystone, marls and limestones. The near-shore facies (in the Koszalin zone) is represented by sandstones, shales, limestones (partly reef limestones) and dolomites. The sedimentary record is particularly complete in this very zone, the variegated deposits of Old Red type



Hypothetical cross sections through the South Baltic Basin (situation shown of Fig. 2)

1 Precambrian crystalline rocks, 2 Uppermost Precambrian (Vendian?) sedimentary rocks, 3 Cambrian, 4 Ordovician, 5 Silurian, 6 folded Ordovician and Silurian, 7 Devonian, 8 Lower Carboniferous, 9 Upper Carboniferous, 10 Lower Permian volcanic rocks, 11 Lower Permian sedimentary rocks, 12 Upper Permian Zechstein, 13 Triassic, 14 Lower Jurassic, 15 Middle and Upper Jurassic, 16 Cretaceous, 17 faults

including. The boundary between these facies zones crosses the coastline near Kołobrzeg and runs offshore probably towards WNW.

Similar facies differentiation is marked in the Carboniferous sediments. Lower Carboniferous sequence on Rügen (Knüpfer & Weyer 1967) consists of claystones, marls and limestones while in Western Pomerania it includes layers of coarse greywackes, arkoses, quartz sandstones, oolitic limestones and anhydrites. Finally, the Upper Carboniferous series in Western Pomerania displays much more amount of sandstones than on Rügen (Rost & Schimansky 1967).

The present north-eastern boundary of the Devonian and Carboniferous is in Western Pomerania mostly of tectonic character. The thickness and facies distribution revealed close to this boundary strongly supports such conclusion. Its erosional-tectonic nature is then presumed also in the offshore area (Figs 2, 4*a*, *b*). It seems reasonable to assume that the deposits of the formations discussed extended previously farther northwards and northeastwards and were even probably connected (along the depression of the Peribaltic Syneclise?) with the area of the Devonian — Lower Carboniferous occurrence in Lithuania and Latvia. This area adjoins at present the Baltic coast at a length of about 300 km, the southernmost localities of the Devonian being known from the Sambia Peninsula (Suveizdis 1964). The Devonian is developed there in the Old Red clastic facies with more or less marine, limestone-dolomite beds in the middle part.

The problem of the western offshore range of the Lithuanian Devonian as well as the details of development and of the northern boundary of the Devonian and Carboniferous between Rügen and Koszalin (Fig. 2) — belong to the most important problems involved.

The Lower Permian rocks occur merely in the south-western strip of the Southern Baltic Basin, lava sheets prevailing in the sequence (Fig. 4*a*, *b*). Superposed sediments of this age are probably in general of small and variable thickness and belong to conglomeratic-sandy marginal facies. These assumptions are evidenced by drilling data from Rügen (Rost & Schimansky 1967) and Wolin Block (Pokorski & Wagner 1972). On the Kołobrzeg Block only the isolated occurrences of volcanic extrusives along the fault zones have been recognized.

The fundamental problems of the Zechstein palaeogeography in the western part of the area under consideration are difficult to solve on the ground of nothing but seismic data although the quality of these data above the Zechstein base is quite good. For that reason the extrapolation from the known geology of the surrounding countries is again necessary.

The fairly complete salt-bearing Zechstein sequences in the north-eastern Mecklenburg and southern Rügen (Münzberger, Rost & Wirth 1966) pass northwards into more reduced sulphate-carbonate sequences on central Rügen and, finally, into marginal clastics of doubtful age on northern Rügen (Arkona Block). The similar trend of the facies changes can be assumed in going north along the Wolin Block (Fig. 3). The Arkona Block in turn may be connected with the Ringkøbing-Fyn High (Sorgenfrei 1969b) which is devoid of the Zechstein deposits and borders the North German Zechstein Basin from the north.

Also farther east the Zechstein of the onshore part of the Darłowo Block (Pokorski & Wagner 1972) is either locally missing or developed as the near-shore carbonates, sulphates and clastics (Fig. 3). On the offshore part of the Darłowo Block as well as of the northern part of the Kołobrzeg Block the poor seismic results and the difficulties in correlation of the supposed Zechstein reflectors are noted. These facts may indicate the extension of the area in which the Zechstein deposits are reduced or absent. The question arises whether the areas of the Arkona and northern Kołobrzeg Blocks were linked together during the Upper Permian time, thus closing the Polish evaporite basin from the north. In the intervening part of the Gryfice Block the dynamic features of the Zechstein reflectors do not, however, change northwards pointing to the occurrence of the Zechstein deposits about 400—500 m thick (Fig. 5b). It may be concluded then that the positive area which was formed towards the close of the Variscan time, was divided into several separate swells. A comparatively free connection may have existed between the Danish Embayment and the Polish Basin along the narrow channel similar to that known from the North Sea Basin (Hinz 1968, Sorgenfrei 1969b).

East of the swell of the Darłowo Block the evaporite facies appears again (Pokorski & Wagner 1972). The western boundary of this subbasin crosses the Baltic coast west of Łeba (Fig. 3) and then turns to the east to come again onshore north of the Sambia Peninsula (Suveizdis 1963).

The discussed problem of reconstruction of the Zechstein sea coast-line is an essential one because of fringing limestone/dolomite reefs which accompany this line at long distances and are perspective for oil and gas exploration.

The direct contact between the Danish Embayment and the Polish Basin (Dadlez 1967a) seems to have been generally continuous during the Triassic, Jurassic and Lower Cretaceous times. Nevertheless, this contact was rather restricted. It happened along the same narrow strait which is believed to have existed in Zechstein *i.e.* along the Gryfice Block *sensu lato*. This conclusion is based on the fact that no major changes of the Mesozoic thickness have been ascertained offshore in the zone discussed (Fig. 5b). Thickness of the Triassic on the island of Sjaelland (1,100 m in the Slagelse well — Sorgenfrei & Buch 1964) is only somewhat smaller than that on the Pomeranian coast (1,400—1,600 m), the facies being very similar. Close relationship of the Liassic facies in Scania, Western Pomerania and on Bornholm (Dadlez 1969) as well as the sequences of the

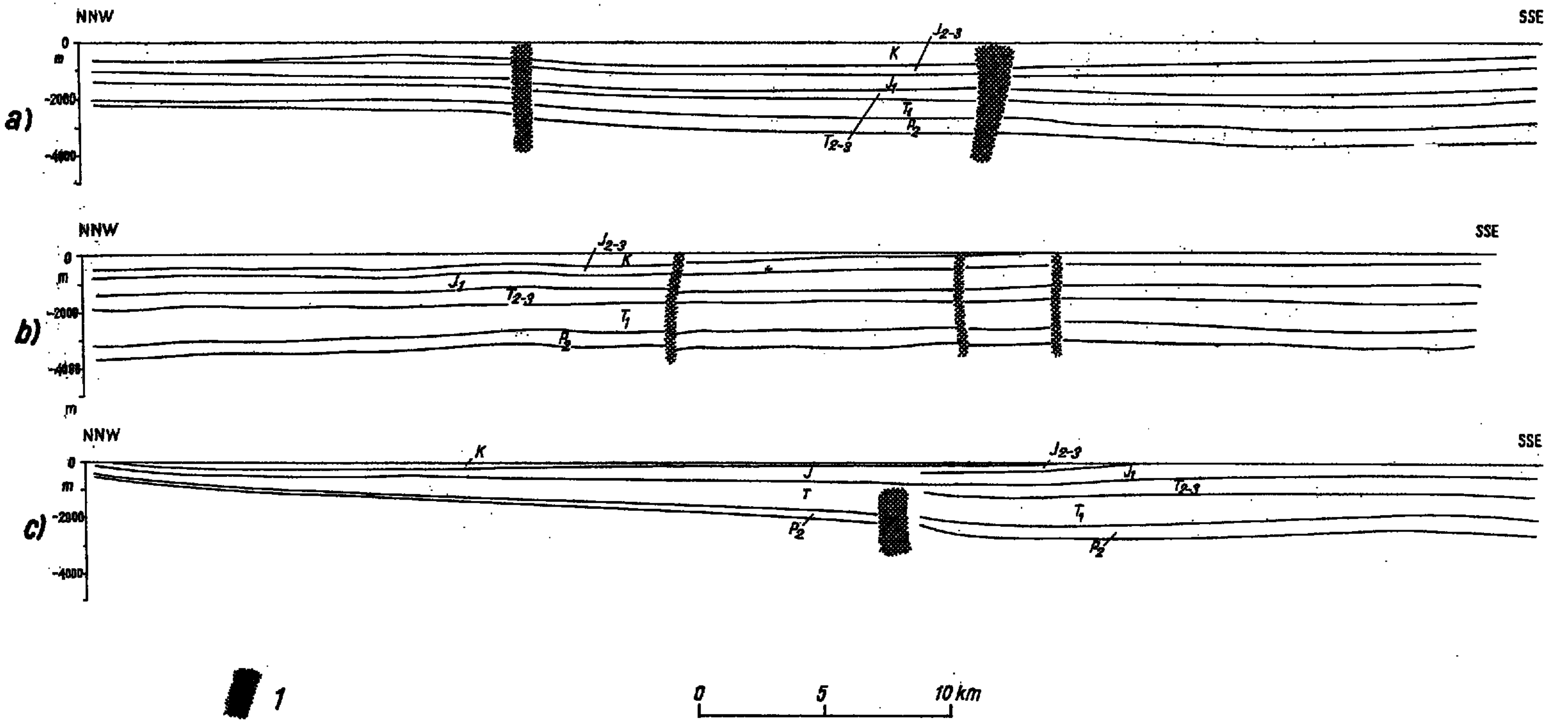


Fig. 5

Cross sections along the Wolin (*a*), Gryfice (*b*) and Kołobrzeg (*c*) Blocks based upon seismic data

1 faults, P_2 Zechstein, *T* Triassic, T_1 Lower Triassic (Buntsandstein), T_{2-3} Middle and Upper Triassic (Muschelkalk and Keuper), *J* Jurassic, J_1 Lower Jurassic, J_{2-3} Middle and Upper Jurassic, *K* Cretaceous

Middle and Upper Jurassic reported recently from Scania (Larsen 1966, Norling 1970) prove the same basinal pattern to continue in the Jurassic. Lastly, the Lower Cretaceous series in these regions, though strongly reduced and developed mainly as continental beds, is thought likewise to have been deposited in the same basin.

On either side of the Gryfice Block the sedimentary record is quite different. Along the line joining Wolin and northern Rügen a considerable reduction in thickness is proved by drilling data. The sequence on the Arkona Block is characterized by the lack of the Jurassic — Lower Cretaceous strata and the strong reduction of the Triassic deposits. Similar trends can be easily recognized on the Wolin and Kołobrzeg Blocks (Fig. 5*a*, *c*) thanks to the offshore seismic data. These sequences may have resulted both from the primary wedging out of some formations and from the subsequent removal of another ones, the latter concerning above all the Jurassic deposits in the Early Cretaceous time. The Lower and Middle Triassic reflectors become northwards less distinct and, finally, they can no longer be identified. It suggests the Muschelkalk limestone facies as well as the Lower Buntsandstein clayey facies to disappear in this direction.

Northwards and northeastwards of the Koszalin fault zone a farther reduction of the Mesozoic cover is observed. The most reduced sequence in the onshore part of the Łeba Uplift (Dadlez 1967a) consists merely of the Lower Triassic, Cenomanian and Turonian. Moreover, the Cretaceous sediments are believed to wedge out offshore near the coast (Figs 3, 4*c*).

In the Upper Cretaceous time the greater part of the Southern Baltic Basin became again the area of sedimentation. An uniform series of marls and limestones covers its south-western part, its thickness reaching 2,000 m at places. In Scania and on Bornholm sandstone beds occur. On the Łeba Uplift the glauconitic sand and siltstones point also to the near-shore environment.

The Tertiary sediments play an unimportant role. They are developed probably only in a narrow and discontinuous belt along the central and eastern part of the Polish coast. The Tertiary cover is thin and rests unconformably on the various Mesozoic stages.

CONCLUDING REMARKS

Some words of comparison between the South Baltic Basin and one of the most attractive prospective areas in Europe — the North Sea Basin (Hinz 1968, Sorgenfrei 1969b, Kent & Walmsley 1970) — seem necessary as a conclusion of this short report. It should be emphasized here that the both areas, in spite of their general relationship within the same Middle European Basin, reveal fairly diverse palaeogeographic and tectonic developments. Among the most significant differences the following should be stressed:

— The position of the top of crystalline basement is in the South Baltic Basin generally higher and the sedimentary cover less differentiated than in the North Sea Basin.

— The South Baltic Basin was situated mostly in the marginal zones of the successive sedimentary basins while the North Sea Basin constituted often the central area of subsidence. The consequences of this difference for the oil and gas prospects are obvious. The negligible role of the Lower Permian sediments, the limited extent and unfavourable facies of the Jurassic and, finally, the lack of the Tertiary subsidence may offer the best examples.

— No evidence of salt flowage has been ascertained in the South Baltic area. Hence the occurrence of neither salt structures nor the local facies and thickness changes connected with salt movements are to be expected in the Zechstein-Mesozoic cover.

— The greater possibilities of the exploration of the Early Palaeozoic rocks in the eastern part of the area may be regarded as an advantage of the South Baltic Basin.

— Thick sandstone and limestone formations of the Devonian and Carboniferous in the south-western part of the area also attract attention. However, modern and expensive seismic methods are needed to obtain an adequate picture of the tectonic framework of these formations.

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R. DADLEZ

NIEKTÓRE PROBLEMY GEOLOGICZNE W BASENIE POŁUDNIOWEGO BAŁTYKU

(Streszczenie)

Na tle wyników morskich refleksyjnych badań sejsmicznych, przeprowadzonych w latach 1964—1967 wzdłuż polskiego wybrzeża, omówiono problematykę budowy geologicznej basenu południowego Bałtyku. Przedstawiony został obecny stan

rozpoznania poszczególnych zagadnień oraz sformułowane zadania stojące przed przyszłymi badaniami, szczególnie w aspekcie perspektyw poszukiwań bituminów.

Spośród problemów tektonicznych jako najważniejsze wydają się być następujące:

— przebieg południowo-zachodniej granicy platformy prekambryjskiej;

— przebieg i charakter granicy dewonu i karbonu w południowo-zachodniej części basenu;

— podział południowo-zachodniej części akwenu na bloki tektoniczne niższego rzędu, a szczególnie kwestia kierunków i przebiegu uskoków waryscyjskich oraz kwestia odmłodzenia uskoków na przełomie ery mezozoicznej i kenozoicznej;

— podział tektoniczny rozległego zachodniego skłonu syneklizy perybałtyckiej oraz zagadnienie pogrzebanych antyklin wieku kambryjskiego lub pokambryjskiego;

— prześledzenie południowo-wschodniego przedłużenia zrębu Bornholmu.

Do problemów paleogeograficznych, wymagających przede wszystkim wyjaśnienia należą:

— zasięg utworów osadowych najmłodszego prekambru;

— badanie strefy przejścia od facji wapiennych do ilastych w ordowiku i sylurze platformy prekambryjskiej oraz problem ewentualnego występowania facji rafowych;

— badanie w południowo-zachodniej części akwenu stref przejścia od nerytycznych facji wapienno-marglistych do brzeżnych facji wapienno-piaszczysto-ilastych w dewonie i dolnym karbonie, jak również od facji ilasto-mułowcowych do facji piaszczystych w górnym karbonie;

— granica zasięgu ku zachodowi utworów dewonu i dolnego karbonu znanych z obszarów Litewskiej i Łotewskiej SRR;

— zasięg i facje serii osadowych dolnego permu oraz zagadnienie udziału i znaczenia skał wulkanicznych tego wieku na południowo-zachodnim skrawku obszaru;

— rekonstrukcja przebiegu linii brzegowej morza cechsztyńskiego i związanych z nią barier utworów węglanowych;

— problem połączeń między basenami północnej Danii i północno-zachodniej Polski w okresie jury i dolnej kredy.

Na tle tego przeglądu zagadnień, zilustrowanego mapami (fig. 2 i 3) oraz przekrojami geologicznymi (fig. 4 i 5), przeprowadzono porównanie z basenem Morza Północnego. Stwierdzono znaczną odmienność budowy geologicznej i historii rozwoju geologicznego basenu południowego Bałtyku, która sprowadza się do następujących cech:

— ogólnie płytsze występowanie podłoża krystalicznego i mniejsze zróżnicowanie pokrywy osadowej;

— usytuowanie w trakcie swej historii geologicznej przeważnie w brzeżnych strefach basenów sedymentacyjnych;

— brak tektoniki solnej w kompleksie cechsztyńsko-mezozoicznym;

— większe możliwości penetracji utworów starszego paleozoiku w obszarze platformy prekambryjskiej;

— interesujące perspektywy badań kompleksu dewońsko-karbońskiego w południowo-zachodniej części obszaru, które jednak wymagają stosowania nowoczesnych metod sejsmicznych.

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