The crystalline basement of the East European Craton (EEC) in Poland is onlapped in the subsurface by a Neo-proterozoic–Lower Palaeozoic volcanic-sedimentary succession, which reveals three depocentres referred to as the Baltic, Podlasie and Lublin basins (Fig. 1; Poprawa, 2010). The succession is disconformably overlain in the north and south by Permian or Lower Devonian deposits, respectively, although a continuous Silurian-to-Devonian transition may be present in the northernmost Baltic Basin (Modliński et al., 1994). The Lower Palaeozoic strata are largely undeformed except for in the western Baltic Basin, where they were involved in the thin-skinned fold-and-thrust belt of the Pomeranian Caledonides (Mazur et al., 2016). Farther to the south, the western limit of these strata has been placed conventionally at the Teisseyre-Tornquist Zone, although they are likely to plunge beneath a 10-km-thick pile of younger sediments in central Poland (e.g., Dadlez et al., 1995).

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As a part of this effort, the authors present here a lithostratigraphic correlation chart of the Ordovician and Silurian succession between the Baltic, Podlasie and Lublin basins (Fig. 2). The correlation is based on the previous lithostratigraphic classifications, erected for the Ordovician by Mod-

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**INTRODUCTION**

The crystalline basement of the East European Craton (EEC) in Poland is onlapped in the subsurface by a Neo-proterozoic–Lower Palaeozoic volcanic-sedimentary succession, which reveals three depocentres referred to as the Baltic, Podlasie and Lublin basins (Fig. 1; Poprawa, 2010). The succession is disconformably overlain in the north and south by Permian or Lower Devonian deposits, respectively, although a continuous Silurian-to-Devonian transition may be present in the northernmost Baltic Basin (Modliński et al., 1994). The Lower Palaeozoic strata are largely undeformed except for in the western Baltic Basin, where they were involved in the thin-skinned fold-and-thrust belt of the Pomeranian Caledonides (Mazur et al., 2016). Farther to the south, the western limit of these strata has been placed conventionally at the Teisseyre-Tornquist Zone, although they are likely to plunge beneath a 10-km-thick pile of younger sediments in central Poland (e.g., Dadlez et al., 1995).

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As a part of this effort, the authors present here a lithostratigraphic correlation chart of the Ordovician and Silurian succession between the Baltic, Podlasie and Lublin basins (Fig. 2). The correlation is based on the previous lithostratigraphic classifications, erected for the Ordovician by Mod-
Fig. 1. Map showing the locations of wells that penetrated the entire thickness of the Ordovician–Silurian strata in the East European Craton. The red line marks the lines of section of each of the cross-sections shown in Figures 3 and 4.

Fig. 2. Lithostratigraphic subdivision of the Ordovician and Silurian successions in the East European Craton (modified from Porębski and Podhalańska, 2017; data sources are listed in the text). Ordovician–Silurian chronostratigraphy, graptolite zonation and correlation of the Ordovician and Silurian standard stages to the Baltic regional stages are after Cooper et al. (2012) and Melchin et al. (2012). The standard graptolite zonation is modified to include the local zones of Urbanek and Teller (1997) and Porębska et al. (2004). Hirnant. – Hirnantian; Lst – Limestone; Mdst – Mudstone; Mrst – marlstone; Mbr – Member.

Explanations:
### Fig. 2. Ordovician-Silurian Lithostratigraphy

<table>
<thead>
<tr>
<th>Age (Ma)</th>
<th>Chronostratigraphy</th>
<th>Graptolite Zones</th>
<th>Baltic Stages</th>
<th>Baltic Basin Formations</th>
<th>Podlasie Basin Formations</th>
<th>Lublin Basin Formations</th>
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**Baltic Basin Formations**
- Piaśnica Mudstone
- Stuchowo Limestone
- Pieszkowo Limestone
- Bialowieża Mudstone
- Krzyże

**Podlasie Basin Formations**
- Kielno Limestone
- Włodowko Limestone
- Pieszkowo Limestone
- Rajsk Glaucolite

**Lublin Basin Formations**
- Uherka Limestone
- Narew Lst
- Pieszkowo Limestone
- Rajsk Mudstone
Słuchowo Mudstone Formation (Floian)

The oldest mudstone tongue in the Floian–Hirnantian succession was distinguished as the Słuchowo Formation (Modliński and Szymański, 1997). It occurs only in the western part of the Baltic Basin and is ca. 10 m thick (in the Lubocino-1 and Opalino-2 wells). The basal part of the Słuchowo Formation contains thin pods of glauconite-rich sandstones, conglomerates and breccias that are frequently cemented with palisade calcite (Skompski and Paszkowski, 2017). The bulk of this formation consists of dark grey and greyish green mudstones, which locally contain intercalations of ostracod coquinites and skeletal packstones, rich in echinoid, trilobite, brachiopod and mollusc bioclasts (Skompski and Paszkowski, 2017). South of the Kościerzyna IG 1 well, the Słuchowo Formation appears to either wedge out entirely, or pass into the Rajsk Glaucocnitate Formation.

Plonka Mudstone Formation (Dapingian–early Darriwilian?)

The middle mudstone tongue was penetrated in few wells in the western Podlasie Basin (southern part of the Płock–Warszawa Trough) and distinguished as the Plonka Formation (Modliński and Szymański, 2008). In the Płonka IG 2a well, this formation consists of dark grey, locally dolomitic mudstones, <5 m thick, which rest on Cambrian dolomitic limestones (Modliński and Szymański, 2008). In the Pęclin-OU1 well, it appears to be represented by an as yet undated, 4-m-thick packet of dark grey and greenish grey, non-calcareous mudstones, locally containing marly nodules, that gradationally extends between the nodular limestones and marlstones of the Pieszkow Formations below and the marly limestones of the Kielno Formation above (Kędzior et al., 2017). Farther to the south, the Plonka Formation seems to pinch out at the top of the Rajsk Formation.

Sasino Mudstone Formation (late Darriwilian–early Katian)

The upper mudstone tongue comprises the Sasino Formation (Modliński and Szymański, 1997) and its lateral equivalent in the Lublin Basin, distinguished as the Udal Claystone Formation (Modliński, 1984). Both formations show a similar lithology that is dominated by black, dark grey and greenish grey, clayey to silty mudstones, intercalated with numerous, thin bentonites and locally bioclastic limestones and marlstones. The authors therefore merged these formations into a single lithostratigraphic unit under the name of the Sasino Mudstone Formation. This redefined Sasino Formation occurs as a persistent sheet across all basins, with its maximum thickness of ca. 60 m in the Płock–Warszawa Trough and the southernmost Lublin Basin. The base of the formation is sharp, often showing signs of transgressive erosion on the carbonates of the Kopalino, Polik, Kielno and Uherka formations and shows evidence of stratigraphic younging landwards within the Didymograptus murchisoni and Diplograptus multidentis zones. The top tends to be gradational into the calcareous mudstones and marlstones of the Prabuty Formation and its eastern equivalents. In the Podlasie and Lublin basins, the Sasino Formation grades laterally updip into the marlstones of the Włodawka Formation (Modliński and Szymański, 2008).
Carbonate complexes

The Ordovician carbonate rocks were subdivided into a number of formations (Fig. 2). However, many of these units display a local or problematic areal distribution, which causes problems in the regional correlation and mapping of them. Hence, these rocks have been grouped here into two informal complexes that are separated by the siliciclastic mudrocks of the Sasino Formation and its lateral marly equivalent, represented by the Włodawka Formation in a cratonward direction (Figs 2, 3). Each complex shows a relatively high lithological integrity and is basinwide in extent.

Lower carbonate complex

The lower carbonate complex (Floian–earliest Sandbian) is up to 40 m thick in the southeast and thins to 4–18 m in the northwest. It begins in the east with a thin (0.5–5 m), locally discontinuous unit, composed of glauconitites, glauconite- and locally chalcedony-cemented conglomerates/brecias, sandstones and limestones. This transgressive unit was defined as the Rajsk Glauconitite Formation (Floian) in the Podlasie Basin (Modliński and Szymański, 2008) and identified also in several new wells drilled in the Lublin Basin and southern part of the Plock–Warszawa Trough (the Berejów-OU1, Syczyn-OU1, Pęclin-OU1 and Goździk-OU1 wells). The Rajsk Formation passes upwards into marlstones, marly and dolomitic limestones, dolomites and bioclastic, locally glauconitic, oolitic and nodular limestones, which were distinguished as the Uherka Limestone Formation in the Lublin Basin (Modliński, 1984) and the Narew, Widowo, Pieszkowo, Kielno and Polik limestone formations in the Baltic and Podlasie basins. The landward (eastern) parts of the lower carbonate complex can be locally glauconitic (Narew Formation), or rich in oolitic facies (Widowo Limestone and Kielno Limestone formations), whereas nodular wackestones interbedded with marlstones and thin mudstones increase in abundance downdip. The latter lithologies predominate in the Kopalino Limestone Formation (Dapingian–early Darriwilian), which represents the most basinward segment of this complex penetrated in the western Baltic Basin. This formation is 2–20 m thick and occurs between the Sluchowo and Sasino mudstones (Modliński and Szymański, 1997), containing numerous omission surfaces and hardgrounds (Skompski and Paszkowski, 2017). The top of the Kopalino Formation occurs at the Didymograptus murchisoni Zone and records a surface that reflects a change from regression below to transgression above.

Upper carbonate complex

The upper carbonate complex (late Katian–Hirnantian) is up to 37 m thick in the southeast and decreases to ca. 3 m in thickness in the northwest. In the Lublin and Podlasie basins, the late Katian part of this complex is dominated by bioclastic, nodular and marly limestones and has been distinguished as the Kodeniec Limestone and Stadniki Limestone formations, respectively (Modliński and Szymański, 1984; Modliński and Szymański, 2008). Their age equivalents in the eastern Baltic Basin comprise variegated, marly limestones and marlstones, interbedded rarely with calcareous and clayey mudstones distinguished as the Morąg Formation, which grades downdip into the even more marly and argillaceous Prabuty Formation. The Ordovician succession ends with Hirnantian marlstones and calcareous mudstones, forming a persistent...
sheet across all the basins. This sheet consists of the Orneta Marlstone Formation in the Baltic Basin and Tyśmienica Marlstone Formation farther southwards (Modliński, 1984; Modliński and Szymański, 1997) and throughout much of its extent is followed upwards by Llandovery black mudstones. It is noteworthy, however, that in the western Baltic Basin, the deposition of the black mudstones began already in late Hirnantian times (Modliński and Szymański, 1997).

The Prabuty and Tyśmienica formations contain discontinuous intercalations, 0.05–6.5 m thick, of poorly sorted, gravelly, muddy quartz wackes to granule-bearing and sandy mudstones, which are rich in Hirnantia brachiopod fauna, diamicitic deposits and a variety of soft-sediment deformations. These intercalations occur in the trilobite Mucronaspis mucronata Zone, corresponding to the early Hirnantian Normalograptus extraordinarius graptolite Zone (Podhalańska, 2009), and are interpreted as being laid down from floating and grounding ice (Modliński, 1982; Porębski et al., 2019).

**SILURIAN**

A north-south-trending facies belt persisted through Silurian times in the EEC (Modliński, 2010). However, the post-Hirnantian deglacial transgression, superimposed upon increasing flexural subsidence, led to the cratonward expansion of the mudrock and carbonate belts and resulted in a dramatic thickness increase of the Silurian infill, attaining >4000 m in the western Baltic Basin. Dziadzio et al. (2006) introduced the Pasłęk Claystone Formation to encompass a Llandovery mudstone succession, 15–70 m thick, in the Baltic Basin. The formation begins with black, bituminous claystones that pass upwards into dark grey claystones, laminated with greenish, grey green and black claystones and interbedded locally with calcareous claystones, thin marls, marly limestones and bentonite laminae (Modliński et al., 2006, p. 788). The Jantar Bituminous Claystone Member forms the basal layer of this formation and consists of black, pyrite-rich, bituminous, argillaceous claystones, intercalated with dark grey, calcareous claystones and infrequent, thin interbeds and nodules of dark grey, marly limestones (Modliński et al., 2006). In a subsequent report, Podhalańska et al. (2010) extended the Pasłęk Formation into the Podlasie and Lublin basins. Dziadzio et al. (2017) showed that the organic-rich mudstones of the Jantar Member are spread, albeit discontinuously, as far south as the Stręczyn-OU1 well in the latter basin.

For practical reasons, the present authors have elevated the Jantar Member to the rank of formation. In this context, it is worth emphasizing that in a number of reports produced for the hydrocarbon industry, rock properties, for instance, – total organic carbon (TOC), are listed separately for the Jantar Member and the Pasłęk Formation. However, it is often unclear whether the values obtained for former unit were counted also for the latter (as one might expect), or omitted, which would have falsified the statistics for the property in the Pasłęk Formation. The proposed solution removes such uncertainties and, more importantly, it results in the separation of two lithostratigraphic units, which are lithologically different and mappable on an interbasinal scale (Dziadzio et al., 2017). Moreover, the Jantar Formation is characterized by high TOC values and hence is easily identifiable on well logs.

**Jantar Mudstone Formation**

*(late Hirnantian–Aeronian)*

The bulk of the formation consists of black, organic-rich, clayey mudstones, which are laminated and non-bioturbated. In the western Baltic Basin, they locally begin already in the late Hirnantian persculptus Zone and rest conformably on the grey marlstones and calcareous mudstones of the Prabuty Formation. However farther to the east, the Jantar Formation tends to onlap erosively various formations of the uppermost Ordovician (Fig. 2), with the associated hiatus spanning the early Rhuddanian ascensus Zone (Podhalańska, 2003; Modliński et al., 2006). In the Plock–Warszawa Trough (in the Pęclin-OU1 and Goździk-OU1 wells), the Jantar Formation is of Rhuddanian–Aeronian age and overlies marly sediments of the Tyśmienica Formation. In the Lublin Basin, the basal contact of the Jantar Formation tends to be sharp to erosional and attributed to a transgressive ravinement (Porębski et al., 2013), which is accompanied by a hiatus spanning the ascensus–vesiculosus zones. In all basins, the top of the formation appears as a gradational transition into the overlying Pasłęk Formation and has been placed at the base of the first intercalation of a greenish grey, bioturbated mudstone. In the cores that have been dated biostratigraphically so far, this boundary falls invariably within the triangulatus Zone of the early Aeronian (Fig. 2). In Pomerania, the Jantar Formation occurs as the fill of a linear, NNW–SSE-trending depocentre, 12–18 m thick, whereas in the Lublin Basin it occurs in a series of discontinuous pods, 1–6 m thick (Fig. 4; Dziadzio et al., 2017). In the eastern Baltic Basin, the formation intertongues locally with dark, nodular and marly limestones of the Barciany Formation (Modliński et al., 2006).

**Pasłęk Mudstone Formation**

*(late Aeronian–Telychian)*

The characteristic feature of the Pasłęk Formation is a zebra-like colour banding, due to the alternation of millimetre-to decametre-thick layers of black to dark grey, laminated, clayey mudstone and greenish grey, clayey mudstone showing a variable, though generally high degree of bioturbation (Uchman, 2017). Both mudstone facies tend to be non-calcareous and contain rare lenses and laminae composed of quartz-feldspar silt, calcisiltite and finely comminuted shell detritus. The top of the formation is gradational and taken to occur at the top of youngest layer of a bioturbated mudstone. Graptolite dating constrains the age of this boundary as falling within the centrefugus to murchisoni zones of the earliest Sheinwoodian (Modliński et al., 2006; Podhalańska et al., 2010). The Pasłęk Formation occurs as a basinwide sheet, up to 60 m thick in the Baltic Basin, thinning to 2 m and onlapping the Ordovician substratum in the Lublin Basin (Fig. 4). At the easternmost reaches, the Pasłęk Formation grades into marlstones and limy mudstones of the Wrotów Formation in the Baltic and Lublin basins (Podhalańska et al., 2010).
Pelplin Mudstone Formation  
(Sheinwoodian–Ludfordian)

The Pasił Formation is followed by the Pelplin Formation, which was defined in the Baltic Basin (Modliński et al., 2006) and subsequently traced into the Podlasie and Lublin basins (Podhalańska et al., 2010). The dominant lithology of the Pelplin Formation comprises dark grey, massive to locally laminated, argillaceous mudstones, interbedded with calcareous-clayey and dolomitic-clayey mudstones, numerous early diagenetic carbonate concretions and centimetre-thick bentonites. Siliciclastic and calcisiltic lenses and laminae, thin lags of shelly detritus and bioclastic limestone beds form common intercalations that increase in abundance upwards in the formation through two to three shoaling-up cyclothems of wide lateral persistence (Dziadzio et al., 2017). The Pelplin Formation is ca. 150–400 m thick and thins generally southeastwards. It grades upwards and laterally to the north into the silt-rich Kociewie Formation and passes laterally in the eastern Lublin and Podlasie basins into the marly and calcareous Terespol Formation (Podhalańska et al., 2010).

Kociewie Formation  
(middle Sheinwoodian–Ludfordian)

The Kociewie Formation, originally defined in the Baltic Basin (Modliński et al., 2006) and traced into the Podlasie and Lublin basins (Podhalańska et al., 2010), is typified by the abundance of both siliciclastic and calcareous siltstone lamina sets and bedsets within grey, clayey and silty mudstones, weakly cemented with calcite or dolomite. Intercalations of bioclastic limestones, early diagenetic carbonate concretions and bentonites are common, whereas those of fine- to medium-grained sandstones, represented by lithic and arkosic wackes (Szczepański et al., 2015), are relatively rare. The base of the formation is strongly gradational into the Pelplin mudstones and in the absence of cores difficult to recognize. Where cores are available, the boundary should be placed at the base of the first thicker (say 0.5 m thick) siltstone lamina set in the grey mudstones.

The base of the Kociewie Formation is clearly diachronous and younging both cratonwards (Modliński et al., 2006) and southwards along the strike (Mazur et al., 2018). Silt-dominated sedimentation began during the early Sheinwoodian in the western Baltic Basin (Jaworowski, 2000; Modliński et al., 2006), arrived during the nassa–leintwardinensis biochrones of the late Homerian–early Ludfordian in the Plock–Warszawa Trough, and reached the southern Lublin Basin (in the Berejów-OU1 and Dobrynów-OU1 wells) in the praecornutus–cornutus biochrones of the Ludfordian (Mazur et al., 2018).

In the Baltic Basin, the uppermost part of the Kociewie Formation was distinguished as the Reda Member, up to 34 m thick, which consists of calcareous mudstones and marly limestones, spanning the kozlowskii–latilobus-balticus
zones of the latest Ludfordian (Modliński et al., 2006). The Reda Member is correlated with a low-amplitude, “blocky” signature on gamma-ray logs and is traceable as far south as the Kościerzyna IG 1 well (Dziadzio et al., 2017). A similar anomaly is also recognizable across much of the Lublin Basin, where it corresponds to a 4.5–5-m-thick unit, composed of laminated calcareous mudstones and calcisilicites and dated as the latest Ludfordian (Podhalańska, 2017). In the Berejów-OU1 and Syczyn-OU1 wells, this unit was affected by rotational sliding and slumping (Porębski et al., 2013). Although the silt facies is continuous into the Pridoli, the top of the Kociewie Formation is accepted as being at the top of the Reda Member, because this boundary is easily recognizable in well logs and seismic sections across much of the EEC segment analysed here. The thickness of the formation reaches >3000 m in the Baltic Basin (Modliński et al., 2006) and decreases to ca. 50 m in the southern Lublin Basin. The thickness maximum in the southernmost Baltic Basin (Fig. 4) may reflect a transverse (roughly E–W-striking) zone of Late Silurian growth faulting.

Puck Formation (Pridoli)

The Silurian succession ends with the Puck Formation (Modliński et al., 2006; Podhalańska et al., 2010), which consists mainly of grey and variegated, clayey to silty, argillaceous and calcareous mudstones, intercalated with carbonate concretions and bentonites. However, owing to discontinuous core record, the Puck Formation is poorly defined and its base is difficult to recognize in the areas, where the Reda Member is missing. Its top is a disconformity below the Devonian or Permain strata, although a continuous Silurian-to-Devonian transition may exist in the northernmost Baltic Basin (Modliński et al., 1994).

CONCLUSIONS

The proposed modifications to the existing lithostratigraphic classifications of the Ordovician–Silurian strata on the SE slope of the East European Craton highlight the potential for long-distance correlation of some fine-grained units. The revised Sasino Mudstone Formation (upper Darriwilian–lower Katian) includes the Udal Claystone Formation, formerly distinguished in the Lublin Basin. It forms a persistent mudstone sheet separating two carbonate-dominated complexes.

The Jantar Bituminous Claystone Member of the Pasłęka Formation (Llandovery) now is distinguished as the Jantar Mudstone Formation (late Hirnantian–Aeronian). This organic-rich unit is traceable as far south as the Lublin Basin, where it becomes discontinuous. The name Pasłęka Mudstone Formation is here retained for the upper Aeronian–Telychian, thin-bedded alternations of black, laminated mudstones and greenish, bioturbated mudstones. The top of the Kociewie Formation (Sheinwoodian–Ludfordian) is placed at the upper boundary of the Reda Member (latest Ludfordian), which can be traced, albeit intermittently, into the Lublin Basin.

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REFERENCES


Modliński, Z., 1982. The development of Ordovician lithofacies and palaeotectonics in the area of the Precambrian platform in Poland. Prace Instytutu Geologicznego, 102: 1–66. [In Polish, with English summary.]


Podhalańska, T., 2017. Biostratigraphy of the Silurian and Carboniferous rocks of Poland – integration of the research results. Przegląd Geologiczny 64, 1008–1021. [In Polish, with English summary.]


analiza ewolucji tektonicznej przykrawędziowej strefy platformy wschodnioeuropejskiej dla oceny rozmieszczenia niekonwencjonalnych złož węglowodorów. Wydawnictwo Arka, Cieszyn, pp. 278–296. [In Polish.]
