

Defining maritime space typology based on economic land-sea interaction. The case of the Polish Baltic Sea coast¹

Typologia przestrzeni morskiej na podstawie interakcji ekonomicznych ląd-morze. Przykład polskiego wybrzeża Morza Bałtyckiego

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Abstract: The purpose of the paper is to develop the first land-sea space typology on the basis of key characteristics of its economic use in the Polish conditions. Based on the criterion of exploitation of marine areas and significance of marine economy sectors in coastal municipalities, the following types of marine space have been distinguished: A (areas of particular planning concern for the regions of high intensity of activities both at land and sea), B (areas of a chance for diversification of economic development based on ecosystem services and abiotic marine areas), W (areas associated with unused inland potential), Z (areas of low intensity of economic land-sea links), and G (areas where the land-sea interaction does not constitute a significant mechanism of spatial development), as well as three intermediate types: AB, WZ and BZ. The paper analyses both the benefits, such as taking into account local characteristics and intensity of economic exploitation of land and sea, and the challenges of the methodology to be further developed (data limitations, the problem of determining a distance for interactions). The conclusions explain how maritime space typology based on economic land-sea interaction may influence soft space planning for maritime areas.

Keywords: maritime spatial planning, land use planning, economic land-sea interactions, Baltic Sea

Streszczenie: Celem artykułu jest wypracowanie pierwszej typologii przestrzeni lądowo-morskiej na podstawie kluczowych charakterystyk jej ekonomicznego wykorzystania w warunkach polskich. Na podstawie kryterium wykorzystania obszarów morskich i znaczenia sektorów gospodarki morskiej w gminach nadmorskich wyróżniono główne rodzaje przestrzeni morskiej: A (obszary szczególnej troski planistycznej związane z intensywnym użytkowaniem zarówno na lądzie i morzu), B (obszary szansy dywersyfikacji rozwoju gospodarczego bazującego na usługach ekosystemowych i abiotycznych obszarach morskich), W (obszary związane z niewykorzystanym potencjałem na lądzie), Z (obszary niskiej intensywności powiązań ekonomicznych ląd-morze) i G (obszary, dla których oddziaływanie ląd-morze nie stanowi znaczącego mechanizmu rozwoju przestrzennego) oraz trzy typy pośrednie: AB, WZ i BZ. Artykuł analizuje zarówno korzyści wypracowanej metodologii, takie jak uwzględnienie cech lokalnych i intensywności gospodarczego wykorzystania obszarów na styku lądu i morza, jak i wyzwania związane z metodologią wymagające dalszych prac (ograniczenia w dostępności danych, problem określania dystansu oddziaływania interakcji). W podsumowaniu wyjaśniono, w jaki sposób opracowana typologia przestrzeni morskiej wpisuje się w dyskusję na temat przestrzeni morskiej jako „soft space” i gospodarowanie przestrzenią morską.

Słowa kluczowe: planowanie przestrzenne obszarów morskich, planowanie przestrzenne, interakcje gospodarcze ląd-morze, Morze Bałtyckie

INTRODUCTION

This paper constitutes the first attempt to prepare a typology of the land-sea space in the Polish conditions, on the basis of key characteristics of its economic use. Its purpose is not so much a detailed definition of boundaries of the areas that in this respect are different from each other, but rather testing the methodology and initiating an academic discussion in this matter contributing to enhanced resilience of the land-sea interface [2]. This issue has a great significance, taking into consideration a progressive intensification of exploitation of marine areas in the whole world and the popularity of the blue growth concept [3, 4, 5, 6] putting a new concern of the multi-use in sea areas [7] at the marine governance agenda. This increased exploration of seas and oceans might alter the functioning of the marine ecosystems in particular in the coastal areas, e.g., by influencing “invisible” ecosystem services related to regulation and maintenance [8]. As underlined by Kidd et al. [9] sustainable development of the world’s oceans is inextricably connected to activities on land. They have identified [9: 254] 23 essential human induced pressures affecting the health of coastal waters. Therefore, more in-depth knowledge on land-sea interactions is of great importance both for blue growth and for long-term ability of the sea ecosystem to continue its proper functioning. Moreover, the land-sea interface produces important cultural values [10] since the sea is of great importance for building a sense of place, health or community cohesion [11]. Social sustainability has been becoming an important concern of marine governance [12]. Some researchers even claim the need to better combine maritime spatial planning and integrated coastal zone management [13]. All these arguments speak for a high significance of more profound research on land-sea typologies, in particular when considering information constrains hampering socio-economic analysis of the sea areas [14]. However, the experience in this field is limited. As explained in the first chapter of this paper, the existing two attempts to produce land-sea spatial typologies [15, 16] suffer from a too high level of generalization since they cover the entire sea basin(s). Thus, they could not make use of more detailed and specific knowledge available at local level in a particular country. Therefore, the research described in this paper offers both methodological advancement (by testing the methodology of producing local level land-sea spatial typologies and inspiring similar research in other countries), as well as contributes to the process of marine governance as input to ongoing maritime spatial planning (MSP) in Poland [17].

TYPES OF MARINE SPACE IN THE EU AND THE BALTIC SEA REGION

The ESPON ESaTDOR project included a research of the land-sea interactions which analyzed the resulting opportunities and developmental threats [16]. In these analyses three variables considered significant in understanding the relations and links of land-sea areas were used:

- ◆ significance of marine economy, affecting, e.g., the share of employment in marine sectors and those originating from both the sea (including the fishing industry) and the land,

- ◆ flow of goods, services, information and people crossing marine areas,
- ◆ pressure on the marine environment including human activity in marine areas, as well as on land, e.g., shipping or agriculture.

Two of these variables are of economic nature, and the third is partially economic. It is difficult to say whether these flows or economic structure have their primary source in marine areas, and to what extent they result from what happens on land. Unfortunately, in practice a precise differentiation between these sources is impossible, due to the reciprocal nature of these interactions.

The intensity of interactions enables the classification of coastal regions and adjacent marine waters into the following categories: European hub, regional hub, transitional area, rural area and areas exploited to a small degree (wilderness) (Tab. 1).

A spatial visualization of these analyses is presented in Figure 1. It demonstrates that the space between the United Kingdom and France, Belgium, Netherlands, Germany and Denmark constitutes the land-sea hub of the EU, and that regional hubs are located around the United Kingdom, in the Bay of Biscay, the Gulf of Finland, in the southern part of the North Sea, in the north-western part of the Mediterranean Sea, and along the coasts of Portugal. The obtained results are vitiated with errors resulting, for example, from different surfaces of units NUTS 2 in Europe, which affects the indicators of maritime economy’s significance in such delimited units (the whole Latvia versus counties in the United Kingdom). However, the added value of this analysis is constituted by the holistic spatial approach to marine areas together with their direct land supply base (level NUTS 2) in a dynamic approach to structure and flows. The indications regarding the conduct of spatial policy, proposed on this basis, have been limited to: a) emphasizing the need of coordination within the land-sea dimension and above the countries’ administrative boundaries, and b) the necessity of a new approach to collecting and processing statistical information regarding marine space (delimitation of a NUTS type unit in the sea).

There is a lack of references to the maritime spatial policy, particularly the suggestions regarding directions and methods of supporting the maritime spatial development in such delimited regions. Perhaps, a too high level of generalization accepted in the whole research did not allow this. However, most of all, the spatial structure of maritime economy at sea as well as the spatial management of marine areas resulting from it and from other decisions of coastal communities (private sector and public zone) could not be included in the typologies.

Janssen et al. tried to fill this gap within the framework of the same project [15], with the help of the example of the Baltic Sea region. They took into consideration various ways of human economic exploitation of spaces of marine areas: subsea cables (existing and planned), industrial fishing (existing), sea

Tab. I. Typology of the EU land-sea space, according to the ESPON ESaTDOR project.

REGION/ CHARACTERISTICS	EUROPEAN HUB	REGIONAL HUB	TRANSITIONAL AREA	RURAL AREA	AREAS EXPLOITED TO A SMALL DEGREE
Economic significance	The highest concentration of employment in the maritime economy/ very high strategic and economic significance	High concentration of employment in the maritime economy/ high strategic and economic significance	More localized concentration of employment in the maritime economy/ higher dependency on a limited number of strategic sectors	Low level of employment related to the sea, dominance of the first sector's production and tourism	Very low level of employment in the maritime economy/ limited indirect economic significance
Flows	Tight global links, global supply base	Links with national significance and some international links, European supply base	Links with national and sub-regional significance and the same supply base	Limited links, local/ sub-regional supply base with some sector/ seasonal expansion	Distant areas, limited availability, very small supply base, some expansion
Pressure on the natural environment	High pressure on the environment resulting from human activity	Significant pressure on the environment	Moderate pressure on the environment	Low pressure on the environment	Limited pressure on the environment
Land-sea interactions	Very high	High	Medium	Low	Very low

Source: [16].

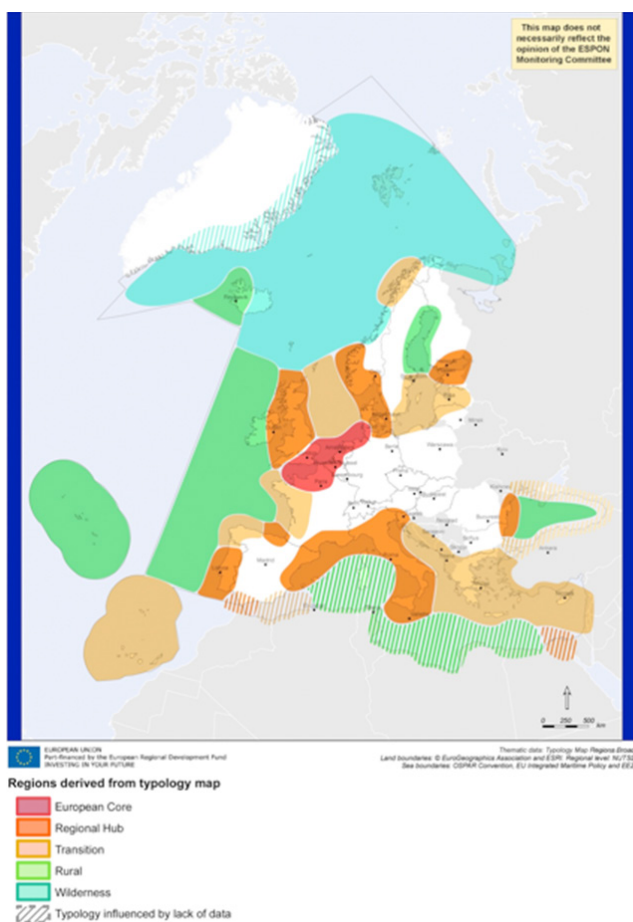


Fig. 1. Typology of the EU marine space - schematic approach
Source: [16].

transport (existing), mariculture (existing), military areas (existing), pipelines (existing and planned), aggregate extraction/exacerbation (existing), wind farms (existing and planned), as well as protection purposes: protected areas NATURA 2000, spawning grounds and areas of cod fry maturation. The intensity of exploitation of marine areas has allowed the authors to distinguish the following types of these areas: wilderness,

extensive rural, intensive rural, transport corridors, transition, local hub, regional hub. According to the typology, the Polish marine waters are categorized entirely as intensive rural, and the Gulf of Gdańsk has been classified as a local hub.

Unfortunately, also in this case, the transition from analysis to practical indications regarding the development of spatial management at sea fails. Like in the case of the main report of the ESaTDOR project, they are limited to general comments regarding the meaning of a borderless perspective, and a holistic approach in this respect. However, Jansen et al. [15: 196] notice the need for spatial differentiation of purposes and methods for the exploitation of marine areas for economic and ecological purposes. They suggest that different intensity should be allocated to spatial categories, depending on the conditions which it analyses or that a different target value should be accepted.

The attempts undertaken by Shaw et al. [16] or Janssen et al. [15] also demonstrate how demanding the works related to spatial typology on the land-sea border are. From the point of view of empirical analyses, it requires linking statistical information from a new (postulated by the ESaTDOR project) level of marine NUTS 2 or 3, as well as from the level of LAU 2 on land. This would require defining a statistical approach in this regard in the EU. Both research groups have failed in doing so and in both cases the typology only covers marine areas.

TPOLOGY OF THE POLISH MARINE SPACE ON THE LAND-SEA BORDER

Area covered, material and methods

The study described in this paper covers the Polish marine areas except three lagoons, which are quite different. A detailed description of key characteristics of both landward and seaward Polish coastal zone is available in the documentation produced in the course of the Polish MSP [18]. In brief, the sea part is exploited with various intensity. It is higher in the Gulf of Gdańsk, and lower at open sea. The land part is mainly rural

Tab. II. Types of business activities for the purposes of identification of the maritime economy sector.

TYPES OF ACTIVITIES BY NACE REV.2 – PKD 2007 CLASSIFICATION (SECTORS AND CODES)	SECTOR OF MARITIME ECONOMY
Marine (03.11) and freshwater (03.12) fishing Marine (03.21) and freshwater (03.22) aquaculture	1 – fishing
Extraction of crude petroleum (06.10) and of natural gas (06.20) Support activities for petroleum and natural gas extraction (09.10) and for other mining and quarrying (09.90) Operation of gravel and sand pits; mining of clays and kaolin (08.12) and of salt (08.93)	2 – mining and energy
Processing and preserving of fish, crustaceans and molluscs (10.20) Wholesale of other food, including fish, crustaceans and molluscs (46.38)	3 – food industry
Building of ships, boats and floating structures, including pleasure and sporting boats (30.1, 30.11, 30.12) and Repair and maintenance of ships and boats (30.15), machinery (33.12) and dismantling of wrecks (38.31)	4 – building of ships and boats
Works related to construction of water projects (42.91, 42.99)	5 – construction of water projects
Sea and coastal passenger and freight water transport (50.10, 50.20) and inland passenger and freight water transport (50.30, 50.40) Service activities incidental to sea transportation (52.22, 52.29) Warehousing and storage and cargo handling in sea ports (52.10, 52.24)	6 – water transport
Research and experimental development on biotechnology and natural sciences and engineering (72.11, 72.19)	7 – research & development
Hotels, holiday and other short-stay accommodation, camping grounds and campsites (55.10, 55.20, 55.30) Restaurants and other eating places (56.10) Rental and leasing of recreational and sports goods and water transport equipment (77.21, 77.34) Tour agents activities (79.11)	8 – tourism

Source: [4].

with the exception of the Gulf of Gdańsk on which one of the biggest Polish metropolitan regions (Gdańsk-Gdynia-Sopot) is located. The area of the Świnoujście port has also been more intensively developed. The rest of the coast is dominated by tourism, nature protection, fishery and agriculture with a few smaller ports with additional functions (e.g., repairing ships etc.). There are several tourist hubs, in particularly in the Hel peninsula Vistula spit, and between Świnoujście and Kołobrzeg. The structure features of the economies of the Polish coastal municipalities have been recently subject to in-depth analysis by Szejgiec-Kolenda and Zaucha [4]. The essence of the research methodology concerns using economic land-sea interactions for developing spatial typologies of the land-sea interface in Poland. This can be seen as a complement or continuation of the studies on economic mechanisms shaping maritime spatial development in Poland [19]. In practice, the typologies were produced by connecting information regarding the intensity of the use of marine areas with the analysis [4] regarding the significance of maritime economy. This has allowed to distinguish marine space classes depending on the economic land-sea interactions. However, the spatial range of these interactions cannot be properly implemented in such a way due to the high level of data generalization, which constitutes a problem in this case.

At the local level, the study draws on EU and worldwide experiences [cf. 20, 21, 22,] which indicate the selected types of business activity classifications (NACE Rev.2 – PKD 2007) as referring to marine economy (Tab. 2). The term “maritime economy” is used to denote economic activity (not economic value) measured by the number of business establishments (entities of national economy included in the business register – REGON) [cf. 1]. This approach is determined largely by the availability of data at local level. Statistical data concerning the number of entities were obtained from the REGON database.

To estimate the intensity of exploitation of marine areas, information from a study of marine areas was used [18]. Each of the methods of marine areas' exploitation was assigned the same weight equal to 1. This algorithm allowed the intensity of exploitation of marine areas to be estimated on the basis of information regarding the spatial distribution of:

- ♦ Wind power industry (permissions issued).
- ♦ Mining (deep sea mining - aggregates + crude oil and gas) from the Stupsk Bank (extraction concessions).
- ♦ Shore protection (sand accumulations for shore protection - areas reserved for reconnaissance).
- ♦ Technical line infrastructure - cables, the existing and planned pipelines with decisions (buffer with a “radius” of 250 m - cross-section 500 m).
- ♦ Harbor areas: dredged material deposition, so-called sea dumping sites, harbors, land and sea boundaries, roadsteads (established with legally binding decisions of the maritime administration).
- ♦ Conservation areas: Natura 2000 special protection areas of birds (OSO), Natura 2000 special habitat protection areas (SOO), national parks, landscape parks.
- ♦ Subsea cultural heritage: archaeological wrecks (buffer 250 m), wreck graveyards (buffer 250 m), subsea cultural landscapes.
- ♦ Seaside tourism: water-based coastal tourism (coastal belt of 100 m into the water + 100 m of the beach + the inner Bay of Puck), diving - popular wrecks and 250 m of the buffer around a wreck.
- ♦ Military areas: Polish Navy areas (closed and not closed), anchorages of the Polish Navy.
- ♦ Intense shipping: navigational routes together with buffers (main route, e.g., TSS - 4 mm in width, secondary route - 3.5 mm, minor route 2.5 and 2 and 1 mm, traffic separation schemes /TSS/ (it should fit into a buffer), anchorages.
- ♦ Intense fishing: designated fishing sites, fishing vessel routes to these fishing sites.

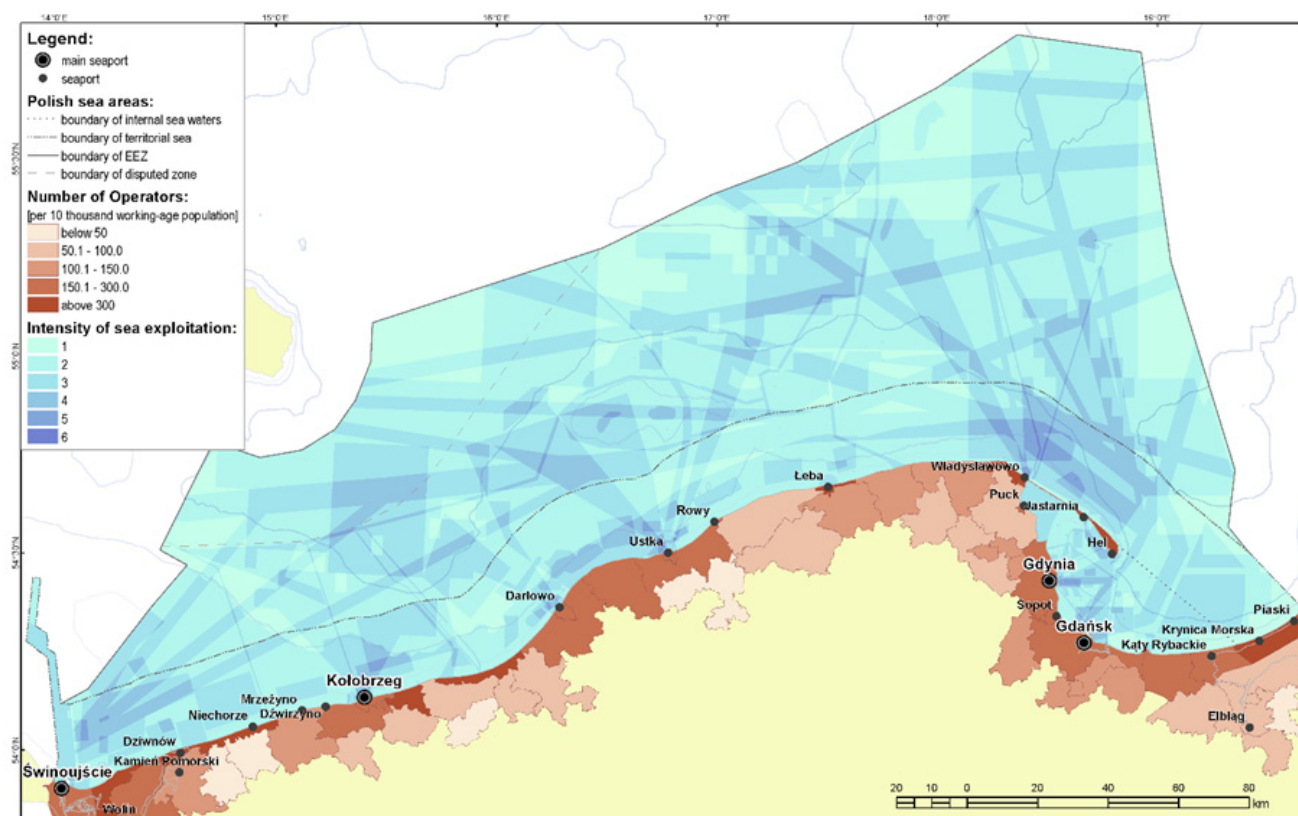


Fig. 2. Intensity of exploitation of marine areas and the number of entities of maritime economy per 10 thousand people at working age in coastal communities in 2016. Source: authors' study based on the data of GUS and the Maritime Institute in Gdańsk (J. Pardus).

- ◆ Extensive ways of exploitation of marine areas (occasional shipping, fishing with the use of small vessels, yachting and marine recreation) – it was assumed that all of them take place across marine areas.

Because this marine space research was the first of this kind in Poland, for both the maritime economy on land and the exploitation of marine areas, simple and easily interpretable indicators were used, i.e., analogically: the significance of the maritime economy sectors measured with the number of entities in maritime economy per 10 thousand people at working age (for details see [4]), and the intensity of exploitation of marine areas measured with the coexistence of various ways for benefiting from the sea (including conservation) in one location. For this purpose, it was decided to total various ways of exploitation of these areas (economic, ecological or for defense reasons), without evaluating their intensity and significance for the marine spatial development. Therefore, the totaling consists in simply adding the ways of exploitation of marine areas mentioned above. Information regarding the intensity of exploitation of marine areas and the number of maritime economy entities per 10 thousand citizens at working age in coastal communities is presented in a joint Figure 2.

RESULTS

After taking into consideration both criteria (exploitation of

marine areas and the economy in coastal municipalities), four types of marine space marked with letters A, B, W, Z (Table 3) were distinguished.

Marine space “A” falls in the area of particular planning concern. This is the main area of focus on maritime economy development and it entails numerous conflicts appear. Their management should constitute the main purpose of the spatial development of type “A” areas. Unconsidered spatial decisions both on land and at sea may create barriers significant for the economy in the form of deterioration of access to harbors or reduction of seaside tourism attractiveness. Detailed planning is needed (local plans of marine areas). In areas with a high number of economic entities, marine areas usually have additional functions associated with the increase of citizens' life quality, including settlement quality. Maintaining and securing their proper functioning (ecosystem services) constitutes one of the premises of development not only in maritime economy, but also in other sectors and economy branches.

Marine space “B” offers a chance to diversify the economic development based on ecosystem services and abiotic marine areas, providing that this is allowed by the specifics of the existing or planned land gateways for marine services. Spatial development should focus on emphasizing these opportunities and pointing out the existing chances and resources to potential users of marine space. However, type “B” could also mean that economically developed land gateway services of marine

Tab. III. Types of marine space based on the economic land-sea interactions and respective types of maritime spatial policy.

MARITIME ECONOMY WITHIN THE ECONOMY OF COASTAL MUNICIPALITIES	INTENSITY OF EXPLOITATION OF MARINE AREAS		
	HIGH	MEDIUM	LOW
Relatively large number of maritime economy entities (300 and more per 10 thousand people at working age)	Marine space A	Marine space AB	Marine space B
Relatively moderate number of maritime economy entities (150-300 per 10 thousand people at working age) and their high absolute number	Marine space A	Marine space AB	Marine space B
Relatively moderate number of maritime economy entities (100-150 per 10 thousand people at working age) and their low absolute number	Marine space W	Marine space WZ	Marine space Z
Relatively low number of maritime economy entities (below 100 of entities per 10 thousand people at working age)	Marine space W	Marine space WZ	Marine space Z

Source: author's study based on the analyses described earlier.

areas serve to exploit further located marine areas, due to the specifics of those which are adjacent. One should not count on diversification of the economic development of marine areas, when there is a relatively large, but in the absolute meaning - small number of entities of maritime economy on land. In such a situation, the development of space "B" should ensure, for economic reasons, the maintenance of marine areas which have been already exploited.

Marine space "W" means unused potential on land. Gateway services of marine areas are located in neighboring territories. In this situation, spatial development may head towards indicating the opportunities for extension and development of the existing gateway services on land. One should consider the extent to which marine areas could create a developmental stimuli for the land part of this marine area. It would be worth launching a process where public intervention (e.g., plan of marine areas and related economic encouragement tools) would automatically initiate the desired developmental processes.

Marine space "Z" constitutes an area of low intensity of land-sea economic connections. There may be a few reasons for such a condition and such a syndrome should not always be negatively perceived. For example, they could be ecologically valuable areas, covered by territorial forms of environment protection. Spatial development in areas "Z" should be carried out in a long-term perspective, with a view to the needs of the future generations, maintaining social and ecological values, as well as from the point of view of the country's or the region's interest.

Spaces "AB" and "WZ" are transitional types. They may evolve in various directions, and their spatial development requires a scenario approach, and the analysis of trends and developmental options. Another mixed type appears when tourism constitutes the main "engine" of the development on land, and marine areas are not intensely exploited. Formally it is recognized as category "B", but in such a situation it does not make sense to propose more intense development of marine areas. This marine space type has been marked as transitional type "BZ", where it is worth maintaining low intensity of economic activities at sea, despite their high intensity on land.

is visible in this Figure, for which land-sea interactions do not constitute a significant mechanism of spatial development. Its spatial development is shaped by specific geographic factors (e.g., deposits of natural resources) and economic connection of transnational nature (e.g., shipping).

The typologies produced reveal very interesting patterns of spatial development of the sea-land interface in Poland. Rather counterintuitively, the dominating type is "A" (AB), and not just around large harbors but also around coastal tourist areas. This can be treated as evidence to the limited number of coastal pristine areas in Poland. Type "Z" exists mainly around national parks and in their vicinity and therefore, special attention should be attached to its maintenance with a serious approach to the protection of sea ecosystems. A fearsome issue is that the space around the Woliński National Park has been classified as an "A" type. Because type "W" does not exist, it does not comprise the area of concern for encouraging the development of coastal municipalities resulting from better exploration of the sea in these areas (intensive development on sea). Type "B" is also an interesting case. It is a task for the Polish MSP to check whether those areas can accommodate additional functions (e.g., tourism, transport, aquaculture). However, this might be challenging since the development of two out of four B areas is determined by defense concerns. In the other two areas, enhancement of high-quality tourism (e.g., diving) or environmentally friendly mariculture (e.g., mussels farming) can be considered.

The presented typologies may be subjected to further modifications. Instead of the economic share index, a variation within municipalities in relation to maritime economy may be used and a classification of marine space can be based on this matter. As an example, to identify the first group (according to the typology of coastal municipalities in a static approach) – "large multi-functional centres" [see 4, 1: 310], a multi-functional development of the surrounding marine space should be programmed, with emphasis on the inhabitants' life quality. Harbors and marine communication routes will play an important role in this group. In marine areas adjacent to municipalities of the fifth group, it would be worth giving priority to water-based space, and for the fourth group - looking for balance between the fishing industry and seaside tourism. Additionally, this group can be a source of many economic stimuli,

Figure 3 presents a visualization of marine space division with the use of its types described in Table 3. An additional type "G"

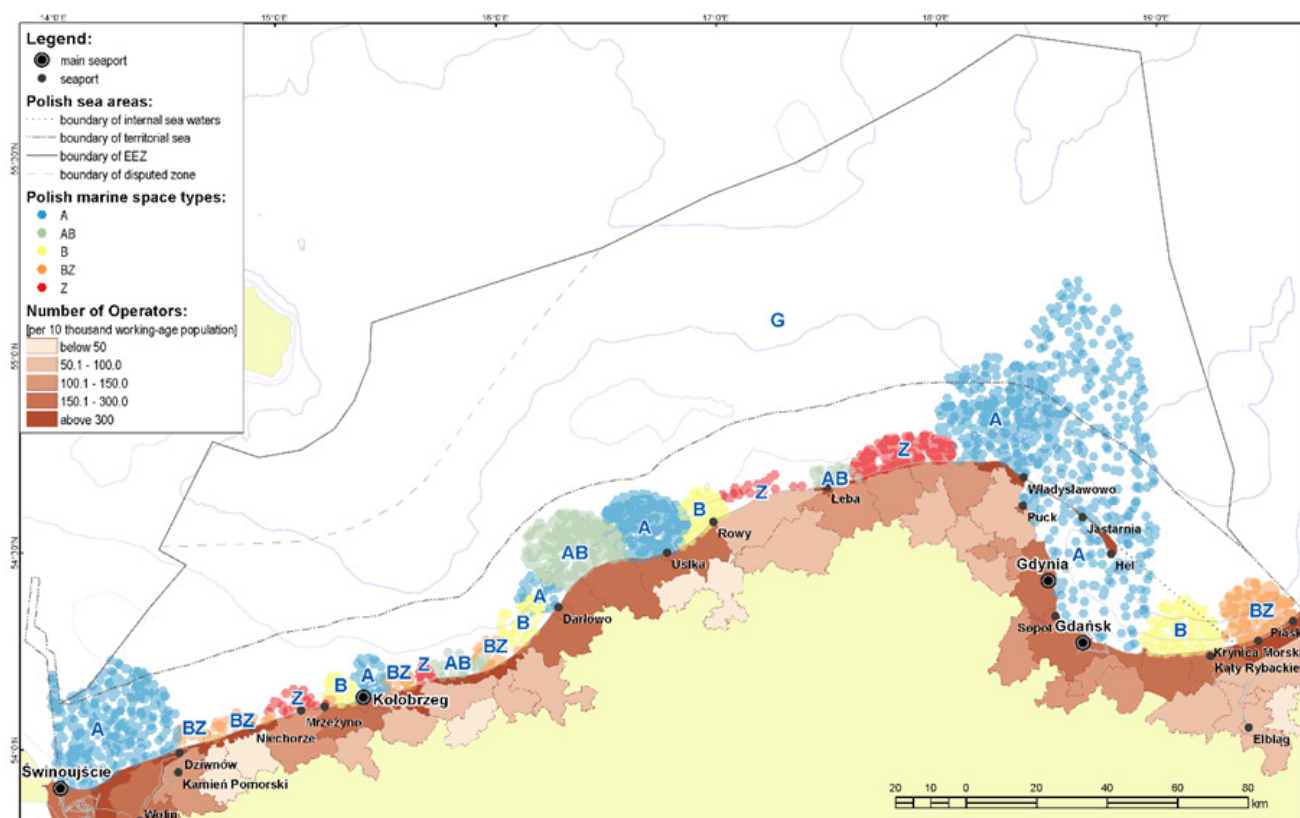


Fig. 3. Types of Polish marine space.
Source: authors' study based on the data of GUS and the Maritime Institute in Gdańsk (J. Pardus).

developmental for marine space due to the multi-functionality of these municipalities' economies. On the other hand, the dynamic typology of coastal municipalities [see 4, 1: 316] indicates that municipalities of the first, third and fourth group with relatively lower dynamics of maritime economy growth are located along the coast. This also applies to typically tourist municipalities. Municipalities with fast maritime economy growth develop based on their supply base. This demonstrates that the developmental stimuli of maritime economy spreads landwards, but also indicates the stability of economic pressure on the exploitation of marine areas in the future.

However, continuing the research effort in this direction would require statistical data showing the significance and scale of maritime economy at the local level, in a more complete and realistic way than what is currently available in the Polish business register REGON as well as functional classification of marine areas, more expanded than those used in Figure 2 and taking into account the criterion of intensity of marine exploitation.

CONCLUSIONS

The above-mentioned considerations lead to several reflections related to the usefulness of such an approach, as well as the encountered barriers and future prospects. Taking into account land-sea interactions, creating typologies of marine spaces is very important for several reasons. As pointed out by

Kid et al. [9] or Zaucha [19], land sea interactions are decisive for the development of maritime space. As of today, people do not yet inhabit marine space permanently. A key challenge is the selection of those interactions and considering their both directions, i.e., not only from land to sea but also from sea to land. The presented research illustrates how this can be done in practice (see, e.g., discussion on type "Z" of marine space – pristine sea nature enhances limited development on land).

The second reflection is related to data and information constraint. Typological attempts analyzed in this paper suffer from lack of available information on different types of interactions. However, research presented in this paper shows that typology based on economic land-sea interactions at local level is feasible and creates a more reliable picture than the typologies applying regional and national data. But, at the local level, statistical information on all sorts of interactions apply mainly to economic and possibly demographic issues. The socio-cultural domain must be covered mainly by dedicated additional research, since it is not subject to routine collection of statistical data. The same is true for the "power" or governance dimension of those interactions. In Poland, they have not been measured, nor analyzed yet at all. In addition, the intensity of exploitation of marine space does not constitute an object of statistical analyses at national nor regional level, therefore the information on this subject requires obtaining data from dispersed sources. Moreover, one should also underline the limitation of data availability that would allow analysis of

flows. The presented typology is of a static nature, i.e., at least the intensity between different sea uses has not been compared and combined in Poland yet. Therefore, the number of uses has been analyzed as a proxy. A similar approach is seen in other studies, although it might lead to oversimplification. This must be changed. The attribution of flow data to marine space is difficult although in some cases (e.g., fishery or navigation), it is possible even now [23].

The third reflection regards the complexity of the problem analyzed but at the same time the usefulness of this approach. It seems that there is no “one size fits all” typology of marine space. The typological attempts analyzed in this paper are based on various approaches. Typologies and their constructions to a large extent depend on the purpose for which they are constructed. Local typologies seem more promising since MSP is usually exercised at national or even regional level. The typology put forward in this paper is pretty fresh, hence so far it has only influenced the minds of MSP experts in Poland. However in general one can expect that it can act as an important boundary object [24] for MSP, making this process more holistic and stakeholder friendly. As experience shows, objects such as ecosystem services or models of land-sea interactions [26, 25] might play an important role in invigorating strategic discussions on the development of the land-sea interface. Also, typologies described in this paper may prove to be very useful for this purpose as binding various objects. They glue up various developmental aspects and perspectives and therefore might inspire stakeholders’ opinions. In a more strategic perspective, it seems that such typologies can be seen as an avenue towards the perception proposed by Faludi European Archipelago [27], i.e., relational governance beyond administrative borders. At least this is the case in Poland, where marine space is managed by the maritime administration (national government) and terrestrial space by local self-governments. Multi-level governance requires a dialogue between national and local authorities and all other marine stakeholders even without formal administrative power. Typologies might facilitate this task. In doing so they will contribute to the creation of land-sea soft spaces [28, 29], which might be relevant for the marine domain in particular

[30]. Such soft spaces are governed by bargaining, flexibility and consensus or even understanding that creating and other actions are significant for marine space which is constituted by various processes that do not fit into administrative and territorial boundaries [31]. Determining the distance at which these interactions may cause an impact, and consequently - boundaries of various types of space (these boundaries are blurred) is a difficult issue. In some cases off-shore economic development might influence areas located far from the coast [32]. In general, economic interactions poorly fit into administrative grids. Therefore soft space might provide an answer to such a governance dilemma. Along the Polish coast, the local authorities (on land) are confronted with much larger national bodies in terms of spatial incidence and this requires the building of a kind of multi-faceted understanding. However, one should keep in mind that the analysis of soft spaces might pose an additional challenge. In the typology presented, only local economic interactions were feasible for analysis due to information constrain already presented above (under the second reflection).

The fourth reflection considers the future. Maritime spatial typologies based on economic land-sea interaction require further research. Economic and environmental interactions should be combined with social and cultural ones in view of the very essence of MSP [33], which requires insight from many scientific disciplines and types of knowledge [34]. One of significant elements that must be taken into account is the territorial capital (for more information about this capital - see [35,36]) of areas located at the land-sea interface. The territorial capital of land-sea interface has not been researched so far in the context of MSP. A better understanding of its role would allow more vigorous analysis of cultural and social land-sea interactions, which shape marine space.

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