

UNEASY ARCHAEOLOGY OF THE CLIFFS – BAGICZ SITES EXAMPLES

NIEŁATWA ARCHEOLOGIA KLIFÓW – PRZYPADEK STANOWISK W BAGICZU

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ABSTRACT: The following paper presents the problem of archaeological sites located on cliffs on the Southern Baltic Sea shore. This article discusses issues related to a necessity of solving the problem of this kind of research, related to methodological, as well as documentation and preservation standards based on preliminary results of the project conducted in Bagicz area (Ustronie Morskie commune). In this region four new structures were noted on a cliff surface. The key to understand the situation of archaeological sites located on a cliff areas is the knowledge of the processes related to their formation and activity. All of them have a huge impact for the state of preservation of the cliff, however they have various intensity level depending on the part of the Baltic Coast.

KEY WORDS: cliffs, archaeological sites, Southern Baltic Sea shore

The following paper is merely an introduction to the bigger discussion on abrasion impact in the region of Southern shore of the Baltic Sea and its impact for preservation of archaeological sites. This article discusses issues related to a necessity of work out that kind of research, methodological, as well as, documentation and preservation standards.

Archeological sites are rather occasionally noted on cliffs. But, its meaning during interpretation of a past only seemingly is marginal. The very problem of presence and destruction of sites as a result of abrasion processes is not discussed in archeology commonly. In European Archaeology this problem is still poorly researched.

Among few scientific works on that issue there is a paper on analysis of archaeological situation in Nowe Warpno region (Krajewski, Chmiel, Adamczyk, 2015). However, in this work the main emphasis was on methodological issues. Research interests in the coastal region generally focus either on underwater archeology or land archeology, with sites located on coastal dunes and cliffs being studied rarely.

Of course that kind of situation is a resultant of several factors, such as difficulties in recognizing and registering of objects located on the cliffs or dunes and problems related to various interests in case of the coast. On one hand, the key are environmental issues connected with the shape of the coast, preservation of a sandy cliffs and so on, which are protected by the Maritime Office. There is also a question of a local plans of spatial development and decisions made by local authorities, mainly in connection with the development of tourism. On the other hand we often have also a valuable archaeological cultural heritage, important for social impact, yet often not known, which is under the care of the Voivodship Heritage Board.

In this case a very important problem is also archaeological methods and a procedure of rescue excavation in that kind of places. There is no possibility of a traditional exploration of a site. Excavation basically are about “picking out” individual archaeological structures, when a large part of them has already been destroyed, thus it is more surveying bellow the cliff, than a regular excavation in its classic meaning.

BAGICZ CASE – DISCOVERY AND RESEARCH

In 2018 the project “Cultural aspects of life and death – non-invasive research on prehistoric settlement in the Bagicz Forest” has started. Within its range there is a strip of cliffs at the height of the post-Soviet airbase in Bagicz included in the research area.

Our knowledge of the cultural situation in the Bagicz area in the Roman Iron Age has changed radically with the discovery and research of the Wielbark Culture barrow cemetery in the Bagicz Forrest (Bagicz site 22) (see Chmiel-Chrzanowska, 2018). Along with ongoing research on the cemetery, a non-invasive surveys has started in the woodland area and beach in close proximity of Bagicz.

In March 2018 a discovery of structures on the cliff wall was reported to the author of this paper, made by a local history enthusiast mr Robert Maziarz. He noticed some dark layer structures, as well as pottery assemblage originating from it. Field verification led us to conclusion that we are dealing with at least three cremation graves. This statement was supported by presence of burned bones. Registered fragments of pottery allowed to determine the cultural affiliation of the site to the Wielbark Culture. Small amount of pottery pieces were taken, which in general can be described as parts of a vessel of the group I and a vessel of the group V according to the classification byR. Wołagiewicz (1993, p. 12–14). The registered structures were between 50 and 60 cm long and approximately 30 cm deep. On this stage the Voivodship Heritage Board decided to carry out a rescue research. The pit graves

destroyed by abrasion were located exactly in the same place were about 100 years ago the grave of a women buried in a log coffin was discovered, therefore considered that objects were a continuation of the cemetery (Wołagiewicz, 1980, p. 40).

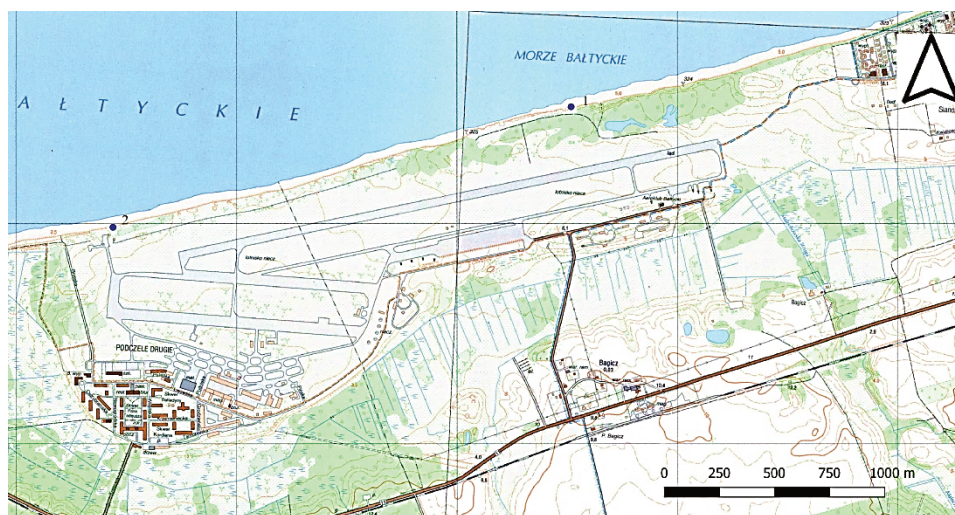


Fig. 1. Map presenting localization of the sites. No. 1 – site 1, No. 2 – site discovered approximately 1000 m from site 1.

The cliff monitoring along the Bagicz Airbase was also continued in April. In this period two of the three graves were destroyed. Also the structure that has been preserved in the cliff was seriously damaged. It seems that the main reason of this situation was the thawing of the cliff, which caused the structural damage. Getting all formal permissions necessary to start field works took three months. During this time the site has been seriously affected, and another structure was exposed.



Warstwy:

I. Ciemnoszary, drobnoziarnisty piasek z licznymi węglami drzewnymi, nielicznymi przepalonymi kośćcami i ceramiką.

Fig. 2. Profile of a structure No. 1.

Rescue field works were carried out in the beginning of June. Generally on this stage three structures were excavated. One of them was discovered during previous surveys and two more structures have appeared in the cliff profile. First should be interpreted as part of the Wielbarkian cemetery, other are related to a settlement. Material registered in a fulfillment allowed to date them to the Bronze Age.

Structure 1 – probable grave of Wielbark Culture, 6 fragments of pottery and burned bones. 120 cm in width, depth app. 35 cm. Many of burned stones, strongly destroyed, part of the structure was at the base of the cliff, several charcoals. There was no possibility to explore the whole of the grave because of the danger of landslide, about 10 cm was removed in the profile, it is not known how far the object reaches in the cliff.

Structure 2 – unknown function, possibly connected with a settlement activity, 140 cm in width, 80 cm in depth, 172 pieces of pottery, including burned out, both thin-walled, as well as thick-walled, represents the Lusatian Culture pottery tradition. Structure consists of three layers: 1 – red-orange, burned (?) sand, 2 – very light, fine-grained sand, 3 – dark gray, fine-grained sand, with charcoals and large, heavily burnt stones. The structure was not explored due the danger that cliff will fall. Only 40 cm in the profile was removed. It is not known how far in the cliff the structure reaches.

Structure 3 – unknown function, possibly connected with a settlement activity, 270 cm in width, 30 cm in depth. Structure consists of two layers: 1 – dark gray, fine-grained sand with a small amount of charcoal, 2 – red, fine-grained sand, slightly heat-treated. Ceramic material was noted within both layers. 60 pieces of strongly damaged pottery, both thick and thin-walled, most probably Lusatian Culture.



Warstwy:

- I. Przepalony, czerwony drobnziarnisty piasek, liczne fragmenty ceramiki,
- II. Jasnozółty, drobnziarnisty piasek, liczne fragmenty ceramiki,
- III. Ciemnoszary, drobnziarnisty piasek, z dużą ilością przepalonych kamieni, niewielką ilością węgla drzewnych.

10 cm

Fig. 3. Profile of a structure No. 2.

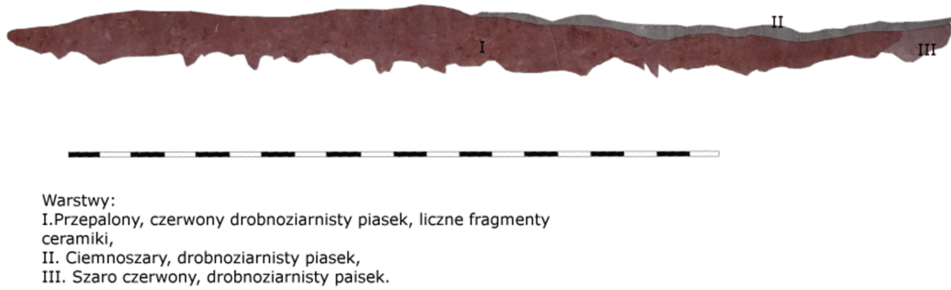


Fig. 4. Profile of a structure No. 3.

In addition 1000 m to the West from site 1, another structure has been registered. It was poorly visible on the cliff wall. However, a lot of pottery pieces was found both in the structure and below it, at the base of the cliff. It should be connected with the Lusatian Culture from Early Iron Age.

DISCOVERED STRUCTURES AND THE ARCHAEOLOGICAL CONTEXT

In scientific discourse Bagicz is associated mostly with the grave in a wooden log, which 100 years ago fell from the cliff near the village. In 1899 the find had been analyzed by amateur archaeologist Hugo Schumman (1900, p. 1–9). Results of his research were verified by Ryszard Wołągiewicz, who in 1980 introduced the description of the discovery according to the scientific standards of the age and attempted to interpret it on a wider cultural background (Wołągiewicz, 1980). His analysis led to determine the chronology of the grave to phase B2/C1 of the Roman Iron Age. Burial in a log had been found as a single grave, because of searching carried out by A. Stubenrauch and R. Richter did not reveal any other graves in the area.

Nonetheless in 1936 another cemetery had been discovered in the area of the airbase and got tagged as site number 2. Excavations carried out by O. Dibelt led to finding of four cremation graves. Three were dated to Roman Iron Age and one to Pre-Roman Iron Age. In general equipment of the graves from site 2 and the single grave from site 1 allow to state that these graves are simultaneous (Wołągiewicz, 1980, p. 46).

R. Wołągiewicz had two hypotheses about relations between site 1 and 2. On the one hand he assumed that the grave in a log coffin might have been connected with a cemetery unpreserved till modern times, destroyed by abrasion. On the other hand he also allowed the possibility that the burial was a single one, unrelated to any cemetery.

He also considered the situation when the log coffin burial belonged to representative of a privileged part of the community. Similar situation is known from Gronowo, where a flat cemetery was located close to a barrow site (see Machajew-

ski, 2013). In the case of Bagicz the log coffin might suggest a higher social position of the buried woman.

Ryszard Wołagiewicz's hypothesis had been considered actual until recently. However for now it seems that the cemetery had its continuation. It is important to state though, it was seriously damaged due to the abrasion process. For this moment we are not able to determine how big part of the site has been destroyed in the last 100 years, as well as how much of it was either preserved or destroyed by creation and development of the airbase. Furthermore, it is unclear how much of the site's area has been lost due to regression of the cliff before early 1900s. Nevertheless, it is still possible that with time more burials will be discovered, especially in autumn and wintertime, during storm seasons.

It is worth mentioning, that the site of Lusatian Culture has not been registered earlier. The objects are not destroyed as much as Wielbarkian cemetery. Their scientific potential is still very large, however, due to the conditions on the cliff, there is a very limited possibility of further exploration.

LOCATION OF THE SITES ON CLIFFS AND ABRASIVE ACTIVITY IN THE REGION

The key to understand the situation of archaeological sites located on a cliff area is a knowledge of the processes connected with their formation and activity. All of them have a huge impact for the state of preservation of the cliff, however they have various intensity level depending on the part of the Baltic coast.

Cliffs consists approximately 20% of the Polish Baltic Sea shore (Subotowicz, 1982). Most of them were developed on the basis of Pleistocene soils, and their forming stopped when littoral transgression had started (Deng et al., 2017, p. 88).

Process of cliffs creation is directly related to the abrasion process. In case of cliffs which arise on soft rocks a destructive activity is caused both by waves and coastal currents. The material removed from the cliff is embedded at its base. Additional cliff surface erosion processes occur (Migoń, 2007, p. 398). In contrast to the dune coastline, lithodynamic processes lead to the formation of landslides on the cliffs coastlines (Zawadzka-Kahlau, 1999, p. 85).

The rate at which cliffs retreats depends on many complex factors and may take place in various ways within the Baltic Sea. Main factors which have an impact on the rate of abrasion are exposition of a coast, intensity of storms in a region, diversification of the Earth's crust movements and atmospheric dynamics in a region, mainly the force of winds (Musielak et al., 2017, p. 75). Cliffs within Baltic coast have a diversified geological structure and height. They often are differing from each other, even on short sections (Łabuz, 2013, p. 20).

Medium rate of abrasion on Pleistocene glacial soils has ranged from 1–10 meters per year. As a result of extrapolation it allows to estimate that during last 1000

years the shore may have been retreated up to 1000–10000 meters (Goudie, 1995, p. 195). Of course, it is a quite big simplification. Coastal profile will evolve during time, depending on the gains or losses of sediments (Deng et al., 2017, p. 88).

Interesting from the point of view of following paper is that the study area is counted to the Sarbinowo-Ustronie Morskie-Kołobrzeg strip. In Bagicz region we observe a landslide shore and uplift plateau with a sector of landslide, which was caused by exudation of groundwater at the interface between clays and sands (Subotowicz, 1982, p. 95–97). Due to the water drainage and the slope of the cliff itself, landslides and runoffs often occur on the discussed section (Dobracki, Zachowicz, 1998). It is another process which has essential impact on the state of preservation archaeological sites, but also influences possibilities of their registration within the cliffs. Research conducted in the area of Kołobrzeg has showed that there is lack of favorable conditions for aeolian accumulation at the back of the beach. In this region, a strip of coastal dunes shows a significant tendency to narrow, in some places disappearing completely (Borówka, 1999, p. 33).

The area of Bagicz zone is still falling, in addition to the intense activity of the winds causing the waves reaching height of up to 5,56 m, the general water level also rises (Paplińska, Reda, 2001). The abrasion rate in Ustronie Morskie area is estimated within 0.6–0.7 m annually (observation for the period 1960–1983), and in the vicinity of Sianożęty it reaches up to 1.3 m per year (Zawadzka-Kahlau, 1999, p. 95). However, in nearby Sarbinowo it is 0.7–1.9 m per year (period 1783–1924) (Subotowicz, 1982, p. 99; Szczygieł, 2009, p. 4). At the same time, it should be kept in mind that these are average values and there are years when very severe destructions occur, as well as periods of relative calm.

There are cliff sections in Poland on which abrasion process is much faster, like for example in Rowy region (Pomeranian voivodship) where the speed of movement of the cliff reached in the years 1960–1983 is 2.7 m per year (Zawadzka-Kahlau, 1999, p. 95). Therefore area of Bagicz is in the zone with an average level of abrasion processes intensity. However, it should also be noticed that on research area cliffs are quite low. Height of the cliff in this place reaches just over 2 meters, therefore the possibilities of the observation of sites on its surface is rather straightforward. But only a few hundred meters to the West the height of the cliff reaches 6 meters (see Łabuz, 2013, p. 21).

In 2018 also weather conditions were essential for state of preservation of the cliffs. Till the half of March in the Kołobrzeg region there has been frosts, while from April the temperature has risen significantly and rapidly. As a result of defrosting, the intense runoffs of meltwater had started and the construction of the cliff had been weakened and was broken strongly. In fact, that was the process that weakened the cliff, in combination with storms (yet still having a smaller impact) led to destruction of two of the three registered Wielbarkian graves in March this year and the unveiling of objects associated with the Lusatian Culture.



Fig. 5. Destruction of a Bagicz cliff.



Fig. 6. Slope processes visible on the cliff.

COASTAL PROTECTION AND THE RISK FOR ARCHAEOLOGICAL SITES

The most known case of cultural heritage in Poland, which was seriously damaged as a result of a cliff abrasion process, and which were to be saved by modern hydrotechnical activities is the church in Trzęsacz, dating back to the 13th century. Originally, the church has been located 1.5–2 km from the Baltic Coast (Wierucka, Cześnin, 2004, p. 13). Cliff in Trzęsacz, similar to this in Bagicz area, was built from glacial till. Also in this case there are groundwater drains leading to runoff in the cliff area. Abrasion in Trzęsacz cliff area should supposed to be decreased and during 20th century has been as slow as only 0.1 m per year (Subotowicz, 1982, p. 114–116). In 2002 works has begun to secure the cliff and the historical church. Their main purpose was strengthening the cliff, but also the base of the church, which in the first phase of the work was demolished and subjected to conservation. The cliff itself was strengthened and reconstructed, its bases were made of gambion and gambion bands, on which remains of the church were put (Wierucka, Cześnin, 2004, p. 42; Jurkiewicz, 2010, p. 29–32).

The study area was classified as for an ecological utility and therefore building development in the edge area of the cliff side was completely forbidden (Biskupska, 2009, p. 39). The coast around Kołobrzeg is protected by the program named *Sea coast protection program*, which was established in 2003. As part of it, bank fortifications are being built, monitoring of the sea coasts will be conducted, research aimed at identifying activities and securing the shores, stabilization of the coastline from the year 2000, preventing the disappearance of beaches (Act from 28.03.2003 r.: Dz. U. z 2003 r. Nr 67, poz. 621).

Research conducted on the rate of reversing cliffs in different parts of Polish shores of Southern Baltic indicate for a quite limited possibilities of natural protection of the coasts (Zawadzka-Kahlau, 1999, p. 105). Therefore, artificial security is used, such as: durable bands made of concrete, often based on a metal structure, gabions in the form of metal baskets filled with stones, biotechnical protection using other techniques, as well as covers and geotextile covering also being used (Łabuz, 2013, p. 77). Currently, the area of the cliff in Bagicz region has not been stabilized yet, but the potential threat is tourism explorations. Apart from the environmental effects of such activities, they also have a real impact on the conditions of archaeological sites on the cliff (see Łabuz, 2013, p. 33, 42).

That kind of situation took place in a small part of the shore in Nowe Warpno, on the Southern Coast of Szczecin Lagoon, where some archaeological structures had been noted in the cliff profile. However, due to the very strong abrasive activity on the cliff, a concrete band was mounted. Unfortunately, no rescue excavation was carried out (see Krajewski, Chmiel, Adamczyk, 2015).

TOWARD SOLVING THE PROBLEM OF CLIFF ARCHAEOLOGY

In that kind of cases the key seems to be cooperation between Heritage Boards and Maritime Offices. The latter must begin to consider the potential presence of archaeological sites in the planning of possible works. During monitoring of abrasion on particular sections of the coast the presence of an archaeologist seems indispensable.

Of course there is no possibility in a reality that archaeologists will monitor cliff over a dozen times during year. Some solution may be special courses for field employees of Maritime Offices allowing them to recognize potential archaeological sites and, at the same time, report them to the Heritage Boards. The specialist in the field of archeology should also be included in the prepared projects for the purpose of protection of the coast and its natural environment. In the case of sites located and already noted on the cliffs a regular monitoring is crucial, especially during storm periods and winter-spring seasonal changes. It should be remembered that archaeological sites can often be destroyed in just two or three months or even weeks. At the same time, the number of sites identified during 2018 field season monitoring, on a short stretch in Bagicz, indicates how much data we can obtain or loose.

A few words should also be said about the methodology of excavation of sites located on the cliffs. Due to the safety and legal protection of the cliffs, it is not possible to uncover individual structures in the plan. Therefore it is necessary to document objects in the profile. Also a full exploration is often impossible, especially in a case of big structures, because it leads to a breach of the cliff structure. In addition, it should be kept in mind that remnants of the destroyed structures fillings are located at the base of the cliff. Therefore it is necessary to examine and sieve wastes in search of loose material. Unfortunately, natural limitations do not allow for extensive research in such cases. Especially problematic is the issue of partial exploration of archaeological objects, resulting in limitations in obtained data. It seems that such works, due to its reactive rather than active nature, should be carried out in stages, and when another part of the cliff is destroyed, it will be possible to continue works within the registered structures.

CONCLUSION

The situation seems to be stalemate, for how to conduct research in a situation where archaeological structures appear on the wall of cliff often only for a few weeks, and excavations possibilities are significantly limited? It seems that the only solution in this situation is the cooperation of archaeologists with the state services and local authorities working in the coastal area, above all the Maritime Office, as well as scientists whose work is concentrated in the area of the coast. Although this

is to a certain extent a truism, such postulates have been appearing for land-based research for years. Education in the field of recognizing archaeological sites of maritime services will be of key importance here. Only then archaeologists will have a chance to respond to emerging and disappearing archaeological sites. Surface examinations should also cover the coastal strip, however, due to its specificity, they should be cyclical, depending on the seasons.

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Streszczenie

Niniejszy artykuł jest wstępem do dyskusji na temat oddziaływań abrazji w rejonie południowo-wschodniego wybrzeża Bałtyku i jej wpływu na zachowanie stanowisk archeologicznych. Porusza również kwestie związane z koniecznością wypracowania w tego typu badaniach standardów metodycznych, dokumentacyjnych oraz konserwatorskich.

Stanowiska archeologiczne sporadycznie rozpoznawane są na klifach. Jednak ich znaczenie w trakcie interpretacji przeszłości tylko pozornie jest marginalne. Sama problematyka obecności oraz niszczenia stanowisk w wyniku działania procesów abrazyjnych nie jest poruszana w polskiej archeologii.

Badania na klifach w Bagiczu

W marcu 2018 do autorki niniejszego tekstu zgłosił się Pan Robert Maziarz, który w trakcie niedzielnego spaceru z dziećmi rozpoznał „przebarwienia” na klifie, z których, jak zauważył, wypadła ceramika. Weryfikacja terenowa pozwoliła stwierdzić, że mamy do czynienia z co najmniej trzema grobami ciałopalnymi, na co wskazywała obecność przepalonych kości. Zarejestrowane fragmenty ceramiki pozwoliły określić przynależność kulturową stanowiska do kultury wielbarskiej. Monitoring klifu kontynuowano na odcinku lotniska w Bagiczu jeszcze w kwietniu. W tym okresie zniszczeniu uległy 2 z 3 rozpoznanych obiektów.

Prace ratownicze prowadzono na początku czerwca. Ogółem na tym etapie przebadano trzy obiekty. Jeden rozpoznany w trakcie poprzednich prospekcji oraz dwa kolejne, które uwidoczniły się w profilu klifu. Pierwszy z nich wiązać należy z cmentarzyskiem kultury wielbarskiej, dwa pozostałe mają charakter osadniczy, a rozpoznany w ich wypełnisku materiał pozwala datować je na wczesną epokę żelaza.

Z uwagi na bezpieczeństwo oraz ochronę przyrodniczą klifów nie było możliwości odsłonięcia poszczególnych obiektów w płaszczyźnie. Konieczna była dokumentacja obiektów jedynie w profilu.

Odkryte obiekty a kontekst kulturowy

W dyskursie naukowym Bagicz kojarzony jest przede wszystkim z pochówkiem w drewnianej kłodzie, która ponad sto lat temu wypaść miała z klifu w pobliżu miejscowości. W 1936 r. rozpoznane zostało kolejne cmentarzysko oznaczone numerem 2. Badania prowadzone przez O. Dibelta doprowadziły do odkrycia 4 pochówków ciałopalnych. Trzy zostały datowane na okres wpływów rzymskich, jeden na okres przedrzymski. Generalnie wyposażenie grobów ze stanowiska 2 oraz pojedynczego pochówku w kłodzie pozwoliły stwierdzić, że groby te mają charakter równoczesowy (Wołągiewicz, 1980, p. 46). Wołągiewicz stawia dwie tezy dotyczące relacji pomiędzy oboma stanowiskami, z jednej strony sądzi, że grób w kłodzie związany może być z niezachowanym do dzisiaj cmentarzyskiem, zniszczonym w wyniku abrazji, z drugiej strony dopuszczał również możliwość, że pochówek z jakiegoś powodu miał charakter odosobniony.

Tezy Ryszarda Wołągiewicza dotyczące grobu z Bagicza pozostawały do niedawna aktualne. Obecnie wydaje się jednak, że cmentarzysko posiadało swoją kontynuację, choć zostało bardzo poważnie zniszczone w wyniku działania procesów brzegowych.

Lokalizacja stanowisk na klifach a działalność abrazyjna w regionie

Klify stanowią ok. 20% polskiego wybrzeża Morza Bałtyckiego (Subotowicz, 1982). Proces tworzenia klifów ma ścisły związek z procesem abrazji. W przypadku klifów powstałych na skałach miękkich niszczyielska aktywność spowodowana jest zarówno działalnością falowania, jak i prądów przybrzeżnych (Migoń, 2007, p. 398).

Tempo cofania się klifów zależne jest od wielu czynników i w obrębie wybrzeża Bałtyku może przebiegać w zróżnicowany sposób. Głównymi czynnikami wpływającymi na tempo abrazji są

ekspozycja wybrzeża, intensywność sztormów w regionie, zróżnicowanie ruchów skorupy ziemskiej, dynamika atmosferyczna w regionie – siła wiatrów (Musielak et al., 2017, p. 75).

Interesujący z punktu widzenia pracy obszar zaliczany jest do pasa klifowego Sarbinowo – Ustronie Morskie – Kołobrzeg. W rejonie Bagicza mamy do czynienia z brzegiem mającym charakter klifu wysoczyznowego osuwiskowo-spływowego z odcinkiem obrywowym, co jest spowodowane wycięciem wód gruntowych na styku glin i piasków (Subotowicz, 1982, p. 95–97). Z uwagi na wycięki wód oraz nachylenie samego klifu na omawianym odcinku często dochodzi do osuwisk i spływów zboczowych (Dobrcki, Zachowicz, 1998). Tempo, w jakim zachodzi abrazja w rejonie Ustronia Morskiego, szacowane jest w granicach 0,6–0,7 m rocznie (obserwacja za okres 1960–1983), a w okolicach Sianożętów osiąga do 1,3 m rocznie (Zawadzka-Kahlau, 1999, p. 95). Natomiast w pobliskim Sarbinowie 0,7–1,9 m/rok (okres 1783–1924) (Subotowicz, 1982, p. 99; Szczygieł, 2009, p. 4). Przy czym na uwagę należy mieć, że są to wartości średnie i bywają lata, w których dochodzi do bardzo silnych zniszczeń, a także okresy względnego spokoju.

W sezonie 2018 kluczowe dla stanu zachowania klifu były również warunki pogodowe. Do połowy marca w rejonie Kołobrzegu utrzymywały się przymrozki, natomiast od kwietnia znacząco wzrosła temperatura i nastąpiło szybkie ocieplenie. W wyniku rozmarzania doszło do intensywnych spływów wody roztopowej, osłabienia konstrukcji klifu i w efekcie do silnych obrywów.

Ochrona wybrzeża a zagrożenie stanowisk archeologicznych

Badany obszar zakwalifikowany został jako użytek ekologiczny i całkowicie zabroniona została zabudowa w rejonach przykrawędziowych partii klifu (Biskupska, 2009, p. 39). Badania prowadzone nad tempem cofania się klifów w różnych częściach polskich brzegów południowego Bałtyku wskazują na dość ograniczone możliwości naturalnej ochrony wybrzeży (Zawadzka-Kahlau, 1999, p. 105). W związku z tym stosuje się zabezpieczenia mające charakter sztuczny, takie jak (Łabuz, 2013, p. 77): opaski trwałe, wykonane z betonu, często na metalowej konstrukcji, gabiony mające postać metalowych koszy wypełnionych kamieniami, stosowana jest również ochrona biotechniczna przy wspomaganiu innymi technikami i okrywy z geowłókniny.

Aktualnie teren klifu w rejonie Bagicza nie był jeszcze stabilizowany, jednak potencjalnym zagrożeniem są eksploracje turystyczne. Abstrahując od środowiskowych skutków tego typu działań, mają one również realny wpływ na warunki stanowisk archeologicznych występujących na klifie (zob. Łabuz, 2013, p. 33, 42).

W kierunku rozwiązania problemu archeologii klifów

W przypadku stanowisk zlokalizowanych na klifach kluczowy jest regularny monitoring, zwłaszcza w okresach sztormowych i przy zmianach temperatury z zimowej na wiosenną. Należy pamiętać, że często obiekty archeologiczne mogą ulec zniszczeniu zaledwie w przeciągu dwóch czy trzech miesięcy. Jednocześnie liczba rozpoznanych w trakcie tegorocznego monitoringu stanowisk na krótkim odcinku w Bagiczu wskazuje na to, ile danych możemy uchwycić.

Konkluzje

Wydaje się, że jedynym rozwiązaniem w tej sytuacji jest współpraca archeologów ze służbami państwowymi i władzami lokalnymi działającymi w strefie przybrzeżnej. Badania powierzchniowe powinny obejmować również pas wybrzeża. Jednak ze względu na swoją specyfikę powinny być cykliczne i zależne od pór roku oraz pogody.