

# Past Landscapes of Bias: Refuse at Abandoned Cold War Soviet Nuclear Bases in Poland

GRZEGORZ KIARSZYS 

Department of Archaeology, Institute of History, University of Szczecin, Poland

Email: [grzegorz.kiarszys@usz.edu.pl](mailto:grzegorz.kiarszys@usz.edu.pl)

*This article concerns the interpretation of refuse dumps discovered at three abandoned Soviet tactical nuclear bases in Poland and how their analysis prompted a reassessment of archaeological remote sensing results. The study employed a range of methods to document the remnants of these secret sites, including declassified spy satellite images, aerial photographs, airborne and terrestrial laser scanning, UAV prospection, and field surveys, supplemented by CIA reports and Warsaw Pact military documents. These data bridge significant gaps in archival records, offering valuable insights into the history of these sites. However, the discovery of Cold War-era refuse dumps near the bases containing materials that do not conform to other evidence present an interpretative challenge. It exposed 'survivorship bias' in the dataset, prompting a re-evaluation of earlier conclusions.*

**Keywords:** Cold War, conflict archaeology, garbology, archaeological remote sensing, survivorship bias, Soviet tactical nuclear bases

## INTRODUCTION

The archaeology of the contemporary (or recent) past is a relatively broad and inspiring field of research that encompasses a diverse range of cultural phenomena (e.g. Saunders, 2003, 2010; Schofield, 2005; Schofield & Cocroft, 2007; Harrison & Schofield, 2010; Harrison, 2011; González-Ruibal, 2014). Prominent areas of exploration include modern ruins, abandoned military structures, graffiti, kitsch, furniture, interior decoration, scrapyards, refuse dumps, and even human-made objects left in space, such as decommissioned spy satellites, probes, or lunar landing sites (e.g. Buchli & Lucas, 2001; Rathje & Murphy, 2001; Olsen, 2003; Burström, 2008, 2011;

Capelotti, 2010; Gorman, 2016; Kiarszys, 2019a). Another important field of study is the archaeology of modern conflicts, which investigates battlefields, war crimes, and political, social, or ethnic conflicts, including those that did not escalate into open armed clashes (Burström, 2009a; Banks, 2011; Carr, 2016; Kobińska et al., 2017, 2024; Zalewska & Kiarszys, 2021; Kiarszys & Dzikowski, 2024).

Decaying everyday objects from the recent past have the power to evoke emotions, stimulate memories, and provoke reflection on a changing world, acting as tangible evidence of the passage of time within our lifetimes (Burström, 2009b: 140–41, 2011: 120). Mats Burström (2008: 29; 2009b: 140) observed that

artefacts can serve a mnemonic function, as their familiarity and intimate connection to vivid, personal memories 'make us remember and reflect about the past'. Furthermore, these seemingly mundane items can significantly alter interpretations of official historical documents, providing critical insights that enhance our understanding of the recent past. This article focuses primarily on exploring this latter aspect.

The case study presented here examines the material remains of abandoned Soviet tactical nuclear bases in Poland. The findings from remote sensing surveys conducted at these sites have been extensively discussed in earlier publications (Kierszys, 2019a, 2019b, 2024a, 2024b). Here, I delve into a previously unexplored topic: the interpretation of the contents of refuse dumps found within these former secret military sites. While my approach acknowledges the commonly discussed themes regarding 'garbology', such as social memory, emotions, everyday life and engagement with the material world, it diverges somewhat by adopting the general perspective applied by William Rathje in the Garbage Project (Rathje, 2001; Rathje & Murphy, 2001). Rathje used observations of rubbish ('garbage' in US English) to verify and critique other sources, such as interview surveys and reports, demonstrating that discrepancies in collected evidence may not result from deliberate manipulation but are often the outcome of cultural phenomena that can be understood through social or psychological factors.

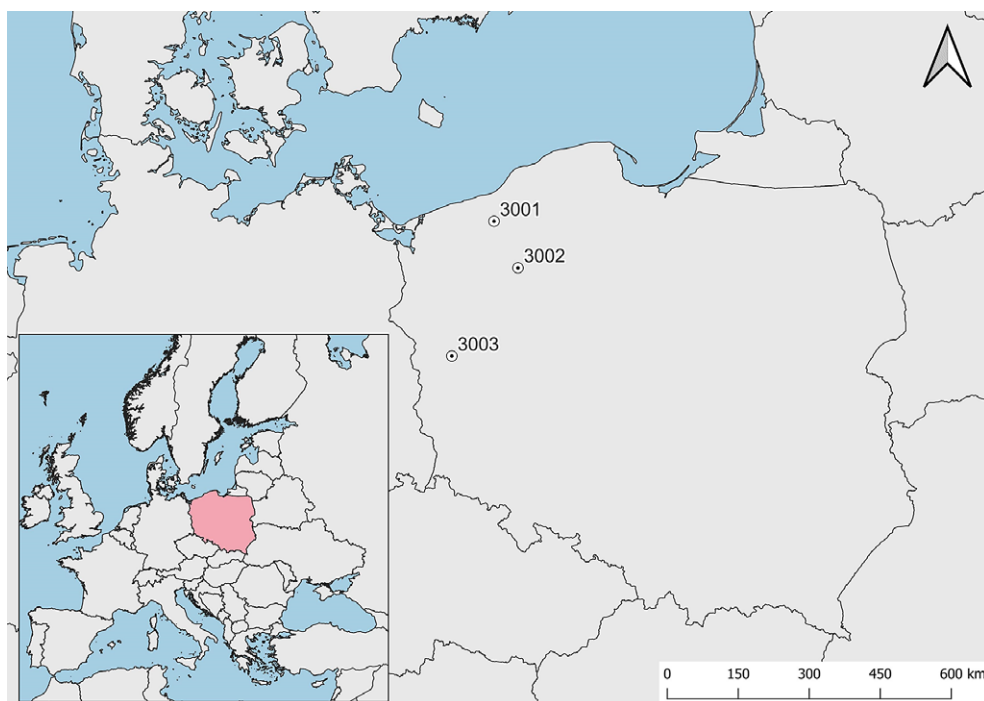
In the same vein, during my investigations of former Soviet nuclear bases, the contents of the rubbish dumps that were discovered contradicted certain statements found in declassified Warsaw Pact documents. This discrepancy highlights the limitations of written records and emphasizes the importance of material evidence for understanding the lived realities at these

sites. It also underscores how seemingly insignificant material evidence can prompt a reconsideration of carefully collected archaeological sources and a re-evaluation of previously formulated conclusions, thereby enriching our understanding of the past. Addressing such apparent contradictions often requires a critical examination of the methods and sources used and a shift in cognitive perspectives. To contextualize the reinterpretation processes, I introduce the concept of 'survivorship bias', i.e. drawing indiscriminating conclusions from incomplete datasets, a term popularized by Abraham Wald in the 1940s (see below).

#### PROJECT WISŁA: HISTORICAL BACKGROUND OF SOVIET TACTICAL NUCLEAR BASES IN POLAND

In February 1967, the construction of three Soviet tactical nuclear bases began in North-Western Poland, sanctioned under the codename Wisła (IPN BU 1405/324, 1966: 468–71). These facilities, termed 'objects', i.e. Object 3001 in Podborsko, Object 3002 in Brzeźnica Kolonia, and Object 3003 in Templewo (Figure 1), were erected by Polish engineering units based on a design supplied by the Soviets (IPN BU 1405/323, 1966; IPN BU 1405/322, 1967: 61–315; Kierszys, 2019a: 238–39). According to the Polish-Soviet agreement, their primary function was the long-term storage of nuclear warheads and unguided nuclear bombs intended for Polish missile units and military aviation.

In peacetime, Soviet forces maintained exclusive oversight of the bases. However, in the event of a European conflict, the warheads stored at these facilities were designated for transfer to Polish military units equipped with nuclear carriers. The construction of the bases was completed in December 1969, and all three facilities were



**Figure 1.** Locations of the Soviet tactical nuclear bases in Poland. Object 3001: Podborsko; Object 3002: Brzeźnica-Kolonia; Object 3003: Templewo.

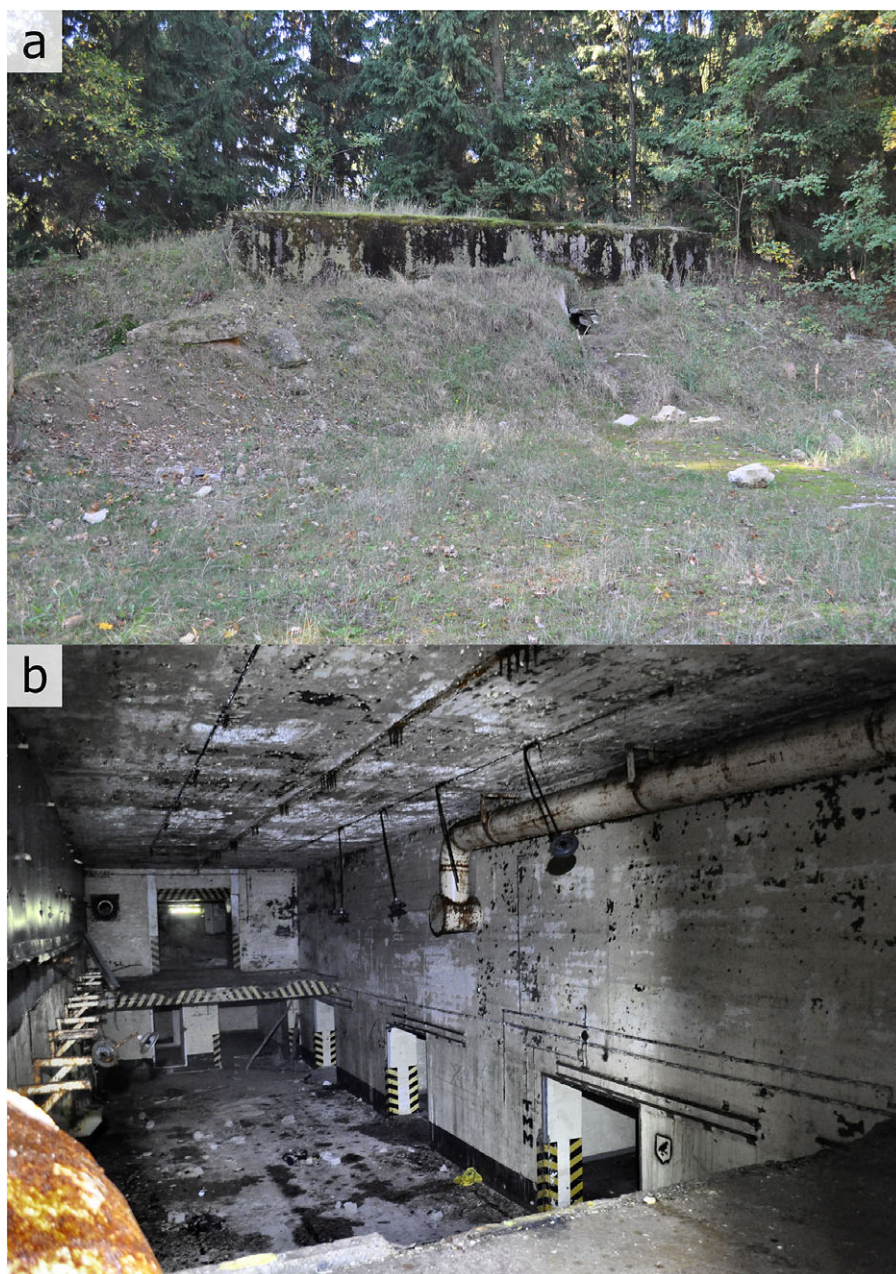
subsequently handed over to Soviet troops. Following this handover, the Polish archival record went silent for the next twenty-two years. It was not until October 1990, when the withdrawing Soviet forces abandoned the bases, that their existence re-entered the historical narrative (Kierszys, 2024b: 815). During the intervening period, Polish military officials were denied access to these heavily restricted sites, further shrouding their activities in secrecy.

The Wisła project files, housed in the archives of the Institute of National Remembrance and declassified in 2006, offer only a partial insight into the historical record (Kierszys, 2019b: 121). Key documents, such as construction schedules, engineering specifications, plans, maps, or blueprints are missing from the collection and hence detailed spatial information about the Wisła facilities remains elusive. This gap can be traced to a

directive issued in December 1969, which ordered the destruction of all documents containing sensitive information about the facilities (IPN BU 1405/322, 1967: 328). The rationale behind the selective removal of certain sources, leaving behind others—some highly informative—remains unknown.

Following the Soviet Army's departure in October 1990, two of the three Wisła sites (Objects 3002 in Brzeźnica-Kolonia and 3003 at Templewo) were almost entirely demolished at the behest of Polish authorities (Kierszys, 2019b: 207–11). The sites were demilitarized and entrusted to the Polish State Forests. What remains today are the most resilient, albeit plundered, structures, including T-7-type reinforced concrete warehouses (Figure 2), as well as other durable structures, field fortifications, and bunkers (Figure 3), roads, and the so-called 'Granit' buildings (warehouses





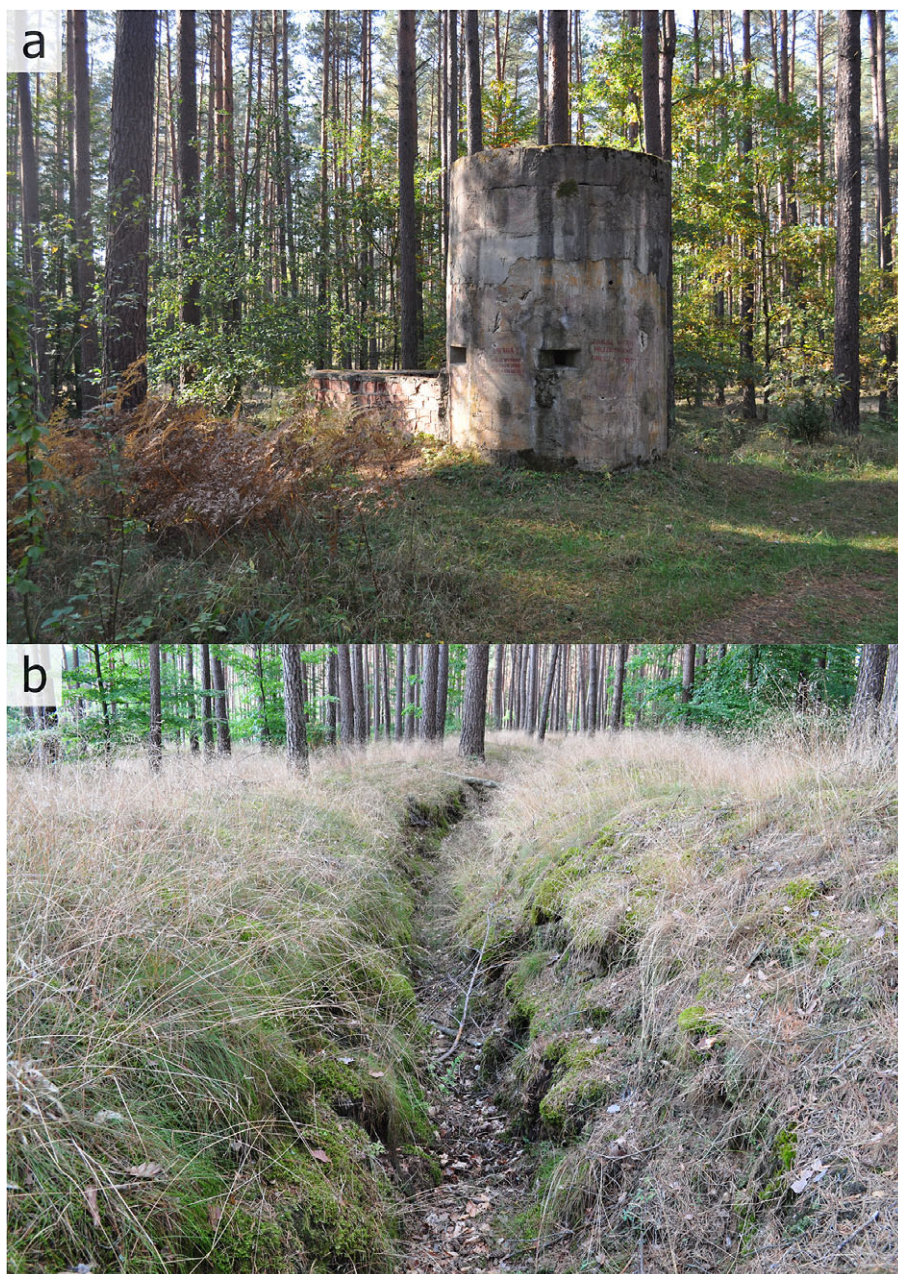
**Figure 2.** The plundered T-7 nuclear warehouses in Templewo (Object 3003). a) Main entrance to the warehouse; b) main hall of the T-7 building.

constructed of prefabricated concrete and covered by a thick layer of earth; Figure 4a) and numerous scattered artefacts.

The remote location and specialized design of these former nuclear bases rendered them

impractical for reuse. Adapting them for new purposes within the Polish Armed Forces or for civilian applications, such as storage facilities for food, weaponry, or hazardous materials, proved unfeasible. As was





**Figure 3.** Surviving elements of fortifications built to defend Brzeźnica-Kolonia (Object 3002). a) Concrete bunker; b) shooting trench.

frequently the case in Poland in the early 1990s, abandoned Soviet bases either lay disused, succumbing to decay, or, in rarer cases, were repurposed into civilian residential areas.

Among the three nuclear facilities, only base 3001 at Podborsko remains relatively intact. Initially serving as a backup command and control centre for the Polish Navy, the former garrison was eventually



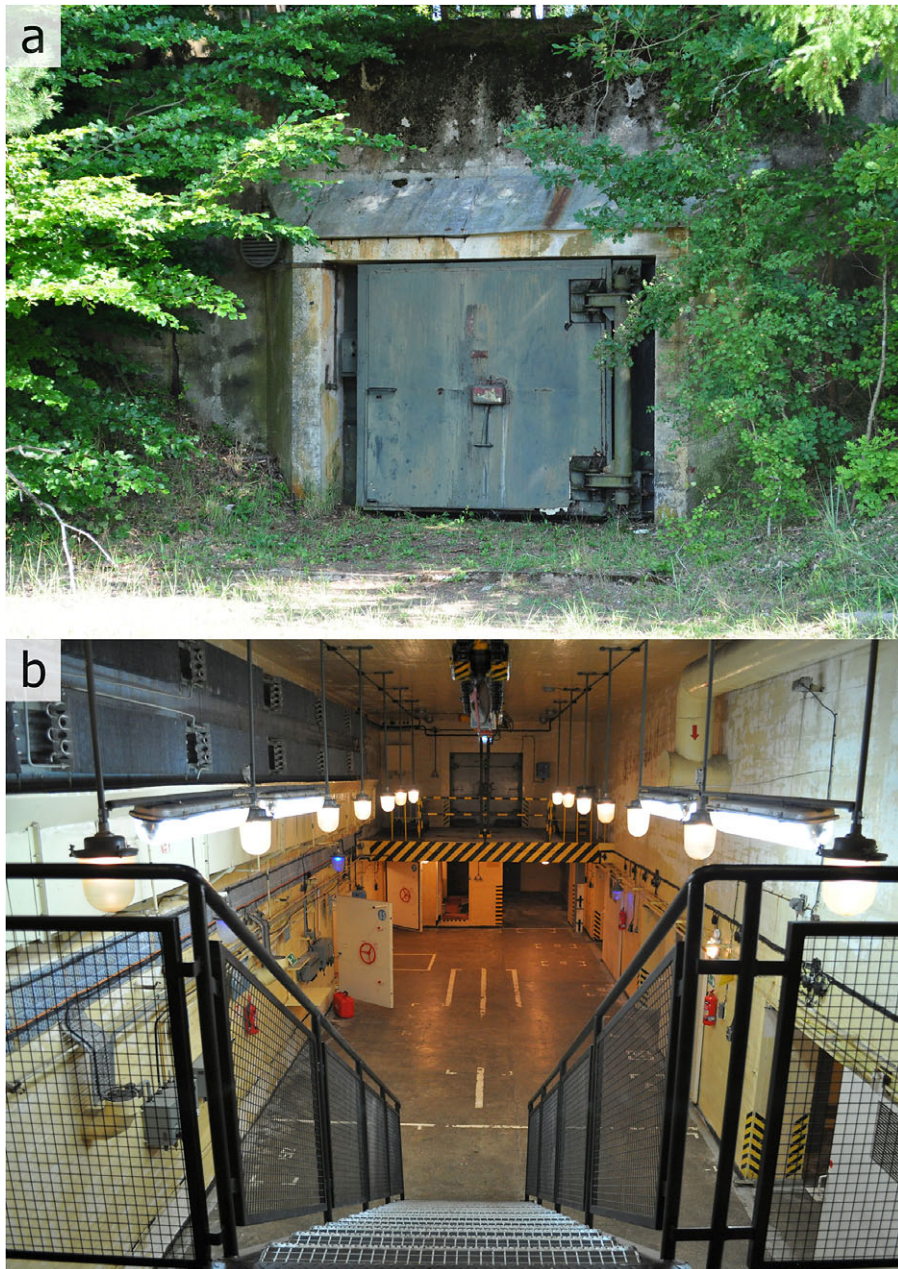
demilitarized and transformed into the State Detention Centre of Dobrowo. Presently, a section of the base housing two well-preserved T-7 nuclear warehouses

and a Granit-type shelter is accessible to the public as part of the Cold War Museum, a branch of the Museum of Polish Arms in Kołobrzeg (Figures 4b & 5).



**Figure 4.** a) Partially destroyed 'Granit' building at Brzeźnica-Kolonia (Object 3002); b) a well-preserved 'Granit' building at the Cold War Museum in Podborsko (Object 3001).





**Figure 5.** Cold War Museum in Podborsko (Object 3001). a) Entrance to the preserved T-7 nuclear warehouse; (b) main hall.

#### REMOTE SENSING OF COLD WAR LANDSCAPES

Diverse non-invasive methods were employed to document remnants of the former Soviet

nuclear bases, including declassified CIA satellite imagery (CORONA and HEXAGON), airborne and terrestrial laser scanning (ALS and TLS), unmanned airborne vehicle (UAV) photographs, structure from

motion (SfM) modelling, historical aerial photographs, and fieldwalking (Kierszys, 2019a: 237, 249–51).

The primary objectives of the analyses and surveys were to draw up comprehensive plans of the facilities examined and decipher their spatial arrangements. Declassified CIA satellite images were crucial for examining landscape alterations not documented in Polish archives (Figure 6). ALS data facilitated the detection and documentation of concealed installations such as trenches, defensive positions, bunkers, and security zone layouts (Figure 7a). Terrestrial laser scans of the well-preserved T-7 and Granit warehouses in Podborsko (base 3001) revealed aspects of their engineering. Historical aerial photographs, taken after demilitarization in 1995, offered insights into facilities at different stages of decay (Figures 6d & 7b). Functional interpretations of structures relied on the Wisła files and interviews with military specialists and Polish soldiers who served in the nuclear bases after the Soviet troops' withdrawal. SfM modelling from UAV images captured finer features like concrete bunkers and field fortifications (Kierszys, 2019b).

The analysis of the remote sensing data concluded that all three nuclear facilities shared similar organizational structures with identical elements (Figure 7a). Each comprised three key zones: 1) a restricted zone housing nuclear warheads in two T-7 warehouses; 2) a barracks zone accommodating officers' and soldiers' quarters, warehouses, mess hall, cinema, infirmary, and ancillary structures; 3) a parking zone housing garages for warhead transport trucks. Variations in spatial layouts among the Wisła bases were due to differences in local topography (Kierszys, 2019a: 239–48).

Over their twenty-two years of operation, uniform development was observed across the facilities. Each base saw the construction of a new, large Granit-type concrete shelter

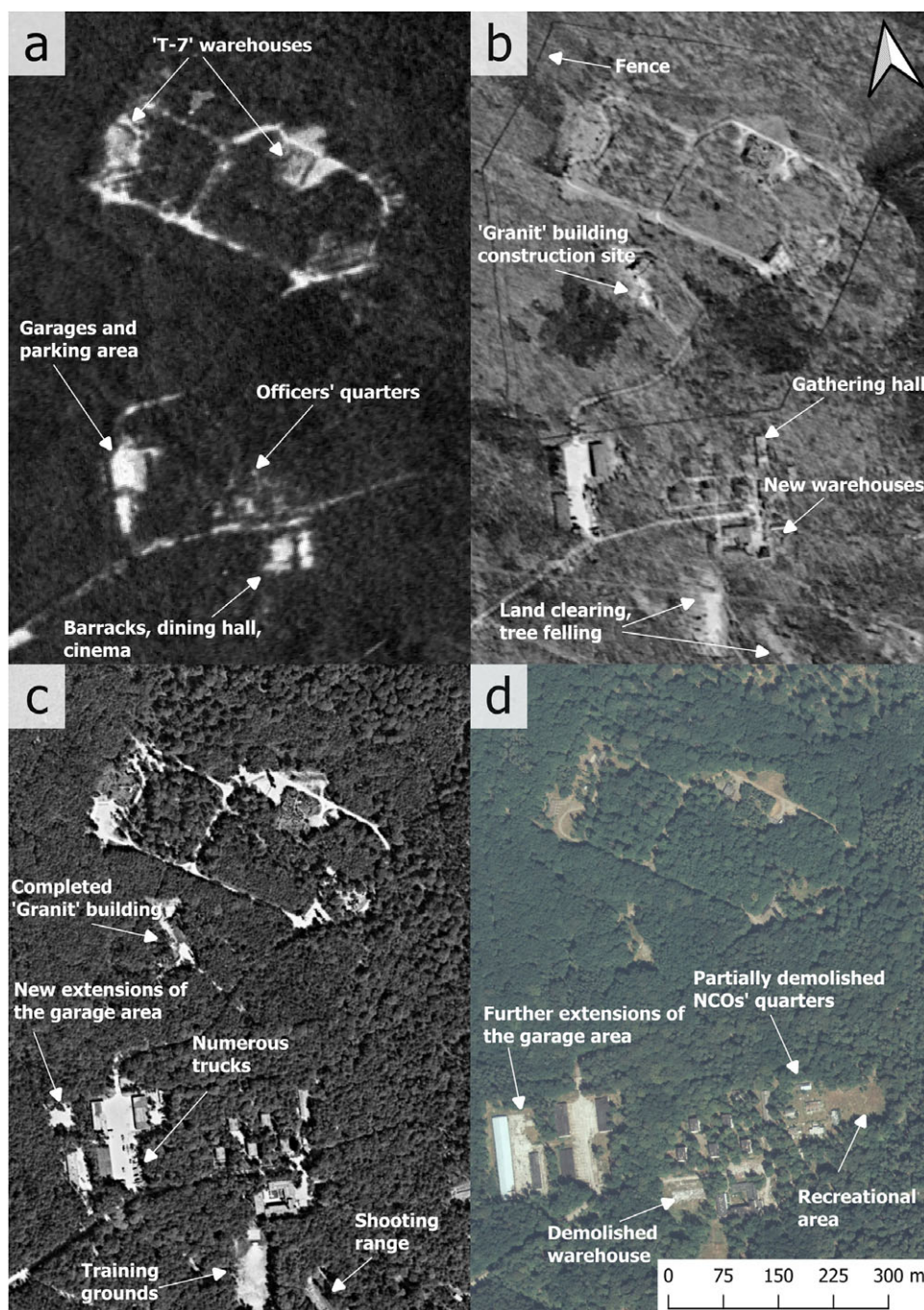
within restricted zones, alongside additional quarters, meeting halls, warehouses, and expanded parking zones with new garages (Figures 6 & 7). ALS derivatives documented intensive fortification works surrounding the bases, including such subtle features as eroded patrolling paths leading to disguised observation points outside the bases. Military expertise facilitated the interpretation of surviving field fortification systems, elucidating the sites' protection strategies against potential assault or unauthorized surveillance. The intricate network of fences, gates, dirt tracks, and concealed shelters for trucks shed light on emergency nuclear warhead evacuation procedures, among other military and spatial organizational aspects. All these findings have been discussed in detail in earlier publications (Kierszys, 2019a, 2019b, 2024a, 2024b).

The wealth of the evidence collected significantly bridges gaps in archival records, providing insights not available in historical documents. However, this vast trove of data may create an illusion that the topic has been comprehensively explored, potentially leading to an inclination towards survivorship bias. While the narrative derived from these detailed analyses appears comprehensive, it is, in some instances, also superficial, as it lacks a crucial component: the daily lives and experiences of the soldiers and officers inhabiting these secretive compounds, the main actors in this drama.

### SURVIVORSHIP BIAS AND THE ARCHAEOLOGICAL RECORD

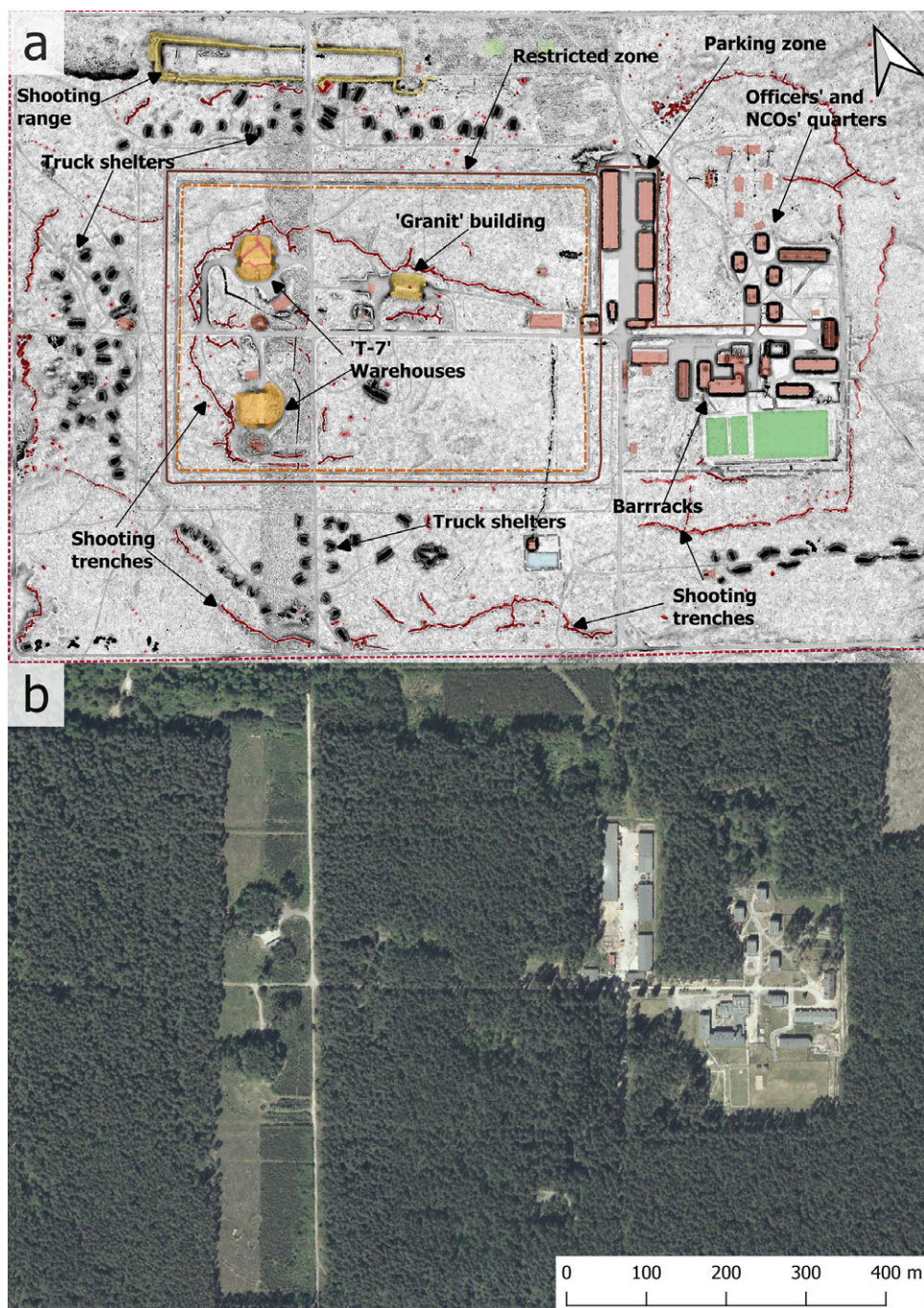
The idea of survivorship bias goes back to ancient times but gained prominence in modern scientific discourse through the works of Abraham Wald (1902–1950), a Hungarian mathematician who completed his PhD at Vienna University. Following the *Anschluss* of Austria in 1938, he sought





**Figure 6.** The Templewo (Object 3003) nuclear base across time. a) CORONA satellite image, 27 July 1969; b) HEXAGON satellite image, 10 April 1979; c) HEXAGON satellite image, 1 June 1982 (latest declassified imagery); d) the Templewo base in a vertical aerial photograph taken before its demolition, 12 August 1995 (a–c: data courtesy of the US Geological Survey; d: Head Office of Geodesy and Cartography (GUGiK), Warsaw).





**Figure 7.** Base at Podborsko (Object 3001). a) Sky View Factor from ALS with superimposed interpretations and descriptions of selected structures; b) aerial photograph in 2017 of the former base. Original Soviet buildings are visible in the eastern part, currently serving as the state detention centre 'Dobrowo'. In the western part, two T-7 type warehouses, which are now part of the Cold War Museum, can be seen (a & b: data courtesy of the Head Office of Geodesy and Cartography (GUGiK), Warsaw).



refuge in the United States of America (Morgenstern, 1951: 361–64; Wolfowitz, 1952). When the United States entered World War II, Wald joined the Statistical Research Group at Columbia University, where he worked on military-related problems to support the war effort (Mangel & Samaniego, 1984: 259).

During this period, the US Navy documented the damage sustained by aircraft returning from combat missions. Based on this evidence, analysts recommended reinforcing the sections of warplanes that were most frequently damaged by enemy fire. Despite this intuitive strategy, there was no discernible increase in the survival of the crews. Wald challenged this approach, identifying it as flawed due to incomplete data. He observed that certain aircraft sections (engines, cockpits, or supporting wing elements) appeared unusually intact in the records. He reasoned that a statistical factor had been overlooked, as the damage should have been more evenly distributed across the fuselage. This observation led to the important realization that the dataset only included planes that returned from missions, neglecting those critically damaged and lost at sea. Consequently, the Navy's records predominantly catalogued minor damage that did not lead to plane loss. Wald's proposal recommended reinforcing the fuselage sections that appeared 'undamaged' in the dataset. These areas were crucial for aircraft survival, as the planes hit in these sections were unlikely to return, challenging prior assumptions about where reinforcement was most needed (Mangel & Samaniego, 1984: 260–67). This case underscores how critical perspectives can radically alter interpretations of the same dataset, even contradicting earlier conclusions that seemed well-founded and highly convincing.

Survivorship bias involves drawing uncritical and inductive conclusions from incomplete datasets without acknowledging their

inherent flaws. Its impact on archaeological landscape studies reliant on remote sensing is significant. The abundance of evidence from modern remote sensing techniques often fosters a misleading belief in the completeness of the data. This illusion can lead scholars to assume naively that all necessary elements for constructing narratives are within the collected data, overlooking the need for theoretical knowledge or supplementary evidence. The sheer detail and volume of data might suggest self-explanation, diverting attention from cognitive limitations. This corroborates David Cowley's observation that 'the enthusiasm of some archaeologists leads them to jump directly from an observed distribution of archaeological data to an interpretation, without due consideration of the influence of data collection strategies and of transformations in the landscape caused by ancient and modern land use' (Cowley, 2016: 148). Every archaeological record inherently carries survivorship biases, selectively registering certain phenomena while omitting others. These biases shape the dataset, influencing what is visible to researchers and what remains hidden, often requiring critical examination to uncover the missing elements. This observation also pertains to other types of sources. Indeed, historical documents are often regarded as trustworthy, but their relevance may be confined to a specific period, and they frequently present a one-sided perspective.

The interpretative problems caused by biases inherent in archaeological records are a frequent subject of critical scientific publications (e.g. Hanson, 2005; Wilson, 2005; Cowley, 2013a, 2016; Cowley et al., 2020; Davis et al., 2020). Some of these works focus on landscape archaeology and archaeological remote sensing, highlighting the origins of such biases, be they rooted in the terminology used, an overly reductive intellectual framework, inadequate survey strategies, or the often unrecognized limitations of applied

field prospection methods. Biases can also arise from processes beyond the control of researchers, e.g. due to formation processes. Similar issues have been observed in other related fields, such as palaeodemography, archaeobotany, physical anthropology, political sciences and more (see e.g. Paine & Harpending, 1998; Castillo, 2019). In historical and political studies, survivorship bias is also often discussed in the context of research relying on statistical methods (Wand, 2024). It also appears in discussions concerning critical approaches to written sources. Overcoming some of these concerns calls for a 'source-critical' approach, reflection on survey practices, and comparison of various types of sources to identify biases (Cowley, 2016: 150).

Engaging with archaeological records should go beyond merely observing and describing empirical evidence; it requires a continuous effort to identify interpretative gaps and address survivorship biases. This approach fosters a more nuanced and comprehensive understanding of the past by accounting for both the presence and the absence of data, whether these gaps result from destructive formation processes, methodological constraints, technical limitations of the applied methods, or overly reductionist theoretical frameworks.

### COLD WAR REFUSE DUMPS

A notable instance of survivorship bias became evident in the unexpected results of the field surveys I conducted at the Wisła bases. The discovery of seemingly minor artefacts prompted a significant re-evaluation of earlier interpretations (see Baraniuk, 2022).

The primary goal of the field survey was to examine locations associated with demolished structures, preserved field fortifications, and other features identified through ALS and satellite images. During these surveys, features undetectable by

remote sensing techniques were uncovered—specifically numerous refuse dumps located just outside the three bases (Figure 8). The contents of these dumps posed a challenge, as some elements appeared incongruous within the context of other known sources. Alongside fragments of Soviet uniforms with missile and artillery unit insignia, military boots, gold-coloured buttons featuring the hammer and sickle motif, military berets, gas masks, broken plates, cans, and alcohol bottles (Figure 9), more unexpected items were found: children's boots and clothes, plastic toy fragments, women's shoes, and other civilian female clothing (Figure 10).

The origin of these civilian items raised intriguing questions: how did they end up in a strictly controlled military environment? Available declassified Cold War documents from the Wisła files made no reference to officers' families residing on the premises. Indeed, the official policy, for counterintelligence purposes and due to limited housing availability, recommended that all wives and children live in larger Soviet garrisons away from the nuclear facilities (IPN BU 1405/323, 1966: 9). This discrepancy between the historical sources and the material evidence challenges the credibility of the official documentation and invites further inquiry into the lived realities of these bases.

Following the discovery of the Soviet refuse dumps, another valuable source emerged to corroborate the hypothesis that officers' wives and children lived permanently within the Wisła bases. An online military forum for former Soviet Army veterans ([www.sgv.su](http://www.sgv.su)) featured discussions and photographs shared by soldiers who had been stationed at these nuclear facilities. Most strikingly, numerous photographs depicted children actively participating in national holiday celebrations. The content of this website was analysed in more detail in a recent publication (Kierszys, 2024b).





**Figure 8.** *The large refuse dump at Templewo (Object 3001).*

While the photographs published online notably avoided showing restricted zones where nuclear warheads were stored, they offered a detailed portrayal of everyday life within the barracks. These visual and anecdotal accounts provided context for the civilian artefacts uncovered during the field surveys, such as children's toys and women's clothing. This 'netnographic' source significantly expanded and refined the understanding of life at the Wisła bases, challenging earlier conclusions based solely on official archival documents and the analysis of remote sensing techniques.

#### REINTERPRETING THE SOCIAL MICROCOSM OF SOVIET NUCLEAR BASES

A prevailing contemporary notion of Soviet nuclear bases, shaped by popular culture and historical narratives, sees these sites as exclusive enclaves, strictly inhabited

by carefully selected professional military personnel. However, this perception diverges sharply from the material evidence uncovered at such locations. This idealized image of a 'model' Soviet nuclear base, while compelling, is fundamentally flawed. As McWilliams (2013: 209–12) has noted, the archaeology of the Cold War involves an ongoing engagement with metaphors shaped by popular culture, while uncovering material artefacts that challenge these narratives.

Reinterpreting Soviet tactical nuclear bases indicates that they functioned as social microcosms, encompassing officers, non-commissioned officers, their families, and conscripted young soldiers. The senior specialists responsible for the storage of atomic weapons were obligated to serve extended five-year terms at the base. Prolonged separation from their families posed significant risks to morale and order. To address this, the Soviet command eventually





**Figure 9.** A selection of the mainly 'military' content of the refuse dumps discovered at Templewo (a, b, e) and Podborsko (c, d). a) Piece of uniform with a gold-coloured button featuring the hammer and sickle motif; b) gas mask; c) military berets, alcohol bottles, tin of spam, children's winter boots; d) military hobnailed boot; e) pieces of uniforms and belt, a chess piece (queen).





**Figure 10.** A selection of the mainly 'civilian' content of the refuse dumps at Templewo. a) Child's shoe, ceramic kettle, plastic inkwell, elements of a plastic gun, and a doll; b) over-the-knee boot and small-sized running shoe; c) pieces of plastic toys and poster paints; d) children's winter boots, a torn trouser leg from a military chemical protective suit, torn uniform with two buttons featuring the hammer and sickle, and a broken plate.

allowed officers to reside with their families within the confines of the military complexes, integrating spouses and children into the social fabric of the bases. This policy was implemented only after the construction of the facilities had been completed, thus leaving no traces in Polish archival records.

The presence of families caused subtle yet significant spatial changes within the bases. These adjustments could not be easily discerned through remote sensing techniques. Notably, closer inspection revealed that each of the bases contained a building that served as a kindergarten and primary school, which had previously been interpreted as living quarters. An ordinary family space also organically expanded within these top-secret sites. Military wives cultivated vegetable and flower gardens and planted orchards. A tall wooden fence was erected between the officers' quarters and the service zone to ensure the safety of children and to separate the place of work from the family space. These transformations were detected in all three nuclear bases. Some remnants of this process persist to the present day, such as apple trees and roses growing in forests where the bases once stood, as well as fragments of fences and the foundations of demolished structures.

All these mundane, often symbolic features, which some may consider secondary to the topic under study, would remain unnoticed without prior knowledge of a survivorship bias. Bridging the cognitive gaps through the discovery of refuse dumps enhanced the understanding of the social context in which the bases operated. While military families are absent from declassified documentation, the tangible evidence of their presence is undeniable. Recognizing this provided essential context for interpreting other enigmatic features uncovered during the archaeological surveys, offering new insights into the lived realities. This conclusion aligns with Burström's (2008: 27)

observation that archaeology can, in some cases, provide material evidence linked to specific groups of people omitted from official records.

## CONCLUSIONS

Over seventy years ago, O.G.S. Crawford (1953) coined the idea of the 'landscape palimpsest' to capture the wealth of archaeological remains revealed by aerial photography. The concept of palimpsest (a support for writing that could be reused multiple times by erasing earlier texts and writing new ones) has been used metaphorically for the Earth's surface, which has been transformed repeatedly by past societies. At the time, this term was understood in literal terms as a tangible phenomenon consisting of petrified material traces of the past, forming palimpsest-like assemblages that could be photographed from the air, mapped, and explained. Similar views were shared among other scholars of that period. For example, Paul Kosok characterized aerial photography as a 'wonderful tool in reconstructing the past' that allows 'almost at a glance, a comprehensive and dramatic picture of the archaeological remains' (Kosok, 1965: 39–48).

Although the aerial, God-like perspective was later criticized as artificial, lacking sociocultural context and devoid of an understanding of everyday human practices (e.g. VanValkenburgh & Dufton, 2020: S1–S2), the belief in the objectivity of remote sensing techniques remains strong in contemporary archaeological practice. It is especially prominent today; for example in the context of remote sensing, big data analysis, and the frequent calls for 'data-driven analysis' and the use of empirical (and inductive) classification methods (e.g. Bevan, 2015: 1477).

The practical approach to remote sensing techniques in archaeology often takes the

form of a random amalgamation of borrowed ideas, influenced more by shifting trends and the emergence of new techniques than by deliberate methodological choices (Cowley, 2013b: 18). The rapidly growing potential of prospection methods, along with their compelling ways of presenting results, creates the illusion of being self-explanatory (Rączkowski, 2020: 15–17). This has led to the common belief that more data results in better research, contributing to a richer and more complete reconstruction of the past (e.g. Opitz & Herrmann, 2018: 26–30).

The case study presented here aimed to demonstrate how interpretations of the same archaeological dataset can evolve with the emergence of new knowledge and the application of critical approaches, prompting the re-evaluation of earlier conclusions. As new knowledge emerges, it creates opportunities to ask fresh research questions or re-examine previously studied phenomena from alternative perspectives. This process allows for the formulation of novel conclusions, even from archaeological sources that have already been extensively analysed. In contemporary humanities, this aligns with the concept of the hermeneutic circle, developed by the philosopher Martin Heidegger (see e.g. Warnke, 2011). In our case, contrary to popular perception, the accumulation of data and the use of advanced digital prospection methods do not inherently signify progress in understanding the past. Archaeological sources remain silent until interpreted and narrated. This aligns with the biologist and philosopher Ludwik Fleck's assertion that, 'to see, one must first know' (Fleck, 1947, 1979; see Peine, 2011: 493–94), as interpretation is an intricate cognitive process reliant on our heuristic abilities (Rączkowski, 2020: 13).

In the present case study, the main flaw of the sources analysed was the incoherence caused by survivorship bias, which challenged previous conclusions. In archaeology, such a

situation occurs when the results of various methods are critically integrated (e.g. Cowley, 2016: 167). William Rathje (2001: 64–65) observed that it is common practice to verify previously obtained results by repeating the survey with the same methods. However, this approach does not necessarily yield more trustworthy data, as the biases inherent in the original survey are likely to be replicated. Therefore, a critical approach requires shifting the cognitive perspective and confronting previously formulated conclusions with new evidence obtained from alternative sources or by other methods. While Rathje's conclusion was originally formulated in the context of contemporary studies on food consumption and waste disposal, it is relevant to archaeology. In other words, while new-generation remote sensing devices can provide more accurate, high-resolution data, which is undoubtedly valuable, they are not without bias. Thus, it is necessary to integrate results from various methods that capture different aspects of both material and intangible heritage. Consequently, any interpretation of archaeological records remains perpetually open-ended and non-linear (Burström, 2008: 22), requiring us to revisit and compare previously examined sources.

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## COMPETING INTERESTS

The author declares none.

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## BIOGRAPHICAL NOTE

Grzegorz Kiarszys (PhD, 2010, Szczecin University) is an associate professor of archaeology at the Institute of History, Szczecin University, Poland. His main research interests are conflict archaeology, archaeological remote sensing, landscape archaeology, GIS analysis, and archaeological methodology. In recent years Kiarszys has published papers and monographs on the archaeology of twentieth-century military conflicts.

*Address:* Department of Archaeology, Institute of History, University of Szczecin, Krakowska 71-79, 71-017 Szczecin, Poland. [email: [grzegorz.kiarszys@usz.edu.pl](mailto:grzegorz.kiarszys@usz.edu.pl)]. ORCID: 0000-0001-5304-7409.

## Préconceptions et paysages du passé : les dépotoirs de trois bases nucléaires soviétiques abandonnées datant de la guerre froide en Pologne

*Cet article concerne l'interprétation de dépotoirs découverts sur trois bases nucléaires tactiques soviétiques abandonnées en Pologne. Leur analyse suggère qu'une réévaluation des résultats de la télédétection archéologique est indiquée. Les recherches ont fait appel à diverses méthodes pour documenter ce qu'il restait de ces sites secrets, telles que l'examen d'images de satellite d'espionnage déclassifiées, de photographies aériennes, de balayages laser aéroportés et terrestres, de prospections par drone et de relevés sur le terrain, ainsi que la lecture de rapports de la CIA et de documents militaires du Pacte de Varsovie. Ces données comblent d'importantes lacunes dans les archives et offrent un éclairage précieux sur l'histoire de ces sites. La découverte de dépotoirs datant de la guerre froide à proximité des bases, contenant un mobilier non conforme à ce que l'on pouvait s'attendre, remettent nos interprétations en question. Ils exposent un biais de sélection (survivorship bias) qui invite à une reconsidération de nos conceptions antérieures.*

*Mots-clés:* guerre froide, archéologie des conflits, étude des déchets, télédétection archéologique, biais de sélection, bases nucléaires tactiques soviétiques

## Voreingenommenheit und vergangene Landschaften: Abfalldeponien auf verlassenen sowjetischen Atomwaffenstützpunkten aus der Zeit des Kalten Kriegs in Polen

*Dieser Artikel betrifft die Interpretation von Abfalldeponien, die auf drei verlassenen sowjetischen Atomwaffenstützpunkten in Polen entdeckt wurden, deren Untersuchung zu einer Neubewertung der*



*archäologischen Fernerkundungsergebnisse geführt hat. Verschiedene Methoden, wie die Bearbeitung von deklassifizierten Spionage-Satellitenbilder, Luftaufnahmen, luft- und bodengestützte Laserscans, Prospektionen mit unbenannten Luftfahrzeugen (UAV) und Geländeaufnahmen sowie die Auswertung von CIA-Berichten und Militärdokumenten des Warschauer Pakts wurden eingesetzt, um die Überreste dieser geheimen Anlagen zu dokumentieren. Diese Daten schließen erhebliche Lücken im Archivmaterial und bieten wertvolle Einblicke in die Geschichte dieser Einrichtungen. Die Entdeckung von Abfalldeponien aus der Zeit des Kalten Krieges in der Nähe der Atomwaffenstützpunkte, die nicht erwartungsgemäßes Material enthielten, stellen unsere bisherigen Interpretationen infrage. Dies offenbarte eine „Überlebenden-Verzerrung“ (survivorship bias) im Datenset, welche eine Neubewertung früherer Schlussfolgerungen ergab.*

*Stichworte:* Kalter Krieg, Konfliktarchäologie, Müllarchäologie, archäologische Fernerkundung, Überlebenden-Verzerrung, sowjetische Atomwaffenstützpunkte