

Strongholds of the south-eastern Greater Poland: a regional non-invasive survey

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Abstract

The aim of the project was an inventory of strongholds in SE Greater Poland. Datasets included archive queries, remote sensing data and geophysical surveys. Two aerial surveys were carried out, numerous sites were recorded. Magnetic prospection was conducted for seven sites. For most of the sites prospection provided very suggestive results.

Keywords

aerial survey; Greater Poland; magnetic prospection; regional studies; strongholds

Introduction

The south-eastern Greater Poland belongs to the regions that are outstandingly rich in relics of prehistoric and medieval fortified sites. The oldest ones are commonly connected with communities of the Lusatian Urnfield culture of the Early Iron Age; these are just a few features of very diversified dimensions and constructions. The most numerous group consists of single- and double-ringed forts constructed during the early reign of the Piast dynasty at the turn of the 10th and 11th centuries AD that constituted a well-developed system of chokepoints. Younger defensive structures are represented by late medieval and early modern knights' seats in the motte castle type, some of which took the form of motte-and-bailey (Teske 2000).

In 2019, a project of a detailed inventory of strongholds in SE Greater Poland was initiated. The action had two key objectives: (i) to satisfy basic research needs, collect the data about form and structure of the strongholds, building materials used for their construction, and patterns of use of space within the fortifications and in their vicinity; (ii) to complete documentation for conservation and preservation including, among others, record and assessment of sites' condition and factors threatening their preservation.

The focal area was delimited to the administrative boundaries of eight districts, with over one hundred fortified features already recorded within the area (Fig. 1A).

Presuming systematic character of the works and possible extension of the agenda in the forthcoming seasons, the surveys were initially limited to two neighboring districts of Pleszew and Ostrów Wielkopolski, and only in 2020 expanded onto another one (Krotoszyn county).

Methods

The scenario was to complete exclusively non-invasive actions involving archive queries, analyses of remote sensing data, and geophysical surveys.

The analyses of remote sensing data started from products available as web services that could be directly linked to in QGIS. Satellite imaging of Google Earth as well as aerial orthophoto maps and hillshade visualizations based on airborne laser scanning (ALS) provided by National Geodetic and Cartographic Resource as web map services were used. Kilometer after kilometer, we went through the digital data marking and describing different types of anthropogenic structures (not only fortifications). Already a cursory survey revealed that the overall number of earthworks is much higher than presumed. It yielded another few dozens of spots that called for field verification. For each fortification feature, there were obtained sequences of archival aerial photographs as well as clouds of points

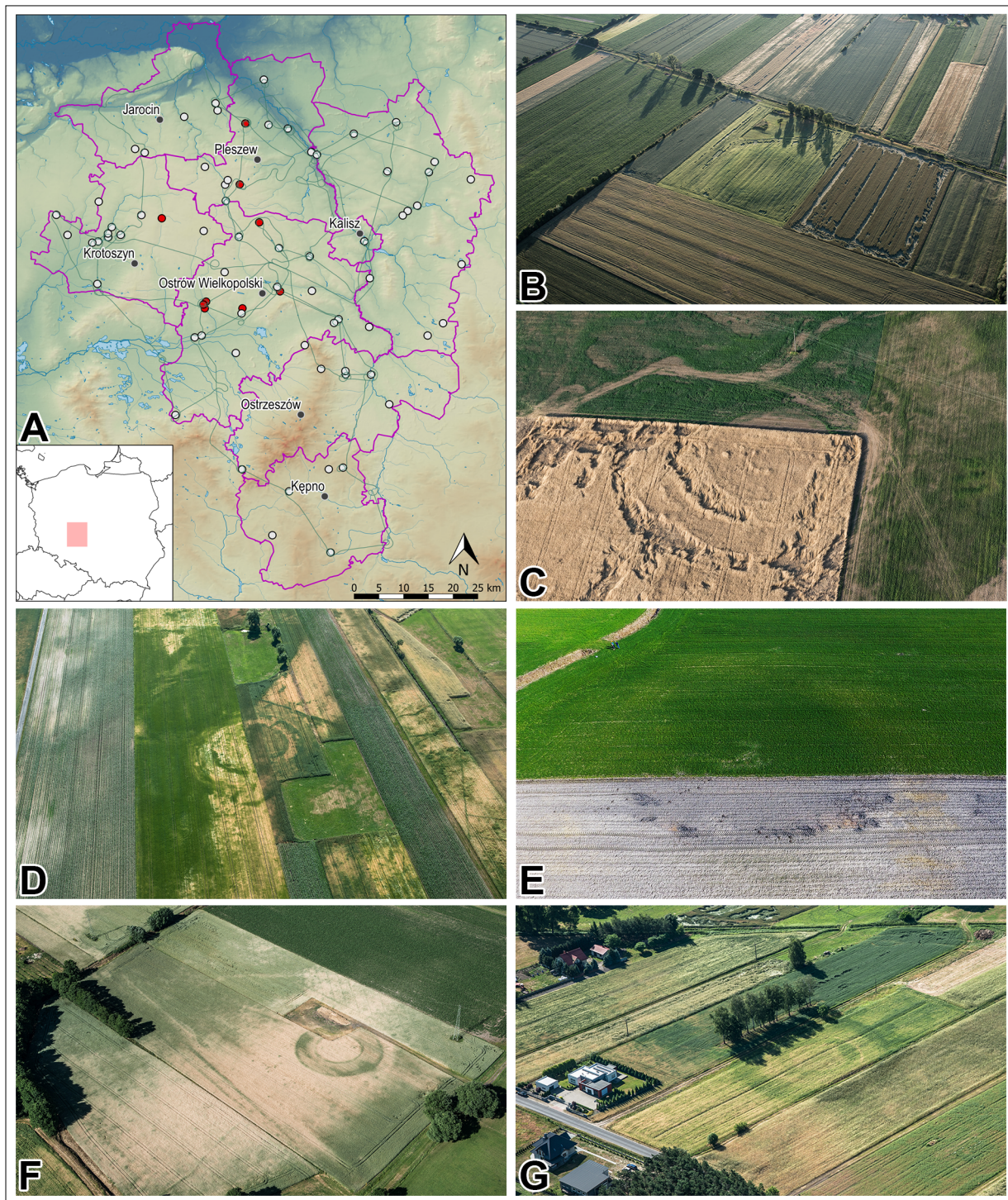


Fig. 1: Study area. White points indicate strongholds, red dots mark surveyed ones. The green lines mark the flight routes. Aerial photos taken in 2019: (B) Taczanów Drugi, (C) Lisewo, (D) Chlewo, (E) Grudzielec, (F) Ostrów Wielkopolski-Krępa, (G) Topola Wielka (base map: hillshaded DTM based on National Geodetic and Cartographic Resource datasets).

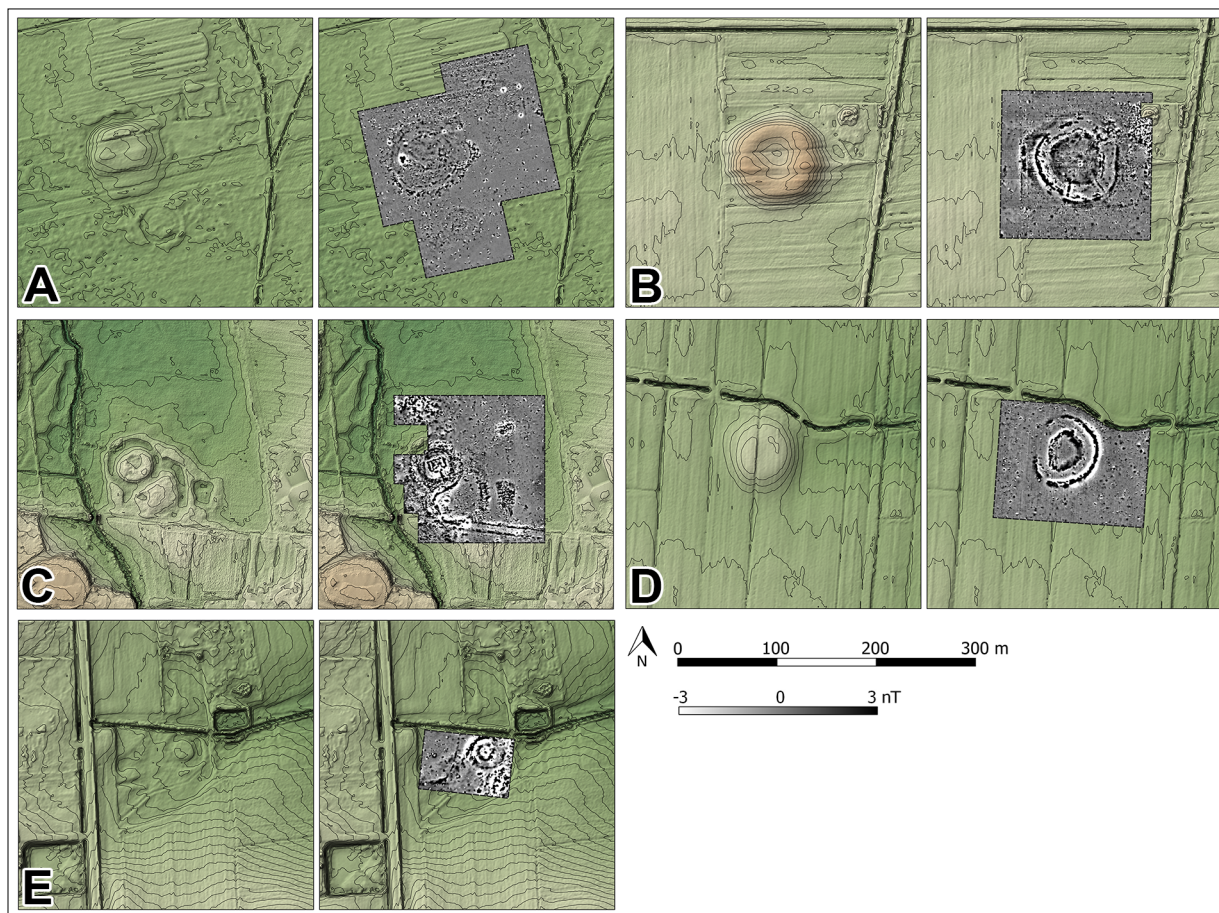


Fig. 2: Magnetic survey results: (A) Nabyszyce, (B) Taczanów Drugi, (C) Rozdrażew, (D) Grudzielec, (E) Czermin (base map: hill-shaded DTM based on National Geodetic and Cartographic Resource datasets).

from ALS, which were then reclassified and visualized with the use of different algorithms.

Aerial surveys were made twice – in June and July 2019, during a strong drought, which made it more likely to detect vegetation marks, generally manifesting themselves rather poorly in the region (Fig. 1). Altogether 25 strongholds and a number of sites of different character were documented. Better visibility of flat sites and earthworks with no longer distinguishable above-ground parts was noticeable.

Monitoring of the sites made with the use of a drone was an important addition to the aerial survey. It allowed for repeated visits to selected places and their documentation in varying conditions and at different vegetation stages. Detailed photogrammetric models and orthophoto maps were made for chosen sites. The latter data precisely documented up-to-date topography, which was then compared with ALS data obtained a few years earlier or with

older contour maps. This way, a process of erosion of terrain features could often be noticed even within a short period of time.

Seven features were chosen for magnetic prospection. All of them were localized in open areas intensely used for agricultural purposes, and thus subject to plough damage. The surveys were done with the use of Bartington Grad 601-2 fluxgate gradiometer. The undertaken actions were aimed, among others, at assessing the current condition of the relics and the dynamics of their degradation.

Results

The five investigated sites were present in the Polish Archaeological Record. Moreover, some of them have been already excavated. New data on the actual localization of defensive features or materials used for their construction

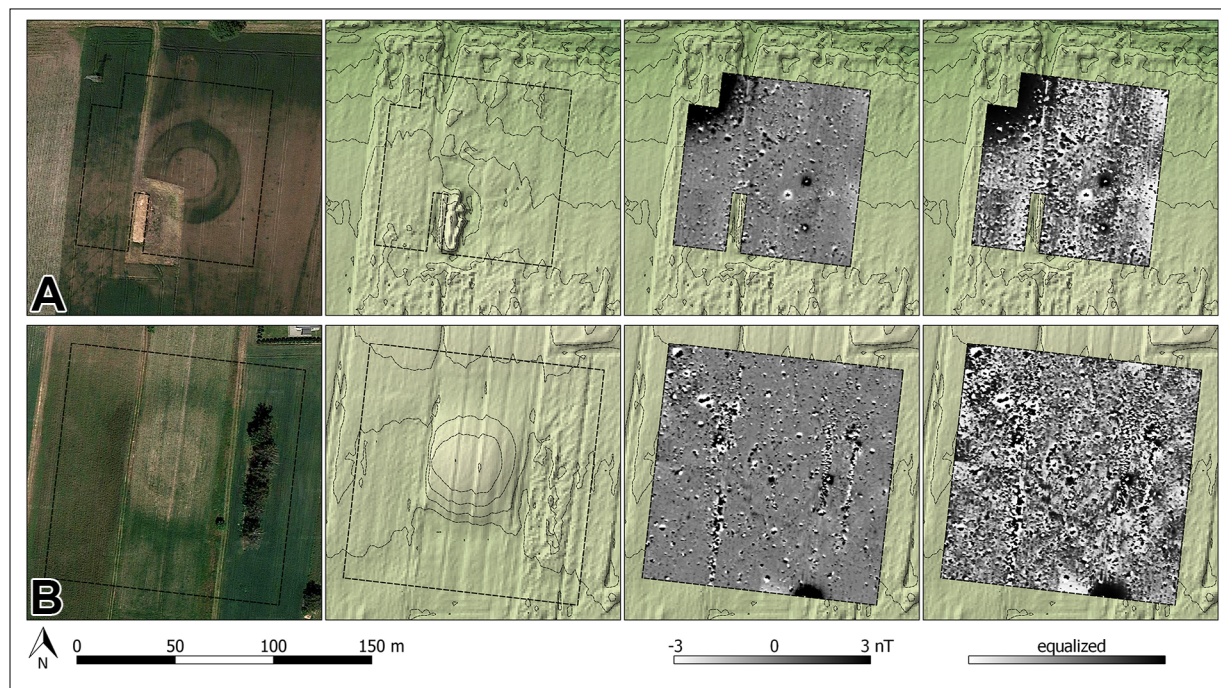


Fig. 3: Satellite imagery (Google, Image Landsat/Copernicus) and magnetic survey results: (A) Ostrów Wielkopolski-Krępa, (B) Topola Wielka (base map: hillshaded DTM based on National Geodetic and Cartographic Resource datasets).

made it possible to extrapolate some of the earlier findings. Quite often though, the resulting picture was more sophisticated, than the initial one. It can be exemplified by the case of the stronghold in Nabyszyce, initially recorded as a single early medieval feature (Fig. 2A). However, aerial photographs and ALS-based visualizations already revealed two probably younger features adjacent to it – a motte and another somewhat enigmatic rectangular structure. Geophysical survey showed that there had also been an additional artificially separated area within the early medieval gord. Geophysics of the early medieval stronghold at Taczanów Drugi revealed quite an interesting architectonic solution with additional radially arranged buttresses reinforcing ramparts or gateways (Fig. 2B). Field pebbles, still numerous occurring on the surface of the site, but also collected and reused for hardening local dirt roads, had been used for their construction. An exceptionally detailed picture was provided as the result of surveys conducted in Rozdrażew, where the course of fortifications surrounding a gord's hill and an ancillary settlement, as well as relics of buildings located therein were recorded (Fig. 2C).

Also, magnetic prospections were completed for two previously unknown features. Already the first observations made in Grudzielec confirmed the find to be relics of a gord – remains of charred wood and burnt clay on

the surface of a plowed field marked the course of earthworks (Fig. 2D); furthermore, there were numerous early medieval sherds. The arrangement of the site was perfectly recorded by magnetic measurements. In Czermin, the alleged late medieval motte was not that clearly visible in the landscape (Fig. 2E). The dam was silhouetted though due to different vegetation.


Magnetic surveys within early medieval strongholds in Ostrów Wielkopolski-Krępa and Topola Wielka yielded no clear pictures (Fig. 3). Both sites are strongly eroded and hence the possible layers of high magnetic susceptibility are rather thin. Still, their location could be clearly seen thanks to vegetation marks.

Conclusions

The scenario involved applying a fast-paced and effective fieldwork procedure, which made the realization of the project's objectives possible while maintaining reasonable costs. In doing so, a rich package of complementary information, shedding new light on a number of sites, was obtained. At present, for the two districts, there is a complete and detailed documentation of all (28) strongholds recorded in the area. For a quarter of them (7) a full doc-

umentation procedure, involving i.a. photogrammetry and magnetic survey, was performed. Considering the whole country, this is quite a result. Where necessary and possible, the works are to be continued with the use of the current methodology as well as other tools.

Acknowledgments

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