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SPATIAL ANALYSIS OF YAMPIL BARROW COMPLEX

ABSTRACT

The Yampil Region represents a concentration of densely populated barrow cemeteries. Some 156 mounds figure in the available cartographic studies, which are the basis of spatial analysis presented below. The aforementioned therefore shall involve an examination of parameters for the localisation of tumuli in respect to altitude, terrain surface incline, direction of exposition and distance from waterways and watershed ridges as well as an analysis of visibility for selected sites, which shall describe preferences in respect to the chosen place of construction.

Key words: spatial analysis, Dniester, Eneolithic, Bronze Age

INTRODUCTION

The Yampil Region lies on the southern edge of the Podolia Upland, in the drainage basin of the Middle Dniester (Fig. 1). The loess substrata here represents

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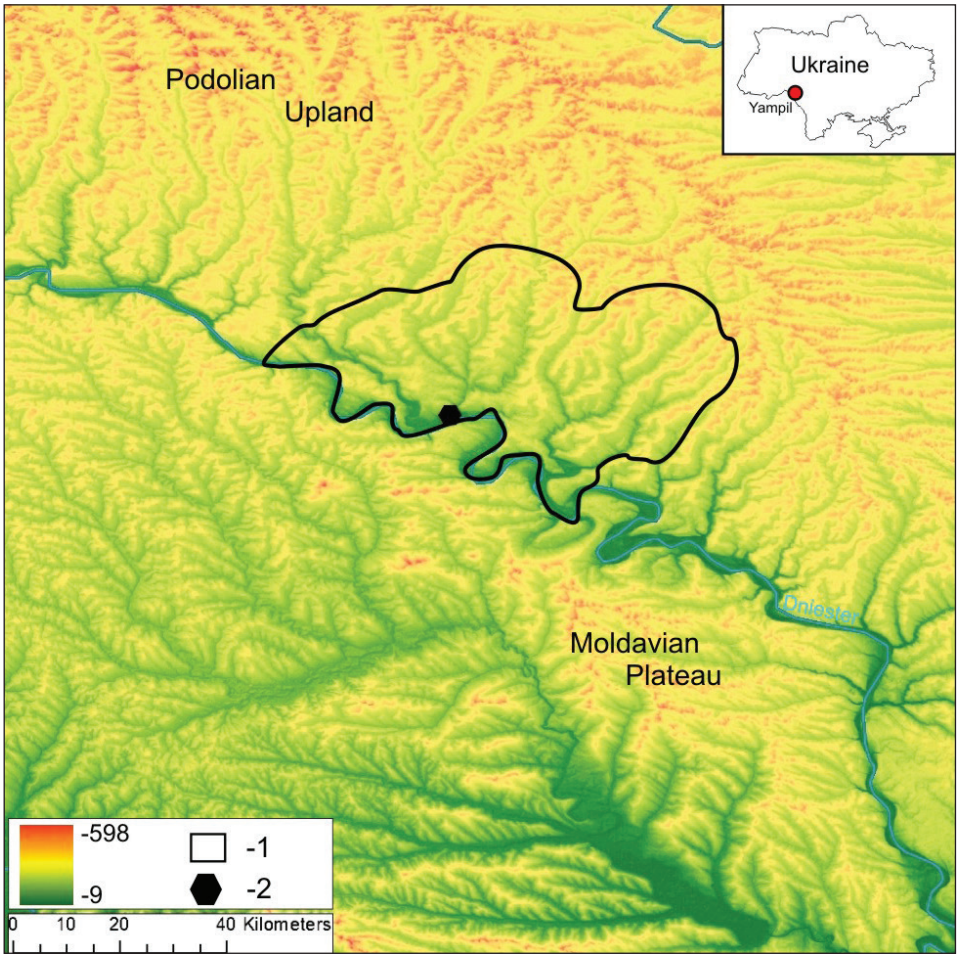


Fig. 1. Location of research area: 1 – Yampil Region border; 2 – Yampil

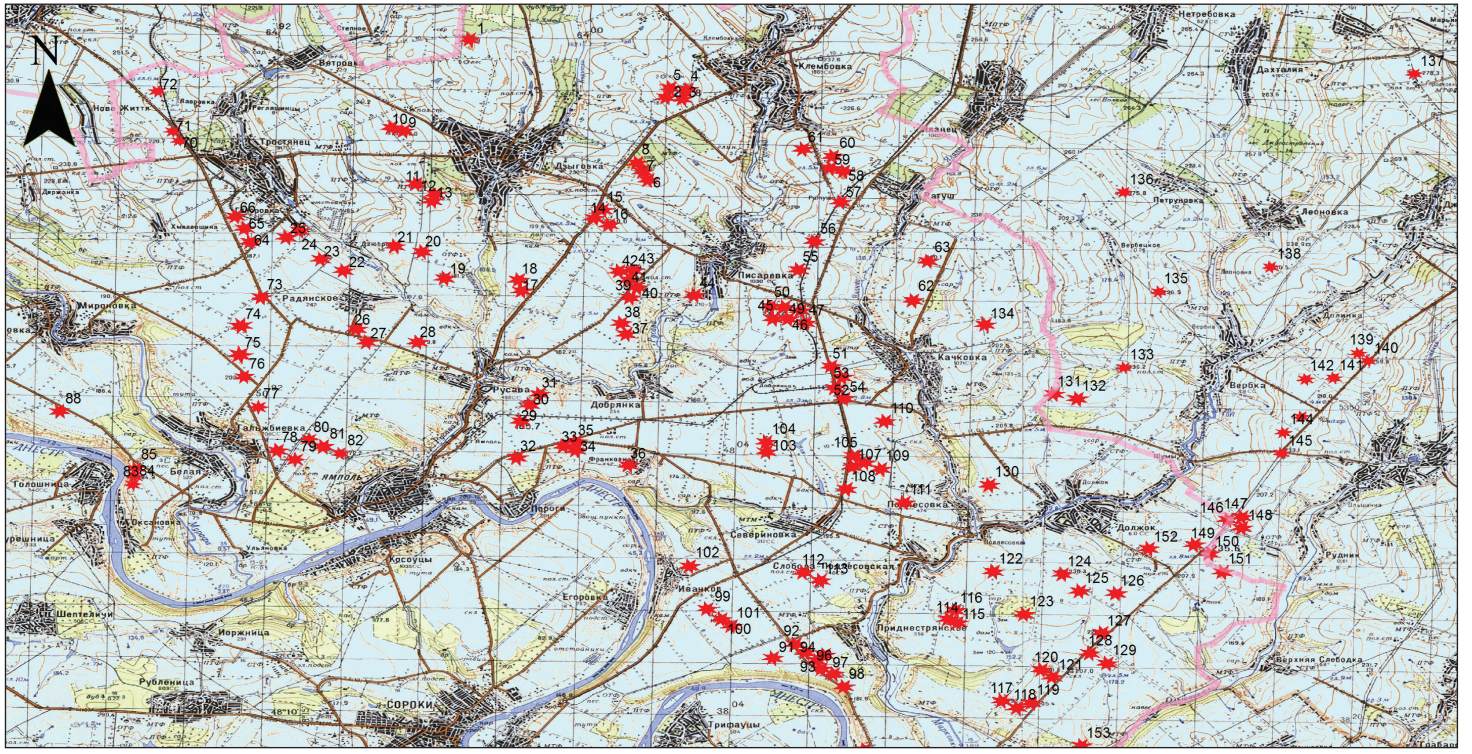
the major scale of studies in this area, which to a significant degree impact on the landscape profile. In the general geomorphological context, the Yampil Region can be said to be in the category of flat and undulating planes of an alluvial and delluvial origin. In respect to climate and flora the subject of study lies in the forest steppe belt – a transitory area between the forest zone and the steppe. The native flora that is characteristic for this terrain is one of oak forests, meadow and stipa grass steppes [Makohonienko, Hildebrandt-Radke 2014; Kusiński, Zastawnyj 2003].

The modern-day landscape of the area under study, combining the traits forming the terrain and its flora, allows for the reading of its particular properties. From the moderate rises of the region vast areas are visible towards a horizon many tens of kilometres away in the distance.

Table 1

Yampil Barrow Cemetery Complex: excavation in 2010-2012 and 2014 research results marked in gray.

Item	Site	Barrow number	Eneolithic	Yamnaya culture	Catacomb culture	Babyno culture	Noua culture	Iron Age	Unidentified	Number of inhumations
1	Dobrianka	1		5		6				11
2	Porohy	1		2						2
3	Porohy	2		4				2		6
4	Porohy	3		2		5		1	1	9
5	Porohy	3A	7	10			4	1		22
6	Porohy	4		1		4		3	1	9
7	Pysarivka	1		2						2
8	Pysarivka	2		1				2		3
9	Pysarivka	3		3				1	1	5
10	Pysarivka	4		2						2
11	Pysarivka	5		1		1		1		3
12	Pysarivka	6		3				1		4
13	Pysarivka	7		1				2	2	5
14	Pysarivka	8		1		1			2	4
15	Pysarivka	9		2		1			1	4
16	Severynivka	1		1		1		2	2	6
17	Severynivka	2		11		1		1		13
18	Pidlisivka	1	3	4	2	2		1	1	13
19	Klembivka	1	3			6	4		2	15
20	Prydnistryanske	I	1		1			2		4
21	Prydnistryanske	II	2						1	3
22	Prydnistryanske	III	2					1		3
23	Prydnistryanske	IV	2	5				2	1	10
			20	61	3	28	8	23	15	158



Map 1. Base map of the spatial analysis of the Yampil Barrow Cemetery Complex (*see* Annex 1)

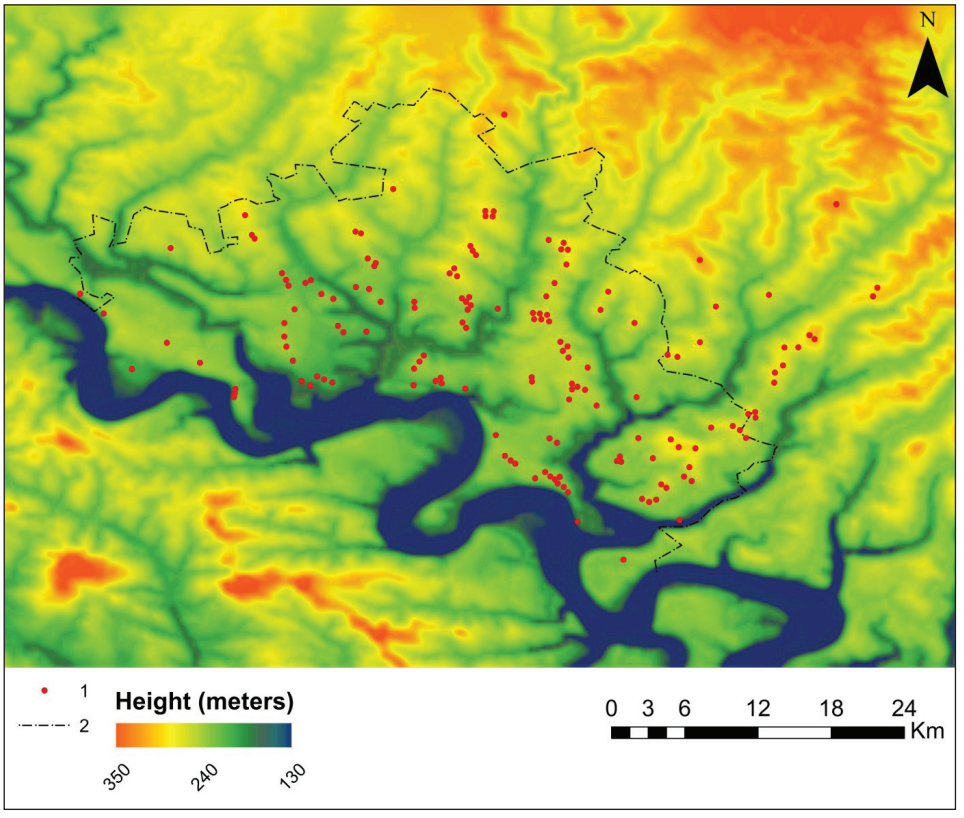


Fig. 2. Yampil barrow cemetery complex: digital elevation model for studied area. 1 – barrows, 2 – borders of the Yampil Region

The hydrographical network of the Yampil Region is made up by the left bank tributaries of the Dniester, which in part demarcates the southern administrative border of the Yampil Region and the territory of Ukraine.

1. MATERIALS

A conservation study of the Yampil Region has produced a topographical map in the scale of 1:100,000 featuring identified barrows in the area [Potupczyk, Razumow 2014], which constitutes the basis of spatial analysis that was conducted. Its publication in 2010 did not entail any new discoveries [Przybyła *et al.* 2017]. In the area under study within the administrative borders of the Yampil Region, measur-

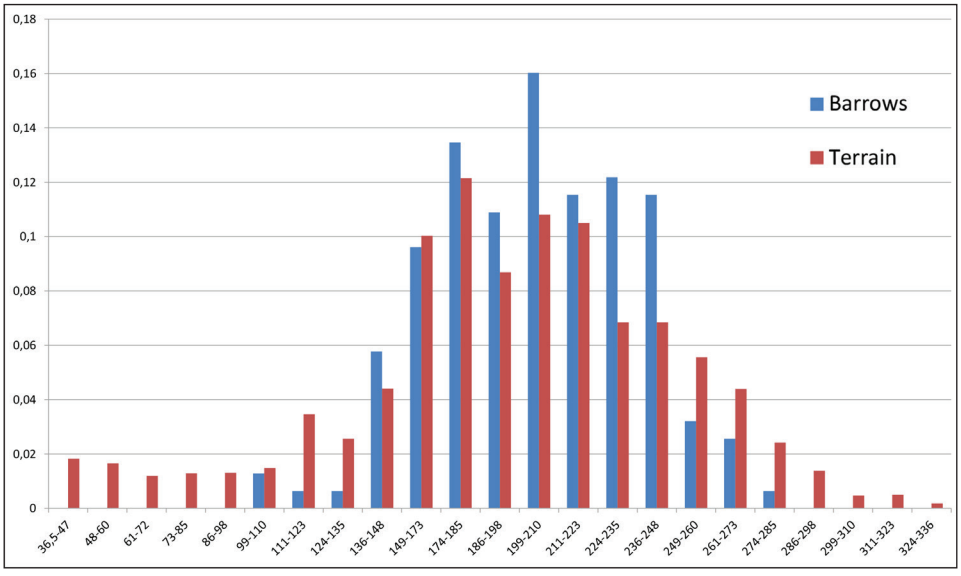


Fig. 3. Yampil barrow cemetery complex: percentage distribution of barrows and surface area in the altitude categories established above sea level.

ing some 790 km^2, there have been recorded thus far 156 tumuli (approximately 0.2 per km^2). Only 23 so far (approximately 15%) have been verified in the context of excavation research. Their characteristics are presented in Tab. 1. Four of the sites studied by the Polish-Ukrainian expedition in the period 2010 to 2014 have been subjected to more detailed analysis of their location in the context of data gained for the entire barrow cemetery complex [Kośko 2015].

2. METHODS

Spatial analysis was conducted on the basis of the Digital Elevation Model (DEM) created using a topographical map in the scale of 1: 100,000 (Map 1 and Fig. 2) [Placek 2008; Jaskulski, Szmidt 2013]. This map also served to create a vector layer that defined the location of barrows. The following were taken into consideration or parameters describing the locus of sites studied: terrain incline, slope exposition as well as distance from river valleys and watershed ridges. The ArcMap 10.2 application, part of the ArcGis software, created by ESRI (Environmental Systems Research Institute) [Litwin, Myrda 2005] was used to record the analysis below. All analysed parameters are given in Annex 1.

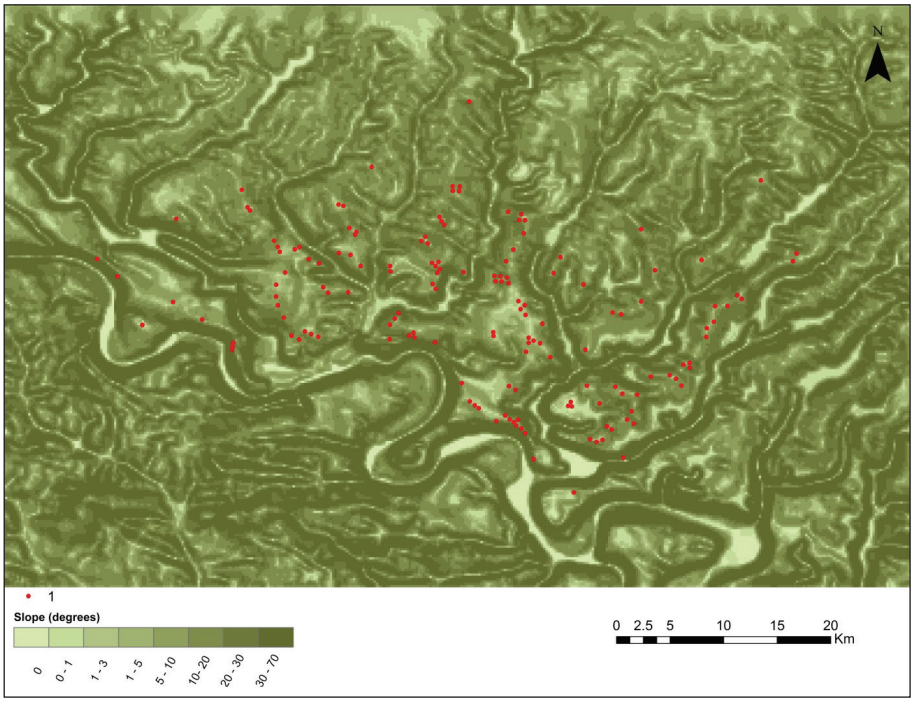


Fig. 4. Yampil barrow cemetery complex: map of slope incline of the terrain under study. 1 – barrows

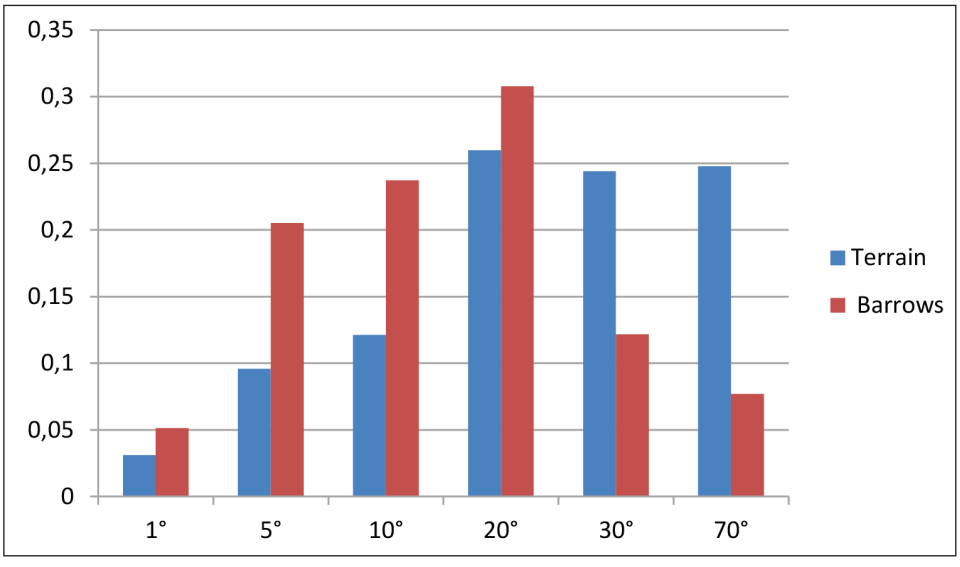


Fig. 5. Yampil barrow cemetery complex: percentage distribution of barrow number and terrain surface for established categories

3. ALTITUDE ABOVE SEA LEVEL

The terrain under study is characterised by marked differences in relative altitude. The lowest placed areas are those in the Dniester Valley (to 36 m a.s.l.). The highest measurements reaching 349 m are recorded on the upland in the northern part of the area under study. As far as the topography is concerned, there is a domination of terrain situated at an altitude between hundred and 49 to 248 m. In this category some 66% of the surface area studied is found and 86% of barrows (Fig. 3).

The location of particular mounds in terms of altitude above sea level in general represents the nature of the terrain as such. The highest placed mound – 283 m a.s.l. – is found in the north-east end of the area under study, near the town of Horodkiv. The lowest placed on the other hand, is the mound near Velyka Kisnytsya, almost 100 m a.s.l. The majority of barrows under study – 86% – are situated in the category of 149-248 m a.s.l.

The excavated sites relate to the category that groups the greatest number of mounds located at a altitude between 140 and 244 m. Amongst this group the lowest situated are the sites in Porohy and Prydnistryanske (163 and 193 m a.s.l.), Whilst the highest located features are found in Pidlisivka and Klembivka (201 and 242 m a.s.l.).

4. TERRAIN SURFACE INCLINE

An analysis of the terrain surface incline map shows that the greatest degree of incline relates to the slope of the Dniester Gorge (up to 68°, Fig. 4). Such a high degree of incline can be also observed on the valley slopes of this river's tributaries. One half (50.8%) of the terrain under study shows a small incline between 0 to 20 degrees, where over 80% of tumuli are found (Fig. 5).

The topography of barrows in the context of landscape incline suggests quite clearly that these tumuli were located on a terrain with a low incline. There are however, a small number of sites that appear to be situated in areas of high parameters in this context (above 20° – Fig. 5). Moreover, the presence of barrows in the last two categories gives one cause for further reflection. This is a result of the fact that inasmuch as a terrain with a 30 to 40° incline physically is suitable for the filling of a mound, areas of a higher parameter in this context would appear to be exceptionally difficult ones in which to undertake such work. First and foremost, the rather large scale of the source map has had an influence in this regard on the

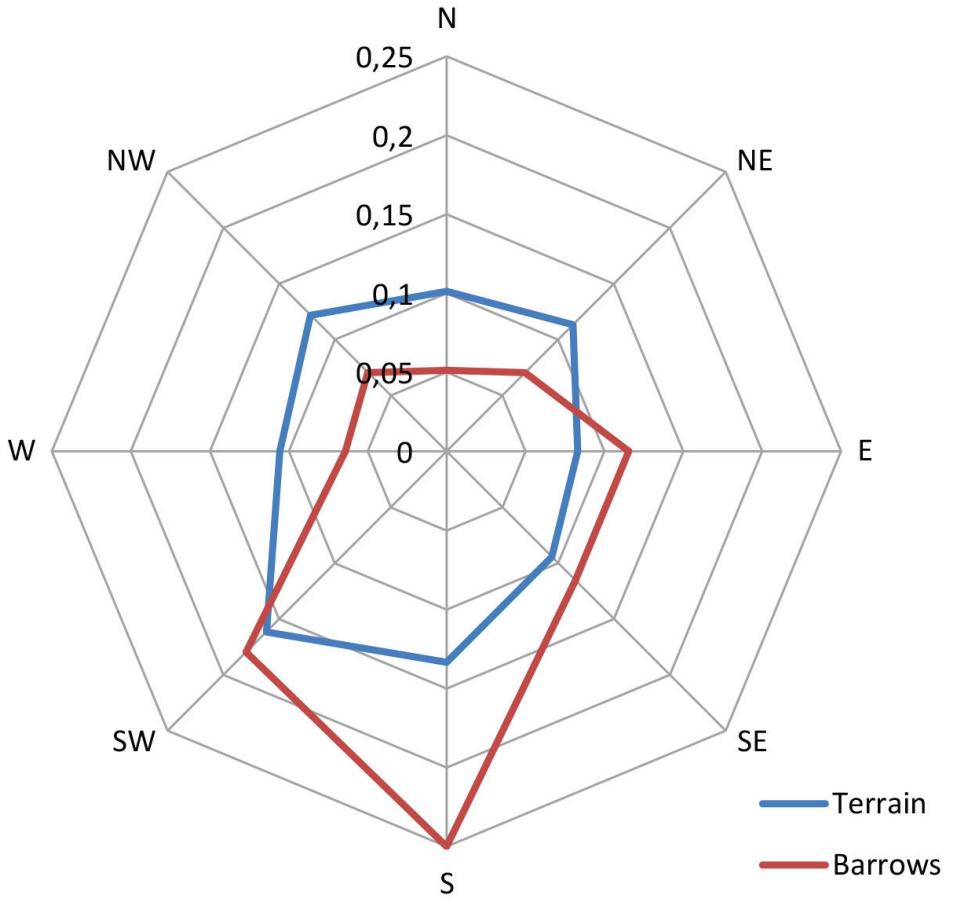


Fig. 6. Yampil barrow cemetery complex: distribution of terrain surface and tumuli for geographical direction

research results. In order to improve these it would be necessary to create a digital altitude model for the use of maps with a decidedly lower scale, which would reduce the risk of error.

The sites subjected to excavation research show small amounts of the parameter in question. In this regard the terrain incline read from the base map does not exceed 13° in any of the cases (Porohy – *see* Annex 1).

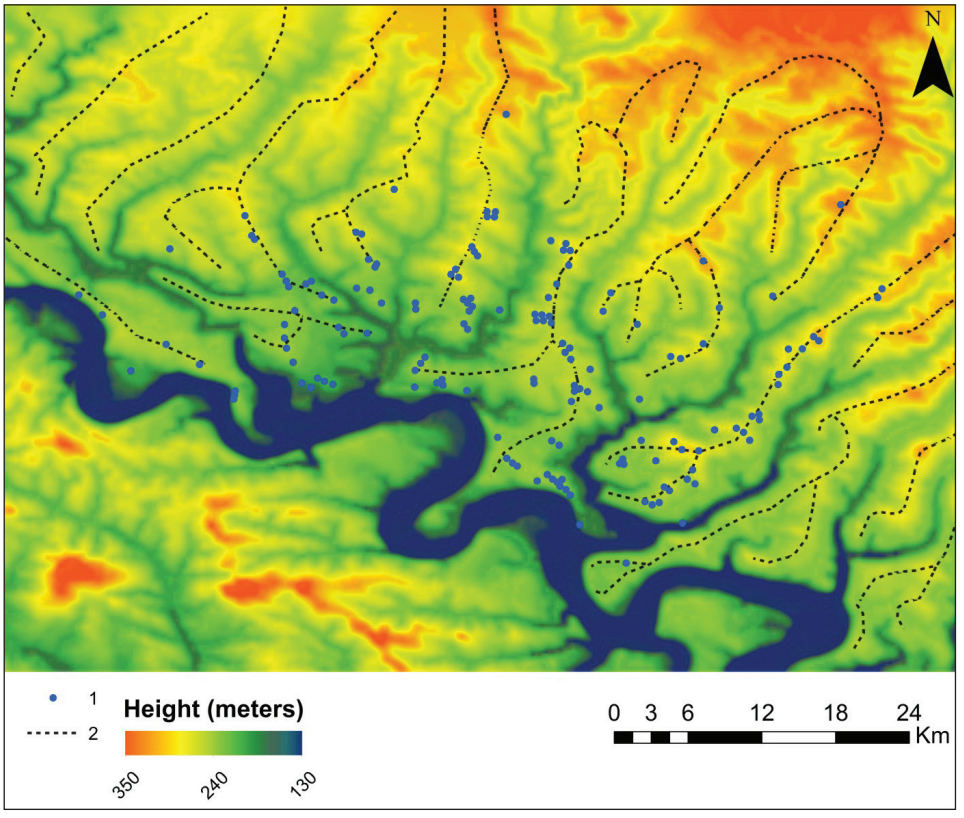


Fig. 7. Yampil barrow cemetery complex: marked watershed ridges of the terrain under study in terms of the altitude model. 1 – barrows, 2 – watershed ridges

5. EXPOSITION DIRECTION

An analysis of topography relating to the sites mentioned in the context of this research aspect is difficult on account of its low readability. This is caused by the differentiated nature of terrain profile in the area studied. Steep river valleys – both the Dniester and its tributaries as well as the numerous hills on watersheds result in a large differentiation of the parameter mentioned. Thus, a description of the usefulness in respect to the exposition parameter in the present discussion needs to take place on the basis of a graph that shows what number of tumuli are situated on inclined slopes in a specific direction (Fig. 6).

The area described as flat combines a mere 8.5% of the terrain surface under study, where 12 barrows are found (8%). The remaining directions of slope incline

in the area under study are broken down rather equally, accepting values oscillating between 10 and 15 % of terrain surface.

In terms of mound topography therefore, there is a tendency for the avoidance of prominent slopes in a northerly direction and preferences for a southern and southern-western direction.

6. DISTANCE FROM WATERWAYS AND WATERSHED RIDGES

The creation of river layers took place through the vectorisation of waterways lines, based on the map in the scale of 1:100,000. So as to mark the line of watershed ridges on the basis of a digital altitude model a layer of surface flow directions was created, using the Flow Direction module, ArcMap application. Subsequently, the halftone that arose as a result of this process was transformed by the Flow Accumulation module. As a result, a map was created, which showed the accumulation of surface flow for every one of the units. On this basis watershed ridges were marked, creating a line in places where the relevant units took on the value 0 (Fig. 7). Naturally, the remaining lines were drawn far more simply so that the network of ridges was not overly dense.

The decided majority of the barrows found is placed at a distance from rivers in the range of 1001 two 4000 m (89% sites, Figs. 8, 9). In this context, the most predominant range of distance is from 2001 to 3000 m, covering as much as 39% of sites. This particular state of affairs allows one to propose that the location of barrows in respect to the *Yampil Complex* was not related to the immediate proximity of rivers.

The chart of distribution for percentage distance from watershed ridges shows that over 77% of barrows (121 mounds) are found at a distance up to 1000 m from the watershed ridge.

In respect to the entire above group there can be seen a clear preference for the location of barrows within watershed ridges and at the same time, an avoidance of locating tumuli in the immediate neighbourhood of waterways.

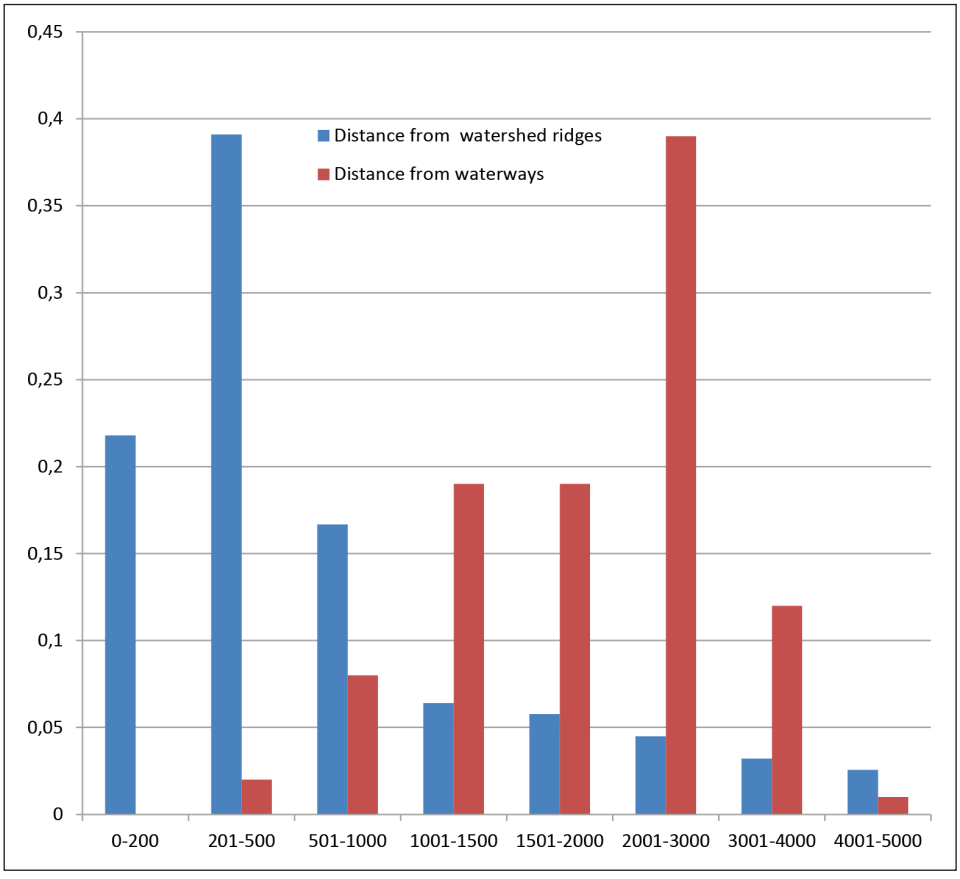


Fig. 8. Yampil barrow cemetery complex: distribution of tumuli number and terrain surface for accepted categories of distance from watershed ridges and waterways

7. ANALYSIS OF VISIBILITY

The visibility of barrows is considered to be one of the significant aspects for the choice of a place for their location [Ślusarska 2011]. In a subsequent analysis a simulation was conducted for the visibility of excavated barrows. For these purposes a buffer with a diameter of 2200 m for each of the tumuli was marked in which a zone was delineated, where a given mound was visible for an observer of 1.7 m [Weathley 1995].

The mound at the site in Pidlisivka, within the buffer measuring 2200 m in diameter, would only be visible from 15% of this surface area, concentrated mainly in a western and north-western direction (Fig. 10: 1). With a broadening of the

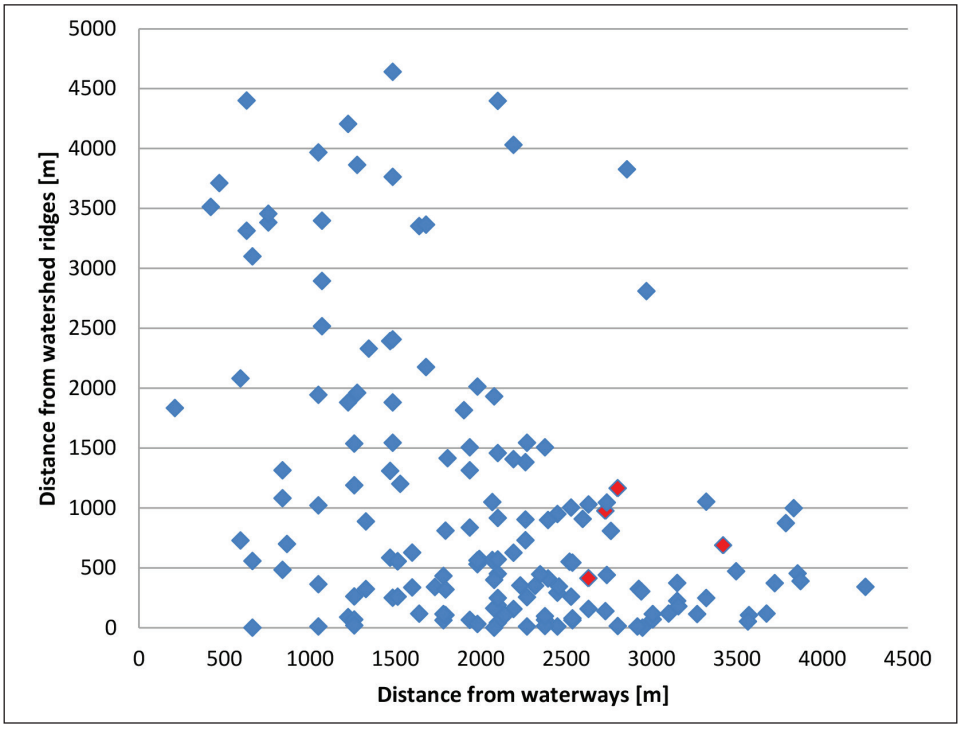


Fig. 9. Yampil barrow cemetery complex: the location of particular barrows for distance from waterways and watershed ridges. Sites excavated are mark in red

zone, from which the tumulus in Pidlisivka would be visible, it is possible to note that these areas combine in a decidedly eastern and southern direction from the site in question. Within their area some 35 barrows were found from this region, which may be interpreted as an indicator of the potential visibility from 35 other barrow mounds in Pidlisivka. This provides a picture of the spatial grouping of these mounds – generation of concentrations that based on the parameter of visibility can create a genus of mutually related local units (chronological?; regional?).

The site in Porohy in direct proximity of the barrow (buffer measuring a diameter of 2220 m) would be visible from a small fragment of area located west of the barrow, taking up 12% of the surface (Fig. 10: 2). The factor analysed, however, begins to increase in respect to distance from the site, where areas with a view of the mound group in particular on the opposite line of the Dniester. Within the bounds of areas from which it is possible to notice the mound in Porohy, merely 15 other tumuli were found, which to a large extent is related to the significant occurrence of areas from which it is possible to see the mound in Porohy on the other side of the Dniester and therefore in areas for which we do not have barrows located.

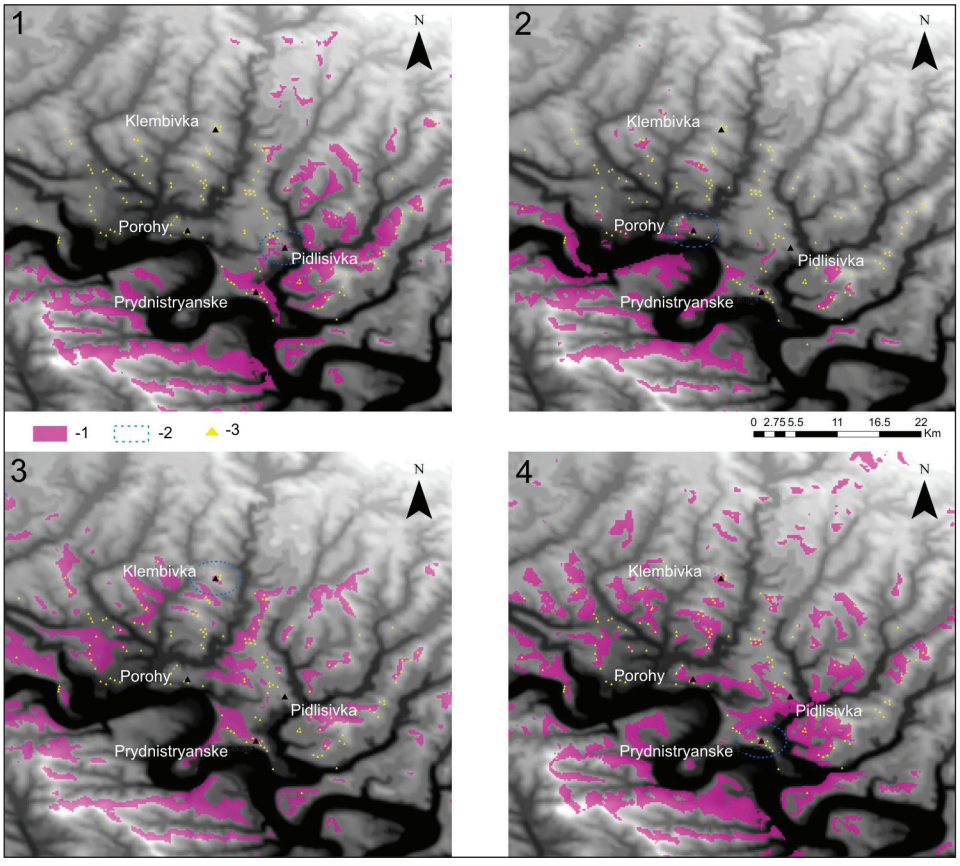


Fig. 10. Yampil barrow cemetery complex: analysis of visibility at the site in Pidlisivka (1), Porohy (2), Klembivka (3) and Prydnistryanske (4). 1 – areas from which the analyzed barrow was visible, 2 – buffer measuring a diameter of 220 m, 3 – remaining barrows

The barrow in Klembivka, in the outline of its buffer, is merely visible from 10% of the area (Fig. 10: 3). From a greater distance, analysis shows its visibility to be concentrated mainly along the tributaries of the Dniester, where 52 other barrows were found.

Within the immediate surrounds of the tumulus in Prydnistryanske only 15% of the terrain demonstrates the possibility of seeing its placement (Fig. 10: 4). By increasing the distance of these areas, from which it is potentially possible to see the tumulus, there are compact areas placed here and there on the opposite side of the Dniester and its tributaries that are visible.

In summarising the results of this analysis is possible to suggest that if the criterion of barrow visibility was in fact important for the creators of these assumptions it was related to significant distances.

SUMMARY

Taking into account the limitations of data used in presenting the above analysis, it is possible to cautiously draw several general conclusions in respect to the preferences of Yampil barrow constructors as to the choice of location. Here, areas placed at a high altitude with the lowest possible terrain incline were chosen, whereby the exposition direction was focused towards the south and south-west. One significant parameter over and above these criteria is the distance of mounds from waterways and watershed ridges, where the latter would appear to be extremely relevant. As far as the visibility of the tumulus in the surrounding landscape is concerned, it would appear that for its constructors the visibility of the barrow was important from a greater distance, which could serve the network of 'connection' in the context of the entire studied region.

For the purposes of this research project a spatial analysis of barrow culture would also be of particular interest, where a particular group rather clearly is differentiated in respect to the average values of parameters analysed.

ANNEX 1. VALUES OF ANALYSED PARAMETERS FOR THE YAMPIL BARROW CEMETERY COMPLEX

ID (Map 1)	M A.S.L	Incline [°]	Exposition direction	Distance from waterways [m]	Distance from watershed ridges [m]	Visible from Prydnistryanske	Visible from Pidlisivka	Visible from Porohy	Visible from Klembivka
0	269,1	18,7	SW	2802	1164	1	0	0	0
1	241,1	4,4	S	3418	689	0	0	0	1
2	243,7	8,7	E	2631	412	1	0	0	1
3	238,9	10,3	Flat	2730	976	0	0	0	0
4	237,0	15,2	S	2597	908	0	0	0	0
5	252,5	10,4	SW	2271	255	1	0	0	1
6	229,2	26,9	NE	3786	873	1	0	0	0
7	242,3	14,7	S	3495	471	1	0	0	0
8	244,3	4,9	SW	3100	118	0	0	0	1
9	231,7	2,5	S	3855	453	0	0	0	1
10	231,7	1,2	SW	3673	118	0	0	0	1
11	205,9	13,4	SW	2730	138	1	0	0	1
12	200,9	3,1	S	2100	189	1	0	0	1
13	195,8	15,8	E	2100	41	1	0	0	0
14	237,9	15,9	SW	3320	248	1	0	1	0
15	241,4	19,2	NE	3267	114	0	0	0	0
16	241,8	5,0	W	3872	389	1	0	1	0
17	181,3	6,1	Flat	1224	1881	0	0	0	0
18	182,2	5,3	Flat	1277	1961	0	0	0	0
19	180,3	7,4	S	1071	2517	1	0	0	0
20	177,0	9,1	Flat	1485	1881	0	0	0	0
21	175,2	27,4	SW	594	2081	0	0	0	0
22	180,2	20,0	S	664	0	0	0	0	1
23	167,6	18,7	SW	1050	10	0	0	0	0
24	156,3	22,1	NE	594	728	0	0	0	0
25	164,3	1,1	SW	1050	363	0	0	0	0
26	167,2	6,9	S	2271	10	1	0	0	1
27	161,5	16,6	Flat	2100	450	0	0	0	0

ID (Map 1)	M A.S.L	Incline [°]	Exposition direction	Distance from waterways [m]	Distance from watershed ridges [m]	Visible from Prydnistryanske	Visible from Pidlisivka	Visible from Porohy	Visible from Klembivka
28	150,7	7,8	NW	1224	88	0	0	0	0
29	187,1	16,4	SW	1936	65	0	0	0	0
30	193,3	5,1	SW	1514	554	1	0	0	0
31	174,9	41,8	W	840	1081	0	0	0	0
32	146,6	27,2	N	1806	1415	0	0	1	0
33	163,1	33,0	NW	1328	887	0	0	1	0
34	168,0	33,3	SE	1050	1021	0	0	0	0
35	180,0	13,5	Flat	1470	584	1	0	1	0
36	142,8	32,5	N	840	1314	0	0	0	0
37	189,7	18,7	SE	1071	2895	1	0	0	0
38	191,9	8,2	SE	1470	2393	0	0	0	0
39	185,0	17,8	NW	1345	2330	1	0	0	0
40	195,3	23,2	NW	1485	2407	1	0	0	0
41	203,3	7,9	NE	2079	1931	1	0	0	0
42	204,1	5,8	NW	2376	1506	1	0	0	0
43	206,2	6,7	S	1981	2013	1	0	0	0
44	159,6	21,7	N	630	4401	0	0	0	0
45	218,6	23,4	E	2262	1382	1	0	0	1
46	229,1	21,5	Flat	2762	808	1	0	0	0
47	218,8	20,7	W	2192	156	1	0	0	0
48	231,6	19,3	SE	2319	350	0	0	0	1
49	228,3	15,7	S	2449	949	0	0	0	1
50	213,9	13,0	SW	1936	1506	0	0	0	1
51	211,0	0,6	SW	2079	399	0	0	0	0
52	208,7	11,9	N	1981	530	0	0	0	0
53	211,6	0,5	SW	2449	10	1	0	0	0
54	210,9	1,3	NW	2376	65	0	0	0	0
55	216,2	8,5	S	1992	555	0	0	0	1
56	220,0	5,6	S	2141	105	0	0	0	1
57	236,7	18,2	SE	2079	162	1	1	0	1
58	241,7	6,3	NE	2738	440	1	0	0	0

ID (Map 1)	M A.S.L	Incline [°]	Exposition direction	Distance from waterways [m]	Distance from watershed ridges [m]	Visible from Prydnistryanske	Visible from Pidlisivka	Visible from Porohy	Visible from Klembivka
59	236,4	23,8	SE	2262	903	1	0	0	1
60	242,2	11,0	S	2738	1045	0	0	0	1
61	211,8	13,4	S	1680	2176	0	0	0	1
62	224,6	6,6	E	1782	432	0	1	0	1
63	229,2	9,7	SE	1640	117	0	0	0	0
64	166,8	2,2	E	2232	353	0	0	0	0
65	171,0	8,8	E	2079	0	0	0	0	0
66	180,6	13,7	Flat	1782	62	1	0	0	0
67	210,6	12,7	SW	1485	1544	1	0	0	0
68	178,1	54,7	Flat	866	699	0	0	0	0
69	173,6	54,5	SW	664	557	0	0	0	0
70	231,9	4,3	SE	2449	292	1	0	0	1
71	231,8	3,6	S	2458	344	0	0	0	0
72	241,2	8,0	N	2947	0	1	0	0	1
73	186,5	4,7	S	3150	224	0	0	0	1
74	184,3	2,6	N	3832	998	0	0	0	1
75	190,4	8,2	NW	3721	372	0	0	0	1
76	200,0	2,7	S	2925	324	1	0	0	1
77	173,5	15,2	NE	2271	1544	0	0	0	0
78	123,2	16,6	NE	1640	3353	0	0	0	0
79	120,9	13,9	S	2192	4031	0	0	0	0
80	140,5	1,4	NW	2856	3827	0	0	0	0
81	141,4	4,3	SE	2100	4398	0	0	0	0
82	143,4	6,9	Flat	1485	4641	0	0	0	0
83	146,0	63,0	Flat	470	3712	0	0	0	0
84	146,0	52,2	W	420	3513	0	0	0	0
85	147,9	41,5	N	630	3314	0	0	0	0
86	141,0	2,1	S	2970	2810	0	0	0	0
87	200,5	3,7	S	2631	157	1	0	1	1
88	200,9	2,5	S	1260	261	1	0	1	1
89	171,1	9,3	S	1260	68	0	0	0	0

ID (Map 1)	M A.S.L	Incline [°]	Exposition direction	Distance from waterways [m]	Distance from watershed ridges [m]	Visible from Prydnistryanske	Visible from Pidlisivka	Visible from Porohy	Visible from Klembivka
90	107,8	47,9	E	757	3383	0	0	0	0
91	186,7	24,5	Flat	1071	3398	0	0	0	0
92	188,5	8,2	S	1680	3365	1	1	1	1
93	193,1	6,4	S	1277	3864	1	1	1	1
94	188,4	10,9	SE	1224	4206	0	1	0	1
95	179,5	23,4	E	1485	3764	0	1	0	0
96	181,3	20,9	W	1050	3968	0	0	0	0
97	179,8	16,2	SW	757	3456	0	1	0	0
98	163,7	37,0	NE	664	3100	0	0	0	0
99	191,9	1,6	S	2394	411	1	1	1	1
100	191,0	4,2	S	2529	1003	1	1	0	1
101	190,3	3,4	SW	2100	1458	1	1	0	1
102	181,6	15,5	W	1470	1309	0	0	1	1
103	206,4	1,9	SW	1260	1537	1	0	0	1
104	206,6	0,9	W	1260	1189	0	0	0	1
105	211,2	2,6	S	1599	336	0	0	0	0
106	211,5	1,2	E	1794	105	1	0	0	0
107	210,2	3,8	E	1328	323	1	0	0	0
108	203,4	6,8	NE	840	483	1	0	0	0
109	207,4	7,4	W	2262	730	0	0	0	0
110	208,8	6,1	SW	1529	1201	0	0	0	0
111	201,5	7,5	NW	1902	1816	1	1	0	0
112	177,0	6,6	SW	2100	916	1	0	0	0
113	168,1	19,4	SW	2192	1407	1	0	0	0
114	179,7	0,7	NW	1936	836	1	1	0	0
115	179,7	0,5	Flat	2068	1049	1	1	0	0
116	179,3	0,3	NW	1599	627	1	1	0	0
117	199,7	11,0	S	2100	248	1	1	1	0
118	199,4	24,1	W	2192	626	0	0	0	0
119	200,0	6,8	SE	1992	574	0	0	0	0
120	218,7	28,7	S	3157	179	1	1	1	1

ID (Map 1)	M A.S.L	Incline [°]	Exposition direction	Distance from waterways [m]	Distance from watershed ridges [m]	Visible from Prydnistryanske	Visible from Pidlisivka	Visible from Porohy	Visible from Klembivka
121	217,4	15,3	E	2940	303	0	0	0	0
122	200,9	2,7	S	1514	555	1	1	0	1
123	202,4	4,7	SW	3320	1052	1	1	0	1
124	248,6	12,3	SW	2068	565	1	1	1	1
125	253,2	6,3	S	2917	10	0	0	0	0
126	250,3	12,5	S	3570	105	0	0	0	0
127	231,6	15,2	SE	3564	52	1	0	1	0
128	199,2	15,7	S	3150	373	0	0	0	0
129	197,6	29,2	W	2631	1029	0	0	0	0
130	188,8	8,3	SE	1050	1944	1	1	0	1
131	223,3	16,1	E	1981	562	1	1	0	1
132	234,5	24,5	SE	2537	62	1	1	0	0
133	238,7	15,7	E	1732	340	0	0	0	0
134	223,8	7,5	E	1485	250	1	1	0	1
135	226,5	1,8	S	1260	19	0	0	0	0
136	272,3	8,8	SW	1782	114	1	1	0	0
137	282,7	0,9	S	4252	341	0	1	0	1
138	222,6	4,5	SE	1514	259	0	0	0	0
139	261,6	15,7	SE	1981	31	1	1	0	1
140	263,9	7,5	E	2100	570	1	1	0	1
141	233,4	9,0	S	2376	14	0	0	0	0
142	239,7	13,8	S	1794	810	0	0	0	1
143	237,1	4,1	E	3007	69	1	1	0	1
144	234,3	0,9	S	2802	14	1	1	0	1
145	230,9	11,9	NE	2348	446	1	1	0	0
146	222,3	18,8	E	2376	96	0	1	0	0
147	225,4	13,6	SE	2529	259	0	0	0	0
148	218,6	28,9	SW	2520	551	0	0	0	0
149	231,0	11,3	S	2537	543	0	1	0	1
150	232,5	4,4	SW	3007	114	0	0	0	0
151	218,3	14,3	NE	2394	899	0	0	0	0

ID (Map 1)	M A.S.L	Incline [°]	Exposition direction	Distance from waterways [m]	Distance from watershed ridges [m]	Visible from Prydnistryanske	Visible from Pidlisivka	Visible from Porohy	Visible from Klembivka
152	216,8	23,1	E	1936	1314	0	1	0	0
153	99,5	57,1	N	210	1834	0	0	0	0
154	254,6	8,3	SE	1794	319	0	1	0	0
155	254,8	13,6	SW	2537	78	0	1	0	0

Translated by Piotr T. Żebrowski

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