

# The content of heavy metals in soils of the Yamal Peninsula

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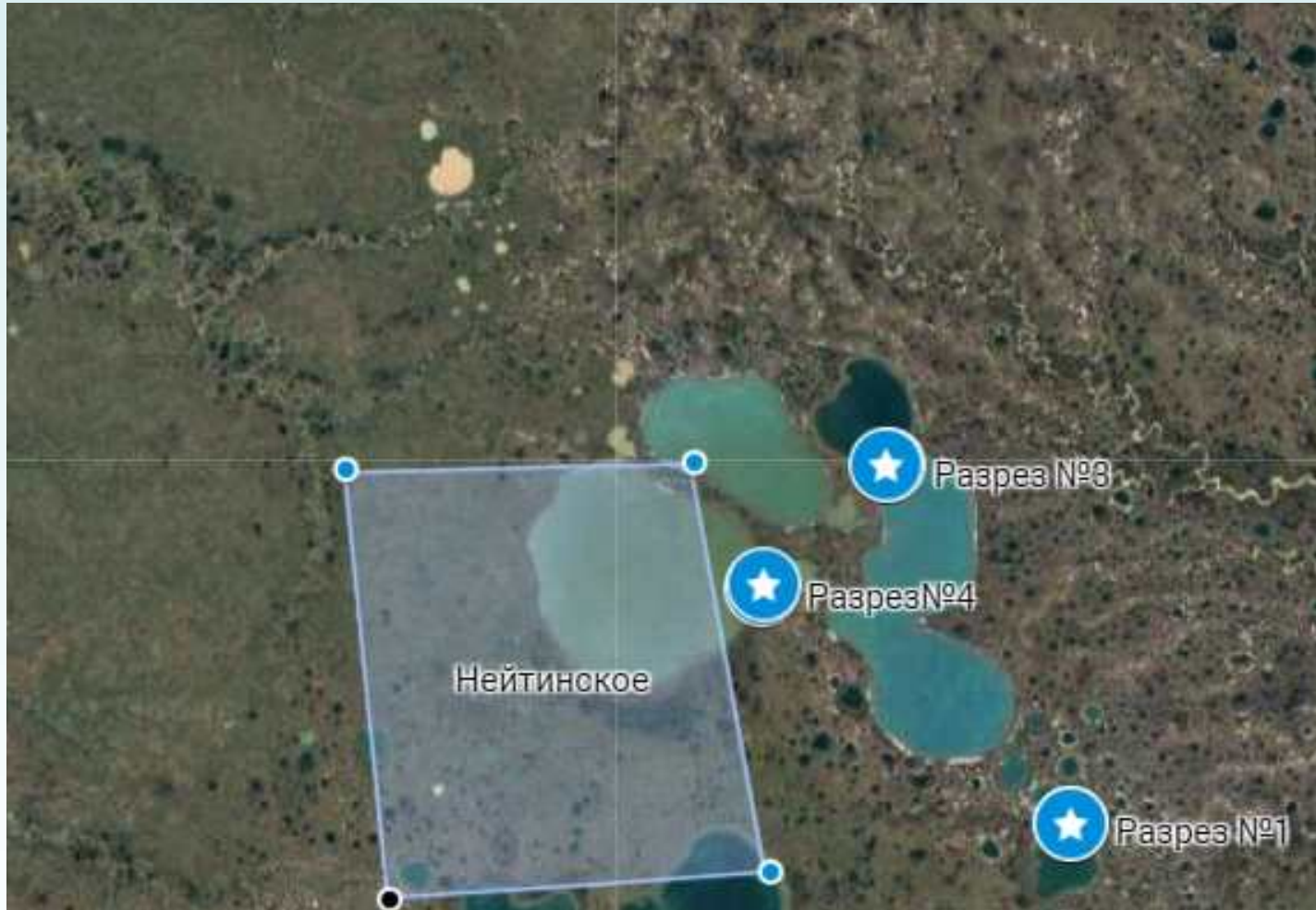
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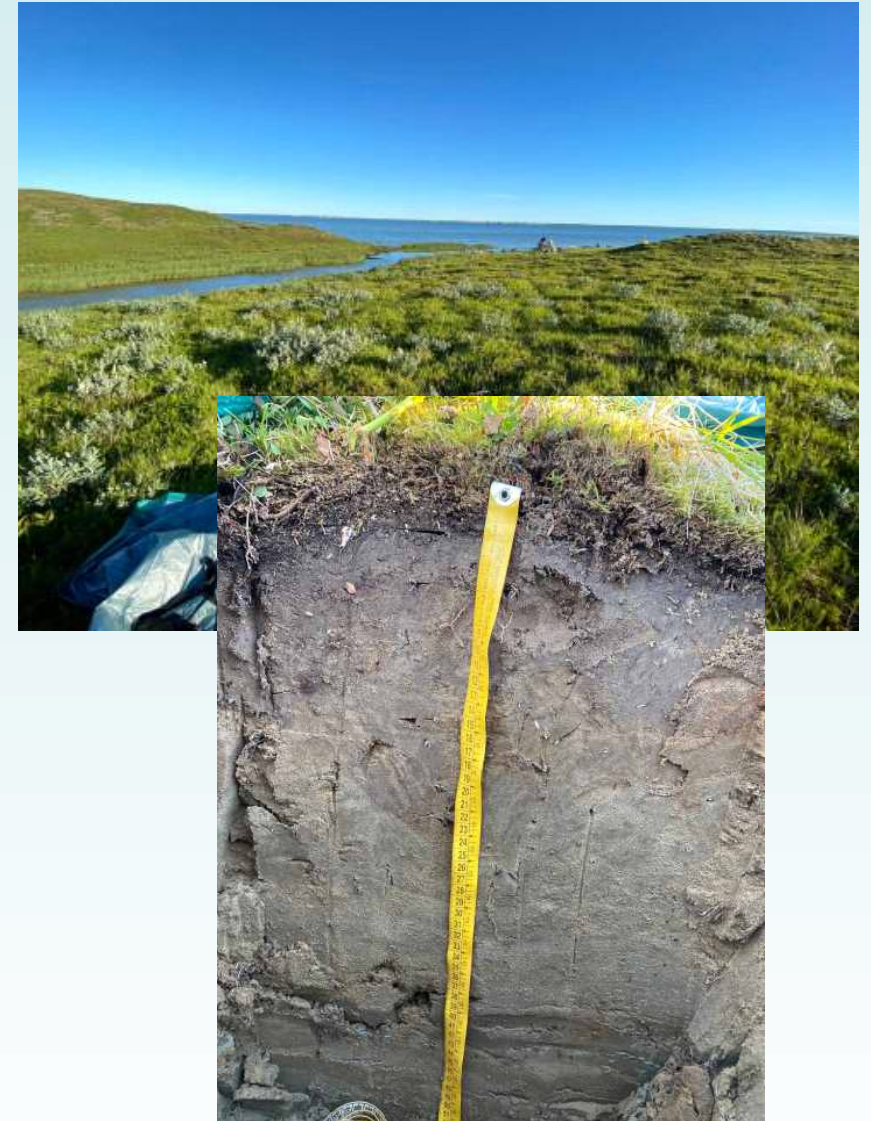
The expansion of anthropogenic impact on the landscapes of Yamal peninsula requires an early study of the components of natural landscapes that are still unaffected by powerful industrial development, but are already experiencing indirect negative effects of human activity.

One of these components is the soil cover. Soil performs the most important functions of redistribution, accumulation and transformation of chemical elements, their forms and compounds in the landscape .

# Research objects

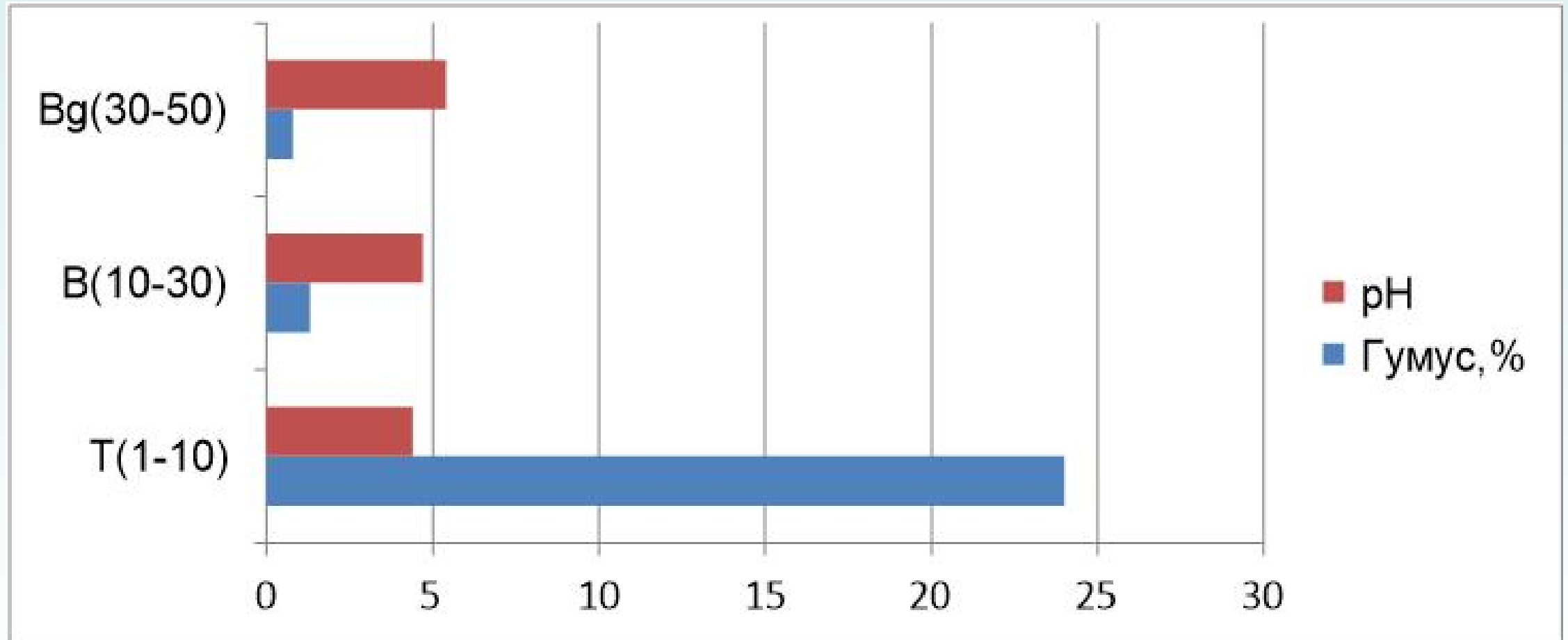


Points of selection of soil samples.



Profile of crysol gley soil, soil section No. 1

# Average values of humus content ( % ) and pH in the soil



# Distribution by profile of gross forms of heavy metals in the main types of soils

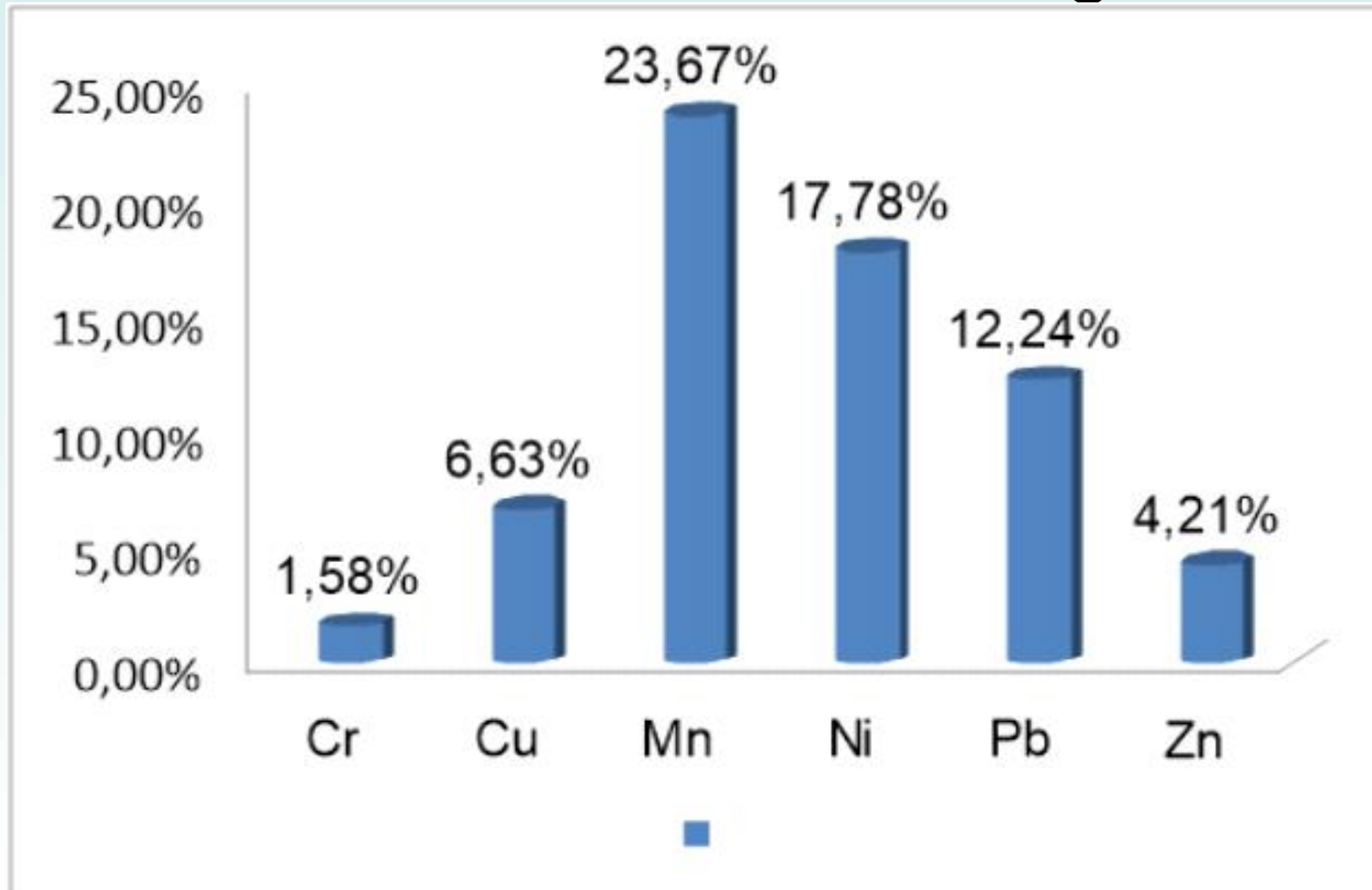
elements	Cr	As	Cd	Cu	Ni	Pb	Zn	Mn	Hg
<i>№1 Cryosol gley peat</i>									
T(1-10)	<1	0,31	0	2,3	10,1	3,3	9,7	26,5	0,01
B(10-40)	<1	0,4	0,12	2,1	7,8	1,9	8,8	33,2	0,005
G(40-50)	<1	0,72	0,13	24,9	81	12	70,5	607	0,011
<i>№2 Cryosol humus-gley</i>									
T(1-15)	<1	0,36	0,13	1,8	7,3	3	9,4	19,4	0,009
B(15-50)	<1	0,35	0,14	0,79	7,3	1,3	4,9	12,5	0,003
<i>№3 Cryosol eluvial-gley</i>									
T(1-8)	<1	0,52	0	1,5	6,7	2	8,6	14,7	0,004
B(8-40)	<1	0,22	0,048	1,9	8,4	2,2	6,9	19,6	0,004
Bg(40-52)	<1	0,5	0	2,4	11,3	2,4	11,2	21,3	0,004

## Statistical parameters of the chemical composition of soils

- The coefficient of variation is calculated for each chemical element as the ratio of the mean square deviation to the arithmetic mean.
- $V = S/x * 100\%$ , where  $V$  is the coefficient of variation,  $S$  is the standard deviation, and  $x$  is the average content of the chemical element.

elements	Max	Min	C сред	S	V,%
Cr	<1	<1			
As	0,72	0,2	0	0	27%
Cd	0,14	0	0	0	77%
Cu	24,9	0,79	13	5	42%
Ni	81	3,8	42	17	41%
Pb	12	1,3	7	2	36%
Zn	70,5	3,4	37	15	41%
Mn	607	9,7	308	138	45%
Hg	0,021	0,001	0	0	42%

The percentage ratio of the mobile forms of some chemical elements to the gross forms



# Conclusions

- Soil organic matter and clay minerals adsorb such as lead, zinc, copper, and nickel.
- Soil processes of cryogenic mass transfer have the greatest influence on the distribution of elements along the profile.
- This study shows the advantage of the profile approach to the assessment of soil pollution in contrast to studies of the surface thickness (up to 20 cm). This approach allows us to fully assess the depth of contamination, the cause and its origin.



**Thanks for your attention**

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