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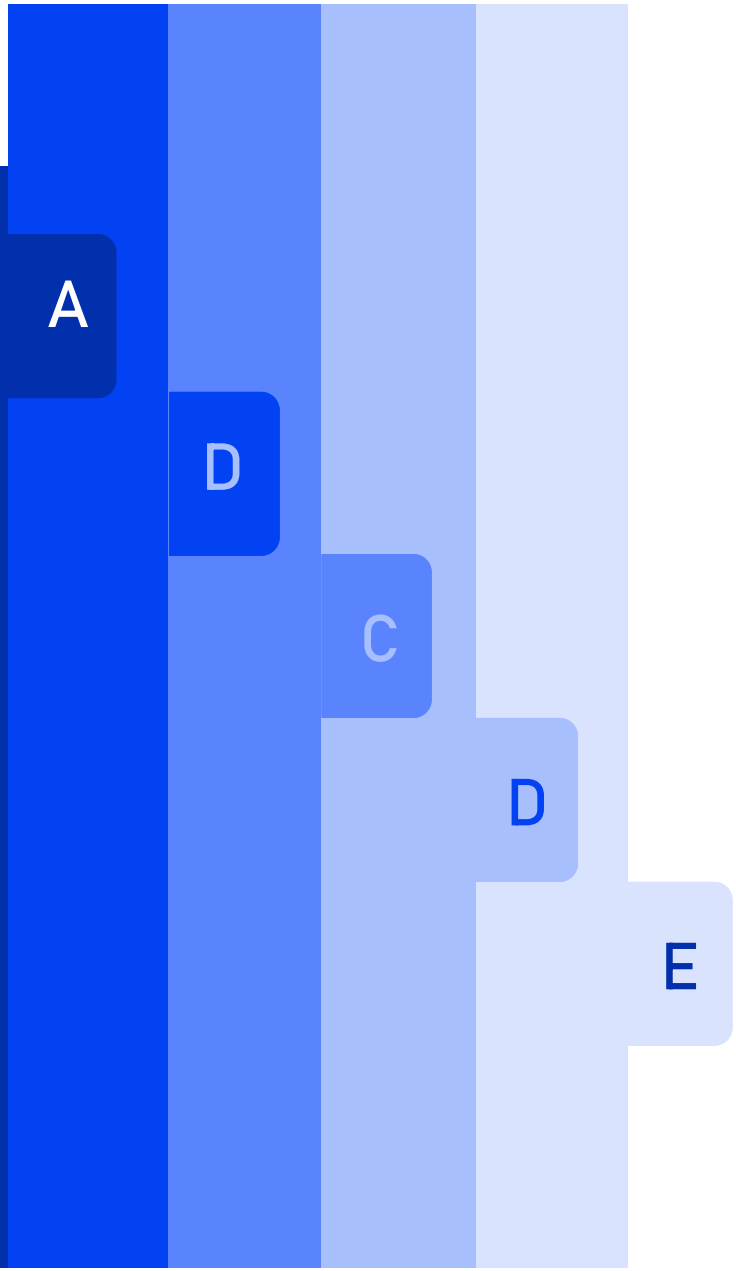
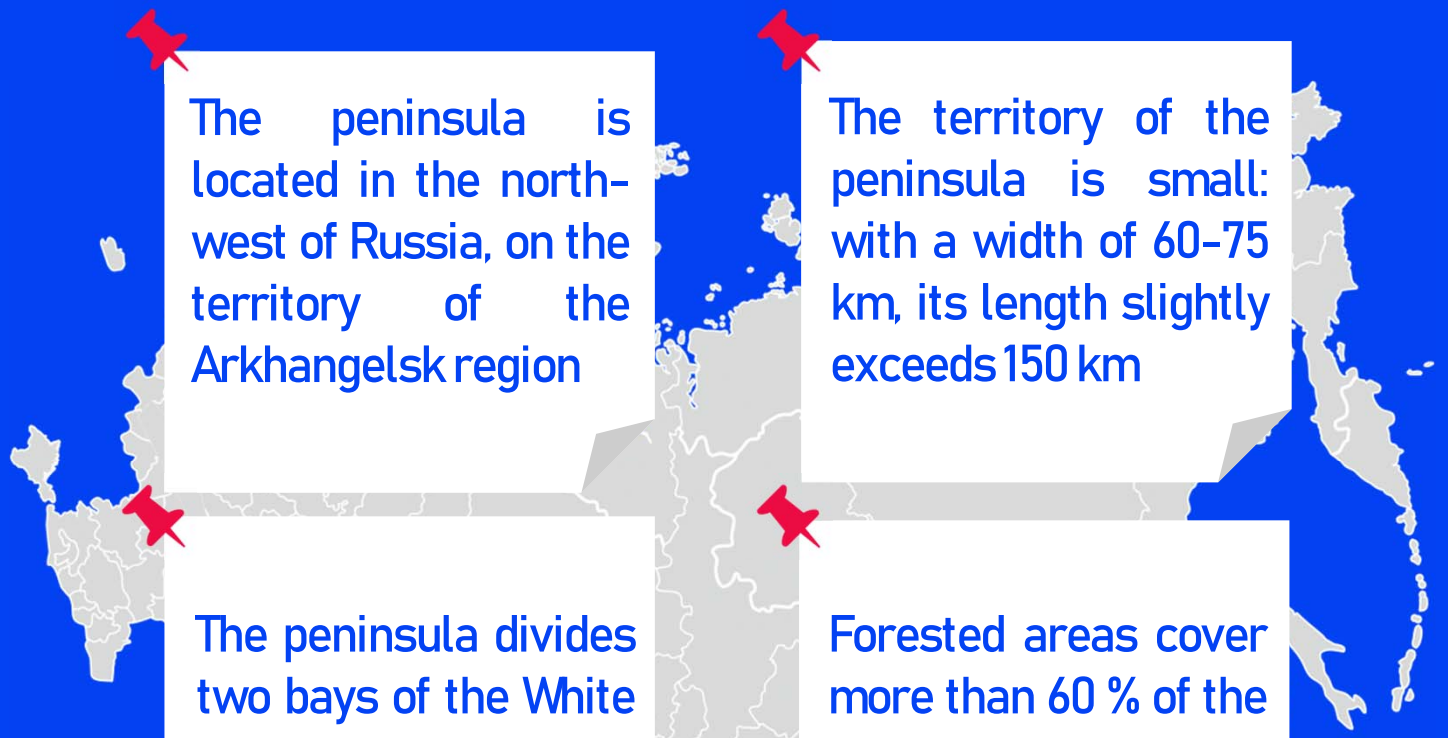
Accumulation of heavy metals in soils and bottom sediments in northern taiga river basins in the areas with intensive forest cuts

Speaker: Sofia Chubova
chubova.24@gmail.com



Characteristics of the Onega Peninsula



The peninsula is located in the north-west of Russia, on the territory of the Arkhangelsk region

The territory of the peninsula is small: with a width of 60–75 km, its length slightly exceeds 150 km

The peninsula divides two bays of the White Sea — Onega and Dvina

Forested areas cover more than 60 % of the northern part of the peninsula

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Description of the study

1. Soil and bottom soil samples were taken in accordance with GOST 17.4.4.02-84 and GOST 17.1.5.01-80.

2. The analysis for the determination of heavy metals was performed in the laboratory of ITMO University by the X-ray fluorescence method using "Spectroscan Max-G".

3. The data obtained were compared with GN 2.17.2041-06 and GN 2.17.2511-09.

4. In the final stage, the total indicators of soil pollution (Zc) were calculated.

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Results of the study

78%
ZINC
(Zn)

100%
Nickel
(Ni)

67%
LEAD
(Pb)

22%
COBALT
(Co)

22%
MANGANESE
(Mn)

In accordance with GN 2.17.2041-06, an excess of the HM content was detected in the following indicators

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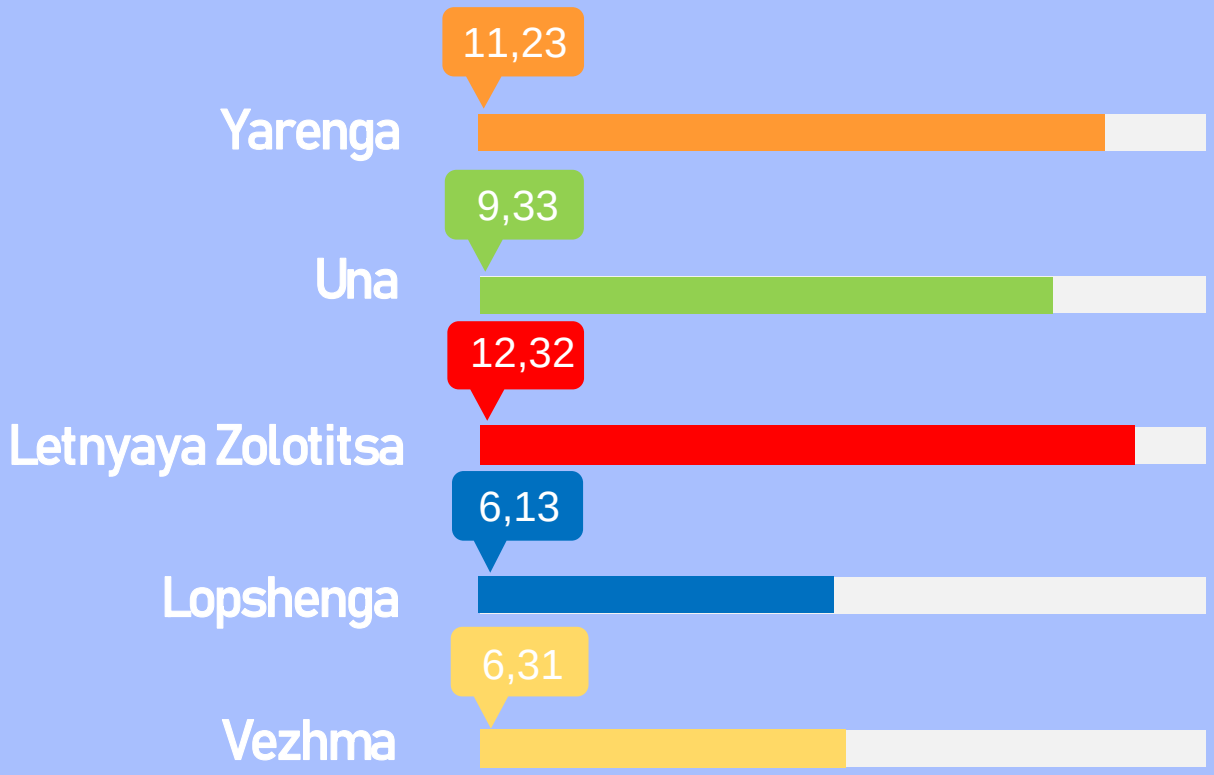
Calculation of the total indicator of soil pollution (Zc)

The indicators were calculated taking into account: Pb, Zn, Ni, Co, Sr, Mn, V.



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Conclusion

1. The sediments of the studied rivers and the forest soils of the basins of these rivers near the areas of active forest cuts accumulate lead.
2. Soils also accumulate zinc and nickel which are not observed in bottom sediments.
3. Pollution with other studied heavy metals is not noted.
4. The revealed excess of normative and background indicators of the HM content in soils and bottom sediments in areas of intensive recent logging may be associated with the use of logging equipment and vehicles, as well as violation of the structure of soils and slow restoration of ground vegetation.
5. The bottom deposits and soils of the Onega Peninsula have a generally low level of contamination with HM.

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