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THE PECULIARITIES OF GEOCHEMICAL FIELD OF THE MICROELEMENTS IN NATURAL AND TECHNOGENICAL ZONES OF LITHUANIA SEA-SHORE

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The special geochemical investigation of microelements has been carried out in the soils of Lithuania Sea-shore (1057 km²). The microelements were chosen because they indicate even small traces of contamination. The concentration of chemical elements was determined by DC-ARC ES and XRF at Geological Institute of Lithuania.

The territory was divided into geochemical zones according to the geochemical conditions of the soil landscape, intensity and character of contaminants. The difference of the geochemical field of microelements between the natural and anthropogenical zones was ascertained. As a result the geochemical maps were compiled.

To establish considerable distinction of the geochemical field in the different zones below listed methods have been applied:

1. Visual analysis of the geochemical maps;
2. Verification of the hypotheses on identity of the samples microelemental composition within different samples (ANOVA, nonparametric ANOVA based on the median criterion of Brown-Mood and the comparison of Kurtosis in the different zones).
3. Factor and correlation analyses (nonparametric Spearman correlation)

Avoiding an impact of the anomalous concentration the minimization of Kurtosis and Skewness has been used. To eliminate the anomalies the robust method using Titien-Moor criterion has been taken.

It was cleared up that 3rd method is the most effective. It allows us to establish the traces of any technogenical activity even if there is no evidence of contamination when using visual and ANOVA methods.

Using above mentioned three methods the considerable differences in microelemental composition between natural and urban geochemical zones were established.

In most cases the natural factors caused the variation in concentration of microelements in soil not impacted by technogenical activities. The main factors are:

- a) sorption of microelements (B, Ga, V, Cr, Sc, Rb etc.) by colloidal clay minerals;
- b) amount of heavy minerals (as a source minerals for Zr, Nb, Ti, Y);
- c) alkaline geochemical barriers (mostly for Mn).

The main source of Pb, Zn, Cu, P, Ag, Mo at technogenically contaminated zones are transport and waste dumps. In general the concentration of the microelements in soil of the towns housing estates is twice as compare to natural zones.

The most contaminated area by Pb, Zn, Cu, Ag, and Cr is Klaipeda city.