



Multiscale structure of Cs-137 soil contamination on the Bryansk Region (Russia) due to the accident at the Chernobyl NPP

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The Cs-137 contamination of the Bryansk Region occurred in the period from April 27 to May 10 into several stages. The complicated character of the soil radionuclide contamination on the Bryansk Region is caused by different nature of the radioactive fallout: dry and wet. Thus, in a number of cases Cs-137 soil pollution is directly connected with the rain intensity, which is well known, have multifractal nature. In some parts of contaminated territory the overlay of different types of fallout was observed. The radioactive contamination of the landscape is a result from nonlinear interplay of geophysical factors which intervene over a large range of scale. As a result of the fallout Cs-137 pattern can be described as a multifractal. Consequently, fields of contamination observed have an extreme spatial variability, frequently cited "hot spots" or "leopard's skin".

As an estimate of background radiation levels, we relied on a dataset of air-gamma-survey of the Bryansk Region, carried out by SSC AEROGEOFIZIKA in the summer of 1993. This dataset includes geo-positioned data of Cs-137 deposition in a grid of 100x100 m with values range from 3 to $11 \cdot 10^4$ kBq/m².

Airborne gamma survey gave the smoothed values of the Cs-137 density of contamination in comparison with the data, obtained directly as a result of soil sampling. However, even in this case in the east part of the Bryansk test site we can observed the "hot spots" (by size several hundred meters) as natural phenomenon.

The article presents the results of the geostatistical and multifractal analysis of the Cs-137 contamination. Scaling analysis was conducted to investigate the linkages between the spatial variability of soil Cs-137 contamination and some landscape characteristics.