



## **Vertical distribution of Cs-137 in arable soils of the Bryansk Region in 2017**

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During the Chernobyl Nuclear Power Plant (ChNPP) accident in April 26 1986 radioactive Cs-137 was released in the environment and deposited on the soils. Soil samples were collected in the Bryansk Region in September 2017 at four test sites. Depending on the specific landscape conditions and the type of land use, 3-6 soil profiles were laid out in each catena, amounting to 17 soil profiles.

On the plowed-up soils of the Kostitsa site Cs-137 is evenly distributed in the topsoil of 0–30 cm at all three sampling points of the catena, reaching a specific concentration of 14–16 Bq/kg. In the lower part of the slope, there is a slight increase in the specific concentration up to 19 Bq/kg in a layer of 5-10 cm, probably due to increased erosion observed in the past.

At the Dubrovka test site, similarly with increased erosion rate on arable soils, Cs-137 is evenly distributed to a depth of 25 cm with a specific activity of 9-11 Bq/kg, in a layer of 25-30 cm - 1.6 Bq/kg. On the unarable soils, due to the washing away of the soil material from the upper part of the slope, practically a uniform distribution of Cs-137 is found over the entire depth of up to 30 cm with an activity equal to 10-11 Bq/kg.

In the most highly contaminated soils (a settlement of Vyshkov) 6 soil profiles were investigated. At the summit of the catena, nonuniform Cs-137 content to a depth of 25 cm with an activity of 1450-1740 Bq/kg occurs. In a layer of 30-40 cm, the activity of Cs-137 decreases to 7 Bq/kg.

In the middle part of the catena, an atypical distribution of Cs-137 is observed: to a depth of 20 cm, its activity varies in the range of 1600–1810 Bq/kg, whereas in a layer of 20–40 cm it increases to a value of 2160–2300 Bq/kg.

According to the analysis of the vertical distribution of Cs-137 in the floodplain part, it can be assumed that the remediation was not carried out here: the maximum activity of Cs-137 at a depth of 22-27 cm (1180 Bq/kg) indicates the natural burial processes due to the accumulation of alluvium on the soil. In another soil profile on the floodplain the maximum activity of Cs-137 is located at a depth of 15-20 cm.

At the Brakhlov site in the floodplain the maximum contamination with Cs-137 (1297 Bq/kg) was detected at a depth of 5-10 cm. In plowed-up soils, the level of Cs-137 is significantly lower - 180 Bq/kg in a layer of 0-20 cm in the upper part of the catena, decreasing in the middle part to the values of 150 Bq/kg and increasing to 190 Bq/kg in the lower part of the catena.

Thus, the analysis of the distribution of Cs-137 in various positions of catena can be used to assess the intensity of the processes of lateral migration over 30 years after the Chernobyl accident.