

## CS-137 – A MARKER OF SOIL EROSION

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The study of soil erosion is important in assessing the stability of the landscape. In this article, we attempt to use radioactive cesium to estimate the amount of soil erosion within the individual tracts of the State natural reserve «Stolby». We compared two soil areas: degraded soils with a trail that is used by tourists for over 100 years. To correlate the amount of Cs-137 on the path to the background conditions, soil samples were taken also in undisturbed areas. As a result of investigations, it was revealed that radioactive Cs-137 isotope is present in all subhorizon litter and humus-accumulative horizon. Stock isotope 30-cm layer varied from 5550 to 5890 Bq/m<sup>2</sup> with an average of  $5.720 \pm 800$  Bq/m<sup>2</sup>. Approximately 94 % of the total stock of Cs-137 is concentrated in humus-accumulative horizon.

It is well known that Cs-137 is stored very firmly in the upper soil layers (Peretrukhin, 2001; Tsvetnova, 2001). Cs-137 soil horizons loss may be associated with only their mechanical migration due to soil erosion and probably to deflation in some extent. As up to 100 % of the reserves Cs-137 is connected with O horizons and AY, its loss is directly proportional to the loss of material stocks in upper soil horizons. On average, reserve Cs-137 horizons O and AY on the background areas of the test slope are up to  $1430 \pm 460$  Bq/m<sup>2</sup> whereas the supply of the isotope in degraded soils within the network of hiking trails was  $740 \pm 310$  Bq/m<sup>2</sup>.

Thus, for the period from the beginning of the active receipt of Cs-137 isotope components of terrestrial ecosystems (1949) until the moment of our research, the loss of soil cover isotope stocks within the system of the test slope trails reached 52 % relative to the background areas which roughly corresponds to the loss of 51 % inventories AY horizon. Taking into account the data on the physical properties of soils and soil horizons stocks, it is not difficult to calculate that for the 65-years period of the soil cover of the slope within a system of hiking trails with respect to the background of soil lost 97.2 tons of the weight of the upper soil horizons. In terms of areal erosion intensity, the test site showed 546 t/ha for 65 years or 8.4 t/ha per year.

### References

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