Geophysical Research Abstracts
Vol. 19, EGU2017-4154, 2017
EGU General Assembly 2017


# Concerning initial and secondary character of radionuclide distribution in elementary landscape geochemical systems

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Specificity of radionuclide distribution in elementary landscape geochemical systems (ELGS) treated as local system of geochemically linked elementary terrestrial units (in toposequence: watershed-slope-closing depression), belongs to one of the less investigated but practically significant problems of current geochemistry. First measurements after the Chernobyl accident showed a considerable variation of Cs-137 distribution in all examined ELGS (Shcheglov et al, 2001; Romanov, 1989; Korobova, Korovaykov, 1990; Linnik, 2008). The results may be interpreted in frames of two alternative hypotheses: 1) irregularity of the initial contamination; 2) secondary redistribution of the initially regular level of fallout. But herewith only a disproof of the first hypothesis automatically justifies the second one.

Factors responsible for initial irregularity of surface contamination included: 1) the presence of the so-called "hot" particles in the initial fallout; 2) interception of radionuclides by forest canopy; 3) irregular aerial particles deposition; 4) uneven initial precipitation. Basing on monitoring Cs-137 spatial distribution that has been performed since 2005, we demonstrate that the observed spatial irregularity in distribution of Cs-137 in ELGS reflects a purely secondary distribution of initial reserves of radionuclides in fallout matter due to its migration with water in local geochemical systems.

This statement has some significant consequences.

1. Mechanism of migration of matter in ELGS is complicated and could not be reduced solely to a primitive moving from watershed to closing depression.
2. The control of migration of "labeled atoms" (Cs-137) permits to understand common mechanism of migration of water in all systems on the level of ELGS.
3. Understanding formation of the structure of contamination zones in ELGS permits to use mathematical model to solve the inverse problem of restoration of the initially equable level of their contamination.

Performed study confirms that Cs-137 as a label helps to trace processes and patterns of chemical elements' migration on the level of ELGS that are numerously reproduced elsewhere in natural systems. The study is aimed at and believed to provide solution for a number of important problems related to generation and evolution of soil structure, spatial redistribution of fertilizers and pesticides, other important processes of matter redistribution on the level of local LGS.

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