Geophysical Research Abstracts
Vol. 17, EGU2015-5063-1, 2015
EGU General Assembly 2015

The influence of forest shelterbelts on 137Cs fallout in Chernobyl affected areas (Tula region, Russia).

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The radioactive fallout after Chernobyl accident caused serious contamination by 137Cs along extensive area of East-European plain.Cs137 fall down on earth surface in two ways: gravitational – "dry" and rainfall – "wet" way. "Dry" fallout is a result of direct deposition of radionuclides from atmosphere with average speed of about 0.1-1 mm/sec. The fate of "dry fall"is far less than rainfall mechanism. Erupted water steam of reactor zone full of radioactive material enriched precipitation with 137Cs. Therefore, the derived spatial structure of contamination was under control of rainfall pattern in May-June 1986.

On the areas affected by rainfall fallout was the Southern part of Tula region in Middle Russia. It got name as "Plava hot spot" by the town in the center of this area. Tula is a traditional rural region, the vast areas covered by chernozem soils are cultivated for centuries. During cultivation forest cover was reduced that urged growth of wind erosion and loss of soil fertility. Hence, in the middle of 20 the century large arrangements for creation of forest shelterbelts were conducted. High efficiency of shelterbelts made them a widely provided part of new human-transformed landscape. Usually shelterbelts are set as a regular network across main direction of winds in particular region. Such organization help to reduce speed of air steam in the lowest 20-30 m layer of atmosphere. In addition, shelterbelts are very good collectors of snow in winter time which increase total moisture of soil and its fertility.

Represented investigation is conducted to find out any correlation between shelterbelts and fallout of radionuclides. If such correlation is significant, it has to be taken into account for further environmental surveys.

Two shelterbelts on the interfluve positions were chosen for detailed examination. Both selected objects emerged before 1986 but have different width, floristic composition, orientation and type of construction. One of shelterbelts is consist of two perpendicular lines forming right angle. Sample of soil were collected inside the and within rectangular network on the sides from the shelterbelt. The distance between sampling points included into network is 15 m for the closest to the shelterbelt point and 70 m for other point in adjacent field. Each sample contains upper 30-cm layer of soil. Inside shelterbelts samples were subdivided into three parts for layer of 0-10, 10-20, 20-30 cm deep. In group of points sampling was undertaken with description of soil sections.

All samples were dried, sieved and examined with γ-spectrometer. After statistical analysis of obtained data we calculated spatial variability of 137Cs inventories and correlation between distance before shelterbelt and inventory was assessed. According to obtained results map of spatial distribution of 137Cs within observed areas were created.