

## **The radiocesium dynamics in the Fukushima forests at the late stage after deposition**

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Forests cover about 2/3 of the territory of Areas 2 and 3 in the Fukushima prefecture. This territory was heavily contaminated with radiocesium released from the Fukushima Dai-Ichi Nuclear Power Plant in March 2011. The extensive decontamination measures aimed to prepare the return of population have been scheduled and are being implemented at the agricultural and residential lands at this territory. However, these measures will be not applied in the large scale in the Fukushima forests. The current radiocesium levels in wood at this territory exceed the Japanese standards for wood; thus, after return of population, the Fukushima forests may remain excluded from the economical use. Understanding of the further dynamics of radiocesium in the forest ecosystems is necessary for elaboration of the strategy concerning the radioactive contaminated Fukushima forests.

In March 2011 radiocesium was intercepted by the tree canopies and then, at the early stage after the accident, was effectively transported to the soil surface with precipitation and litterfall, and partly translocated to wood forming the current levels. The general trend was the decrease of the radiocesium inventory in the aboveground forest biomass. After redistribution in the root-inhabited soil layer radiocesium became available for uptake into the trees through the roots. From the Chernobyl experience, the further levels of radiocesium in the forest ecosystem compartments at the late stage may increase or decrease depending on the intensities of the root uptake and removal fluxes. In the Fukushima forests, the stage of the root uptake has begun recently, and the parameters of the root uptake have not been studied well for the varieties of species, forest types and soil conditions.

Our study is aimed to monitoring and modelling of the radiocesium redistribution in the Fukushima forests after the removal of its initial deposition from the tree canopies. The study has been performed since May 2014 at several experimental sites in the typical Fukushima forests (Japanese cedar, Japanese red pine). We observe the dynamics of the radiocesium concentrations and total inventories in the ecosystem compartments and quantify the biogenic fluxes of radiocesium which will determine its further redistribution between the biomass, soil and litter. Our study also includes characterization of the stable cesium distributions in the forest ecosystems and development of the methods for non-destructive monitoring of the radiocesium concentration in wood. We present the observation results for the period of 2014-2016 (annual and seasonal changes in the aboveground biomass, leaching from the forest litter, downward migration in soil), as well as the estimates of the radiocesium fluxes which will be used later for the modelling of its long-term dynamics in the Fukushima forests.