

福島第一原子力発電所事故から7年間の森林環境中の放射性セシウム移行状況

Seven-year monitoring study of radiocesium transfer in forest environments after the FDNPP accident

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Approximately 70% of the total land area affected by the fallout of the Fukushima nuclear power plant accident was forest area; therefore, monitoring of atmospherically deposited radionuclides such as radiocesium in forest environments is essential for diagnosis and early convergence of the environmental impact of radioactive contamination. This study investigated temporal changes in Cs-137 concentrations in environmental samples collected from various forests over 7 years following the accident. Cesium-137 was detected in all forest environmental samples; however, the concentration in most samples decreased exponentially with time. The decreasing trend of Cs-137 concentrations varied between needles/leaves and the outer bark of Japanese cedar and konara oak trees, suggesting that self-decontamination processes and internal recycling of Cs-137 varied among tree species and different tree parts. Cesium-137 concentrations in throughfall, stemflow, and litterfall exhibited an exponentially decreasing trend with time. Cesium-137 concentrations in throughfall decreased with the concentrations in leaves/needles, whereas Cs-137 concentrations in stemflow were independent of the concentrations in the outer bark. These results suggest that leaching of Cs-137 in throughfall in Japanese cedar depended on Cs-137 concentration in needles; however, the origin of Cs-137 concentrations in stemflow was more complex. Further investigation is required to clarify temporal changes in the leachable Cs-137 stock in the tree canopy and the mechanisms of Cs-137 entrainment to rainwater from different tree parts.

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