

Contribution of suspended solids to the migration of radiocaesium in forests

KOBAYASHI, Masahiro^{1*} ; SHINOMIYA, Yoshiki² ; OHNUKI, Yasuhiro² ; HIRUTA, Toshihide³

¹Forestry and Forest Products Research Institute, ²Tohoku Research Center, Forestry and Forest Products Research Institute,
³Fukushima Prefectural Forestry Research Centre

A wide area of forested land in eastern Japan was seriously contaminated by radiocaesium after the accident of the Fukushima Daiichi Nuclear Power Plant. In the contaminated forests, radiocaesium first trapped at the canopy and the litter layer has migrated to the mineral soil as throughfall (TF) and litter leachate (LL). TF and LL often contain suspended solids (SS) which are thought to transport the radiocaesium. The objective of this study is to clarify the contribution of the SS to the migration of radiocaesium in forests.

Throughfall (TF) and litter leachate (LL) were collected in forested slopes in Ibaraki and Fukushima prefectures. The concentration of Cs-137 of the water samples were measured by germanium detectors before and after filtration using membrane filters with pore size of 0.45 micrometer.

The concentrations of Cs-137 of the TF collected in the Ibaraki site (evergreen coniferous forest) in March and April 2011 were 14 - 60 Bq/L. In this period, the most of Cs-137 was detected as dissolved. Then the total concentration (dissolved + SS) of Cs-137 decreased and the proportion of Cs-137 in SS increased. The total concentration temporarily exceeded 20 Bq/L in the following summer season and the most of Cs-137 was detected from SS. The temporal increase in the radiocaesium in SS also observed in LL. The similar patterns of the concentration change of Cs-137 in summer observed in TF and LL at the evergreen coniferous forest and the deciduous forest in Fukushima. In winter, the total concentration of Cs-137 decreased and the migration rate also decreased. From these results, it was confirmed that the contribution of SS to the migration of radiocaesium as TF and LL in forests increased during summer.

Keywords: Radiocaesium, Forest, Migration, Suspended solid