

Estimation of caesium runoff after the Fukushima accident with the consideration of the fractal mountain geometry

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In Fukushima Daiichi NPP accident, a lot of radioactive substance was released into a wide range of Fukushima Prefecture. It is necessary to estimate how long and how much radioactive contaminants will be discharged from the forest to the rivers and eventually to the sea. In this study, we tried a new method of prediction caesium (Cs-137). We apply the fractal geometry of the surface of mountains, thereby estimate the amount of runoff of surface soil with Cs-137 attached. It is a method to calculate z (height) coordinates of arbitrary points. We calculate the height of the location that we want to know from average of neighborhood points with the white noise. We can simulate a ridgeline of mountain, which similar to the real mountain. In the study, I used the midpoint displacement expanded into three dimensions. The universal soil loss erosion (USLE) model was used to calculate the volume of soil erosion of the simulated ground. And we calculate erosion of Cs-137 from the soil erosion volume. We compared this data of Cs-137 erosion and erosion of real ground. We found that our result agrees with the data roughly. So we concluded this method used the fractal simulation is useful.

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