Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)
©2015. Japan Geoscience Union. All Rights Reserved.

HDS07-05 Room:203 Time:May 25 11:00-11:15

The difference of vegetation formation and radioactivity accumulation due to different estuary forms

NOHARA, Seiichi[1] ; KANEKO, Korehisa[2*]

[1]National Institute for Environmental Studies, [2]Ecosystem Conservation Society - Japan

1. Introduction

A large amount of radioactive nuclides (^{131}I, ^{134}Cs, ^{137}Cs, etc.) were released into the environment by the accident which occurred at the Fukushima Daiichi Nuclear Power Station of Tokyo Electric Power Company on March 11, 2011. Particularly in estuaries, the accumulation of sediment by the catchment from the entire basin and the accumulation of radioactivity substances easily occur; we considered this to be affected due to the differences in the estuary's form (obstructed and open type estuary). However, there are not yet any study examples to be examined in detail about these contents.

In this research, we aim to be clear about the effect of the radioactive pollution on the plants by investigating the local environment (community component species, soil, spatial dose rate) and the ^{137}Cs absorption property of plant communities that are distributed near the different forms of estuaries.

2. Study site and methods

The study sites were the Niida River and Mano River, second-class rivers, located in the Minamisoma City, Fukushima Prefecture. As for estuary form of these rivers, the Niida River is an estuary obstruction type and the Mano River is an estuary opening type. The investigation was conducted on June late in 2013. The range of study sites were the main plant communities (*Phragmites australis*, *Typha domingensis*, *Miscanthus sacchariflorus*) that were distributed along the estuary, midstream and upstream of both rivers.

In methods, we conducted GPS survey marking 5 quadrats to each plant community, and then measured the spatial dose-rate in each quadrat. We also collected sediment cores from about 30cm deep from the surface layer using a PVC pipe. The cores were removed and sealed, maintaining the layer state, and we measured the PH and salinity of the pore water of the core hole via electric conductivity (we measured the electric conductivity as an indicator of the salts). The measurement of biomass in each quadrat was repeated for the above-ground part of the plant (0.5m $*$0.5m), and weighed.

3. Results and Discussion

The biomass of the main plant communities(*Phragmites australis*, *Typha domingensis*, *Miscanthus sacchariflorus*)were higher in Niida river. Concerning the spatial-dose rate of each plant community of both rivers, the *Phragmites australis* community was higher in Niida River, the *Typha domingensis* communities showed no significant difference, and the *Miscanthus sacchariflorus* community was higher overall in the Niida River. We considered that Niida River become a freshwater tidal area due to the suppression of sea water going upstream by estuary obstruction. Moreover, with the progress of the sediment accumulation from upstream, nutrient concentrations in the soil which accumulated in the estuary and part of the vegetation locations were higher, therefore, the biomass and density of *Phragmites australis* and *Miscanthus sacchariflorus* were higher. At the same time, because the sediment containing radioactive material that was carried from upstream is likely to be accumulated in the estuary, the spatial dose rate in plant communities became higher. On the other hand, the Mano River has no estuary obstruction, and the sediment is likely to overflow during floods. We considered the because salt water is going upstream during high tide, the density of *Phragmites australis* community was low due to salt stress, the sediment deposition is small and spatial dose-rate was low compared with that of the Niida River. We considered that community density of the *Typha domingensis* community was low compared with that of *Phragmites australis*, sedimentation is small without a decrease in river flow velocity, and the accumulated volume of the spatial dose-rate in the community was low when compared with the *Phragmites australis* and *Miscanthus sacchariflorus* communities.

Keywords: Radioactive Nuclides, Estuary form, Space Dose Rate, Plant Communities, Biomass, Salinity