

# Temporal Variation and Distribution of Radionuclides Released from the Nuclear Fuel Reprocessing Plant in Rokkasho

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## Abstract

The first commercial nuclear fuel reprocessing plant in Japan, located in Rokkasho, Aomori Prefecture finished its final testing using actual spent nuclear fuels and it is now preparing for full operation. To clarify the temporal variation and distribution of radionuclides ( $^3\text{H}$ ,  $^{14}\text{C}$ ,  $^{129}\text{I}$ , etc.) released from the plant, we measured the concentrations of radionuclides in environmental, agricultural and livestock samples collected at points around the plant, and we also measured the environmental  $\gamma$ -ray dose rates at IES (Institute for Environmental Sciences).

Because no nuclear fuel rods have been sheared or dissolved at the plant since October 2008, we found concentration levels of the radionuclides in most environmental samples collected in FY 2021 were similar to the background ones before the plant test operation, excluding several samples. Iodine-129 deposited on soil and lake sediment surfaces around the plant has still remained at a higher level than each background level. Focusing on  $^{129}\text{I}$  in air at IES, we observed the mean atmospheric  $^{129}\text{I}$  concentrations in particulate and gaseous forms from FYs 2016 to 2021 were  $(2.8 \pm 3.7) \text{ E-10}$  and  $(7.0 \pm 4.6) \text{ E-10 Bq m}^{-3}$ , respectively. Approximately the same levels of  $^{129}\text{I}$  concentration were observed at other points in Aomori Prefecture. Atmospheric  $^{129}\text{I}$  concentration tended to be higher in the gaseous form than in the particulate form. In addition, the temporal variations of atmospheric  $^{129}\text{I}$  concentration at IES, Futamata district in Rokkasho and Hirosaki City have shown similar patterns, being high in winter and low in other seasons. These observed facts could be reasonably explained by assuming that the  $^{129}\text{I}$  discharged from commercial reprocessing plants in Europe was transported long distances by winter monsoons.

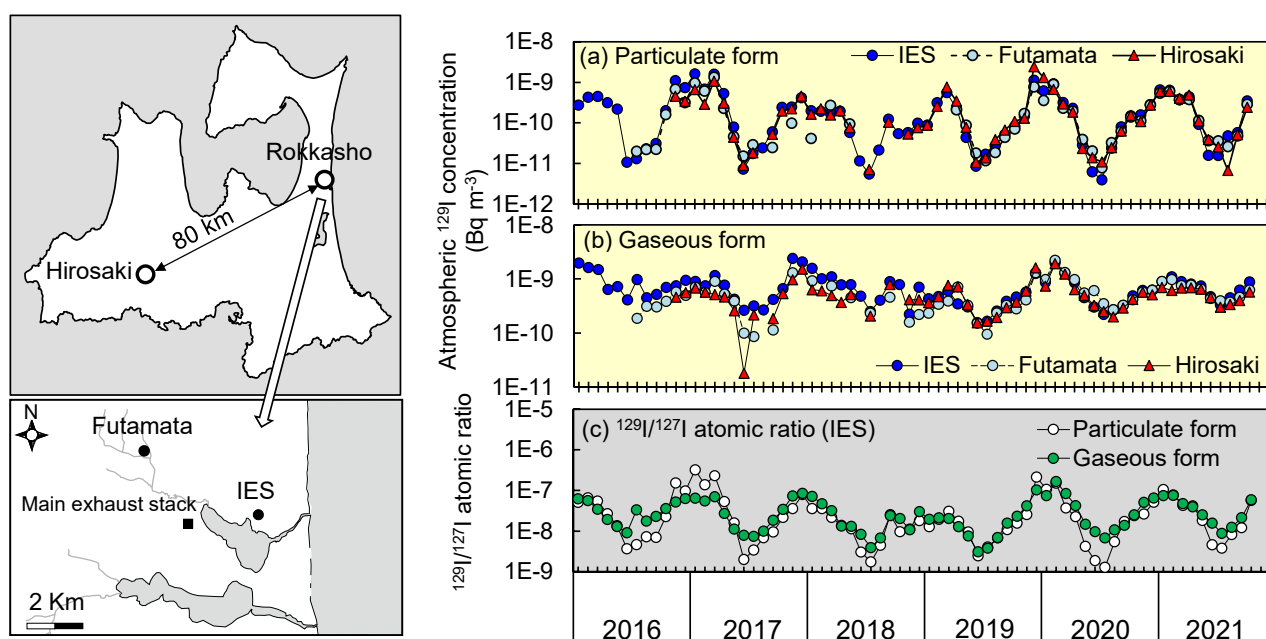


Fig. 1 Temporal variations of  $^{129}\text{I}$  deposition flux at IES, Futamata district in Rokkasho and Hirosaki City, Aomori Prefecture.