

Behavior of Environmental Tritium at NIFS Toki Site of Japan

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The levels of tritium in the atmosphere nowadays are those of natural origin before the nuclear test. Nuclear power stations, nuclear reprocessing plants and fusion facilities are observed as a further occurrence source. Then, in order to appraise the influence of nuclear facilities and long distance transport from the continent where tritium level is relatively high, it is necessary to investigate background levels of tritium. The primary purpose is to develop the technique to evaluate the environmental tritium behavior of the facility origin. Because there are a seasonal variation, a year change and a climate change in the environmental tritium behavior, the continuous investigation is necessary.

Tritium concentrations of river water, precipitation and ground water were determined by low background liquid scintillation measurement system combined with the electrolysis using solid polymer electrolyte in the NIFS site. The electric conductivity and the flow rate of the river were also investigated continuously. At the same time, the isotopic-ratio of oxygen and hydrogen of water samples were measured. The range of tritium concentrations in precipitation were 0.09-0.78 Bq/l (average 0.40 ± 0.14 Bq/l). The tritium concentration is low in the summer and the autumn and is high in the winter and the spring. The tritium concentrations of river water and ground water were almost constant, 0.34 Bq/l and 0.24 Bq/l. The isotopic-ratio of oxygen and hydrogen showed a typical change pattern in Japan which depends on the summer and the winter. The simple dynamic model around the NIFS facilities was developed using these variation data and the behavior of tritium was simulated.