

§10. Environmental Tritium

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We have been measuring environmental tritium concentration by means of liquid scintillation counting method since June 1982 in Higashiyama and Toki area. In Toki area, water samples were collected from rivers, wells, taps and springs. Sampling points in Toki area are shown in Fig 1. Water vapor in the air, precipitation and free water component in vegetation were also collected.

Most of the measurements so far, however, were made with river water samples from the Toki River and its branch rivers. Fig. 2 shows average fluctuation values of the measurements of main 7

Samples from the rivers until 1991. The tritium concentration has gradually been decreasing and arrived at about 1Bq/L in 90s. The value is almost equals to the natural tritium concentration. Tritium is naturally produced by spallation reaction between the cosmic rays and air particles in the stratosphere. The natural tritium concentration is in equilibrium with the production and disintegration including dilution.

In early 60s a lot of nuclear tests were carried out in the air. As a result, environmental tritium concentration became much higher than the natural level. After the conclusion of a nuclear test ban agreement in 1993, the concentration has gradually been decreasing and arrived at about 1Bq/L in 90s, as is shown in Fig.2.

The concentration of 1Bq/L is almost same with the detection limit of our old liquid

scintillation counter, Aloka LB-I. Then our measurement was stopped for several years. In 1996, we introduced a new counter Aloka LB-III which has lower detection limit. Using this device we have started the measurement again. The results are shown in Table 1, but some of them were lower than the detection limit of the new device.

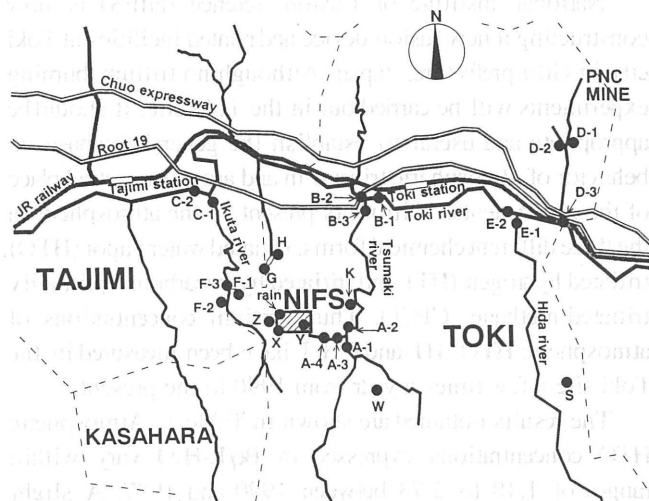


Fig.1 Sampling points of environmental water

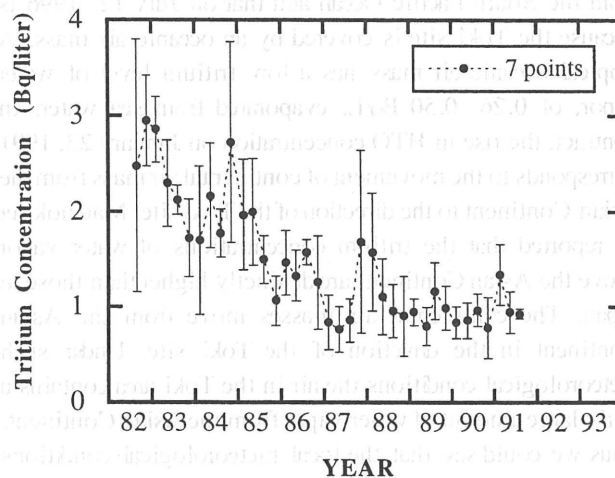


Fig.2 Tritium concentration in rivers at Toki.

Table 1 Recent results.

Date	A-1	A-3	B-1	B-3	C-1	F-1	F-2	Z	[Bq/L]
93/5/11									1.18 ± 0.15
93/11/4	1.03 ± 0.14	1.05 ± 0.15		1.02 ± 0.14	1.06 ± 0.14		1.07 ± 0.14		
94/2/8		1.09 ± 0.14		0.95 ± 0.14		0.98 ± 0.14	1.10 ± 0.14		
94/5/10		1.02 ± 0.14		1.04 ± 0.14					
94/11/1							1.07 ± 0.14		
95/2/7		1.12 ± 0.13							