

§6. Concentration of Environmental Tritium

Sakuma, Y., Yamanishi, H., Obayashi, H.

This subject is focused on the background survey of environmental tritium, prior to the construction of the Large Helical Device (LHD). The experimental program is divided into two phases. In the first phase, experiments using a hydrogen (H) plasma with H⁺-beam injection will be carried out, and in the second phase, the use of a deuterium (D) plasma and D⁺-beam for plasma heating is planned, in order to enhance plasma quality. In the latter case, a small amount of tritium (T) will be generated due to the DD fusion reaction. We estimate the total amount of T produced in the vessel up to the year 2006 to be 430GBq (11.6Ci).

The tritium concentration of surface water fluctuates with time and places. We have been measuring it since 1982, in the Toki River and its branch streams, tap water in Toki and Higashiyama, and adding to them water vapor in the air at Higashiyama and so on.

The sampling points of surface water (15 in all) are selected within the Toki basin. We have been collecting these samples at regular intervals of three months. We measure the tritium concentration by means of liquid scintillation counting method without giving the tritium enriching procedures.

Figure 1 shows the results of two sampling points within fifteen; a stream in the site and the Toki. As was shown in the figure, the observed values of the Toki are apparently decreasing and recent values are almost constant: around 1 Bq/L or less. The difference between the two points is disappearing.

Figure 2 shows mean values of tritium concentration of the main eight points and the concentration of Higashiyama tap water. The decreasing features are

also shown in the figure. Because of the ban of nuclear tests in the atmosphere, the concentration is decreasing, and recent values are also almost fixed.

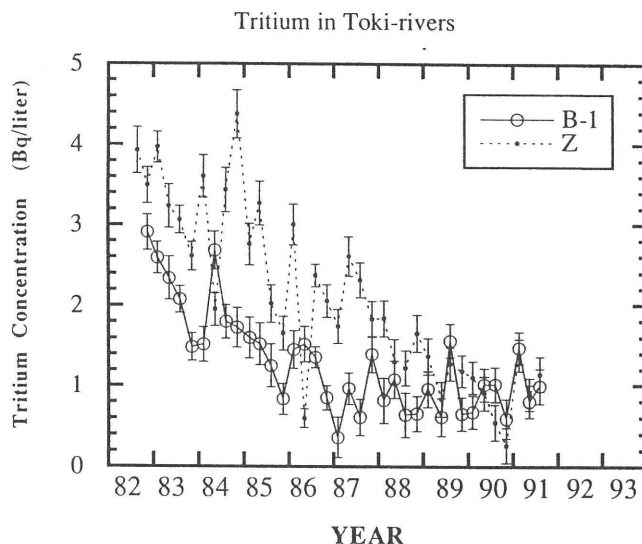


Fig.1. Tritium Concentration of two Points: B-1(the Toki) and Z(in the site)

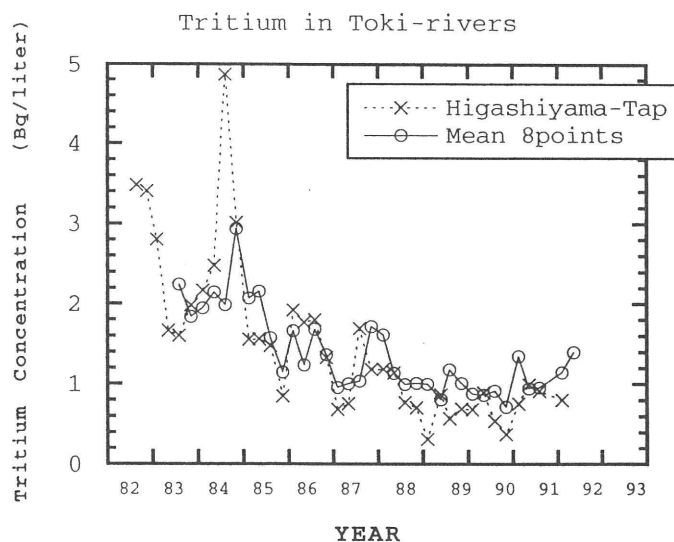


Fig.2. Tritium Concentration of Mean Eight Points and Higashiyama Tap Water