

§11. Environmental Radiation Monitoring at Toki Area

Uda, T., Sakuma, Y., Yamanishi, H., Kawano, T., Miyake, H., Shinotsuka, K., Asakura, Y., Obayashi, H., Tanahashi, S., Hayashi, M., Kaede, M., Hasegawa, K., Ando, Y., Ando, S., Hobo, N., Morikawa, A., Kumasaki, K., Mizuno, H., Sawada, S., Tanaka, K. (Plasma Research Committee of Toki-city), Maruyama, H. (Sue Primary School), Taguchi, M. (Tajimi Technical High School), Takagi, M. (Ena High School), Sasaki, T. (Tajimikita High School), Kano, J. (Tajiminishi High School)

Environmental radiation monitoring has been made to investigate radiological distribution and characteristics with time elapse under natural conditions. To clarify the regional radiological characteristics means to study environmental dynamics from the viewpoint of geological effects to the local area according to operation of LHD and other X-ray generating devices in the Toki Site of NIFS. This study started as collaboration with Plasma Research Committee of Toki-City. It is significant to collaborate with science teachers of schools in and around Toki City from viewpoint of education and public acceptance for research activities of NIFS. In the present report, results of environmental radiation monitoring and some activities of the committee are mentioned. Environmental radiation monitoring methods and results are as follows.

TLD (thermo-luminescence dosimeter) sensors ($\text{CaSO}_4 \cdot \text{Tm}$, UD-200S made by Matsushita Electric Co.) were set at 16 points in Toki and Tajimi area in 3 months, specifically speaking that they are exchanged on the each first Saturday of June, September, December and March. The environmental radiation exposure rates are distributing in 50-150 mR/y, almost equal to 0.5-1.5 mSv/y. There is not a noticeable fluctuation of the dose level at the same point. Major dose level seems to depend on the geological condition. For example, high dose level is observed at the granite layer cropped out place. The TLD is possible to measure external radiation exposure dose rate, to the other hand Radon

monitor is possible to estimate radiation source relating to internal exposure dose.

As natural radiation source, radon and its daughters have been measured. Radon and its daughters are considered as representative natural radiation source for public exposure especially in-door residents. The radon concentration was measured with a nuclear track detector of CR-39 plastic plate. The radon concentrations observed are around 10-20 Bq/m³ beside the point of Kawai where is about 30-60 Bq/m³, and concentration measured in a few years is not stable. This continuous radon monitoring is useful to understand the natural radiation source.

The members of the committee studied about fundamental characteristics of radiation and various radiation properties based on the routine environmental radiation monitoring and discussion. Except of the precedent meeting, special event was planned in summer, then we visited to linear mortar-car experimental facility in Nagoya City. It might be useful to understand about the application technology of magnetic power.

The members also visited to a wind power plant in Hisai City. The wind power plant is thought to be one of the future candidate natural energies. It might be helpful to understand the various energy sources for future generation considering protection of environment.

Other activities of the committee are summarized as follows.

- (1) Prof. Y. Ichimasa (Ibaraki University) lectured fundamentals about biological effects of tritium and tritium behavior in the environment.
- (2) Prof. Y. Fujikawa (Kyoto Univ.) lectured fundamentals about analytical study of environmental radionuclides and their behavior. These topics may be very interesting and familiar for public in Toki and the other cities considering the natural radiation source in soil.
- (3) Some teachers reported practically performing education in school and researches discussed about the affectivity. For example, geological aspect in Toki City was presented as interesting topics.

These activities of the the Plasma Research Committee is expected to be applied for the science education in primary schools, junior high schools and high schools.