

Research Activities



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Science for Radiation Protection

Dosimetry of residents in nuclear hazards was previously studied through physical methods. This entailed external and internal doses for residents being systematically evaluated by in-situ measurements for activities in environment, food, the human body, environmental radiation and laboratory sample analysis. Our findings resulted in the 2005 publication of Nuclear Hazards in the World.

The residents around the Mayak plutonium production complex in the former USSR were studied in situ in April-May 2000. The study indicated the presence of serious internal Sr-90 exposure. Beta ray measurements on the front teeth of the Rongelap people carried out in 2005 showed considerable doses of internal radiation produced by Sr-90. We applied similar tests for Sr-90 internal dosimetry on Japanese people in order to check for radioactive fallout from Chinese nuclear explosions. The maximum evaluated dose was 7mSv.

The largest critical radiation accident to date in Japan occurred at the uranium conversion facilities in the village of Tokai on September 30, 1999. This accident taught us the importance of dose evaluation and radiation protection, reading available information and lectures, and psychological care for the local population. We are studying ways in which we can be better prepared in the future to deal with these issues. We have analyzed anisotropic radiation distribution and evaluated the external doses for residents involved in JCO accidents.

In addition to the above, we also conducted a radiation hygiene survey after the March 2011 Fukushima Dai-Ichi nuclear power station disaster due to the tsunami caused by the enormous earthquake. Our survey has revealed that the public annual dose was 10 mSv following the disaster and in situ dose evaluations did not suitably address health hazards. This study has focused on internal dosimetries of iodine-131 in the thyroid and cesium-134,-137 in the whole body. We have especially been studying radiation hygiene in cattle livestock in Namie, a town located within the 20km evacuation zone around the Fukushima Daiichi nuclear power station. To date, we have found no problem regarding recovery prospects.

Finally, we have conducted research in China, which has had 46 nuclear explosions with yields of 20 megatons over a wide area extending to more than 1000km along the Tarim Basin. Field studies for radiation were conducted in and around the Taklamakan Desert by our research group in 2012. These studies indicated there were lethal risks in the areas.

List of Main Publications from 2009 to 2013

- 1) Takada J.Chinese Nuclear Tests. (2009).1-158. Iryokagakusya, Tokyo. (English and Uyghur).
- 2) Takada J.Hopeful Nuclear Energy Technology in Japan. Radiation Protection Medicine 5.(2009).1-8(in Japanese).
- 3) Takada J. Nuclear Desert and Risk on Silk road sightseeing.(2009). 1-78, Iryokagakusya, Tokyo (in Japanese).
- 4) Tanaka K, Yokobori H, Endo S, Kobayashi T, Bengua G, Saruyama I, Nakagawa Y, Hoshi M. Characteristics of proton beam scanning dependent on Li target thickness from the viewpoint of heat removal and material strength for accelerator-based BNCT, Appl Rad Isot. (2009).67: 259-265.

- 5) Tanaka K, Takatsuka S, Kamo K, Takada J. Radiation damage of semiconductor element by gamma ray exposure, *Radiation Protection Medicine* 5.(2009).32-35.
 - 6) Takada J. Lessons of Nuclear Radiation Protection from Nuclear Weapon Developments in the Soviet.(2010).1-124 (in Japanese).
 - 7) Takada J. Nucleus and sword, Showa history and struggles Heisei , Meiseisha.(2010).1-300.Meiseisha, Tokyo.
 - 8) Kanamori M, Suto T, Tanaka K, Takada J: A Study on Dose Evaluation for Tokaimura Criticality Accident Termination, *JAEA-Technology* 2010-025.(2012)1-11.
 - 9) Tanaka K. Endo S. Hoshi M. Measurements of neutron distribution in neutrons-gamma rays mixed field using imaging plate for neutron capture therapy. *Applied Radiation and Isotopes*,(2010) 68: 207-210.
 - 10) Tanaka K. Endo S. Hoshi M. Takada J. Development of monitoring method of spatial neutron distribution in neutrons-gamma rays mixed field using imaging plate, *Challenges in Neutron Capture Therapy (Proc. of the 14th International Congress on Neutron Capture Therapy)* (Edited by Sara Liberman et al.).(2010) .195-198.
 - 11) Kanamori M, Suto T, Tanaka K, Takada J: A study on dose control for Tokaimura criticality accident termination, *Rad. Prot. Dosimetry*, (2011).146: 42-45.
 - 12) Takada J. East Japan Radiation Hygiene Survey and Rehabilitation plan in 20km area of Fukushima 1st nuke, *Radiation Protection Medicine* 7.(2011):1-8 (in Japanese).
 - 13) Takada J: Fukushima: Neither Chernobyl, Nor Hiroshima, *Global EnergyPolicyResearch*, <http://www.gepr.org/en/contents/20120220-01/> 2011.
 - 14) Tanaka K, Takada J. Development of in-situ measurement method for 90Sr contamination, *Radiation Protection Medicine* 7(2011).37-40 (in Japanese).
 - 15) Tanaka K. Takada J. Development of in-situ measurement for 90Sr specific activity by b ray survey meter combined with sensitivity correction by Monte Carlo calculation, *Applied Radiation and Isotopes*, (2011).69: 814-817.
 - 16) Tanaka K. Endo S. Hoshi M. Takada J. Development of monitoring method of spatial neutron distribution in neutrons-gamma rays mixed field using imaging plate for NCT – Depression of the field –, *Applied Radiation and Isotopes*, (2011).69: 1885-1887.
 - 17) Tanaka K. Tateoka K. Asanuma O. Kamo K. Bengua G. Sato K. Ueda T. Takeda H. Takagi M. Hareyama M. Takada J. A dosimetry study of the Oncoseed 6711 using glass rod dosimeters and EGS5 Monte Carlo code in a geometry lacking radiation equilibrium scatter conditions, *Medical Physics*, (2011).38: 3069-3076.
 - 18) Takada J. Fukushima: Myth and Reality, *Iryokagakusya*, (2012).1-59, Iryokagakusya, Tokyo.
 - 19) Nakagawa Y, Takada J. Japan perish nuclear zero, (2012).1-253, Okura, Tokyo.
 - 20) Takada J. Radiation hygiene survey on human and cattle in Fukushima prefecture, No health hazards due to low doses, 1-4, *The Sapporo Medical Journal*, (2012).81,1-4 .
 - 21) Murahashi H, Takada J. Lower mortality rate of colorectal cancer in areas with higher dose rate of ultraviolet, *J. Center for medical education, Sapporo Medical University*,(2013).4:17-20.
 - 22) Takada J. Low Dose Radiation and No Health Risk in Fukushima in Contrast to Chernobyl, *Genes and Environment*,(2013). 35(3):69-72.
 - 23) Tanaka K, Takada J. Development of collimator for in-situ measurement of 90Sr specific activity by b-ray survey meter and Monte Carlo calculation, *Applied Radiation and Isotopes*, (2013).77: 1-4 .
 - 24) Takada J. We cannot live without radiation. (2013).1-107, Iryokagakusya,, Tokyo (in Japanese).
 - 25) Takada J. Past and Present of the Silk Road.(2013).1-75, Iryokagakusya, Tokyo (in Japanese).
- Takada J. We control the nuclear power in the 21st century.(2013).1-281 ,Iryokagakusya , Tokyo (in Japanese)