

# International Symposium on

Environmental monitoring and dose estimation of residents after accident of TEPCO's Fukushima Daiichi Nuclear Power Stations

14 December 2012 The Shiran Hall, Kyoto University

KURRI Research Program for Scientific Basis of Nuclear Safety

# Programme

### **Preface**

In March 2011, a massive earthquake and the resulting tsunami struck the Tohoku area in Japan, causing serious damages to TEPCO's Fukushima Daiichi nuclear plant and the release of a significant quantity of radionuclides into the surrounding environment. This accident underlined the necessity of establishing new and comprehensive scientific research for promoting safety in nuclear technology. With this aim, the Kyoto University Research Reactor Institute (KURRI) developed a new research program called the "KUR Research Program for Scientific Basis of Nuclear Safety" from this year. In this program, we are planning to hold an annual series of international symposiums along with many other research activities.

The first in this series of symposiums, entitled "The International Symposium on Environmental Monitoring and Dose Estimation of Residents after Accident of TEPCO's Fukushima Daiichi Nuclear Power Station," deals with the radiological effect of the March 2011 accident in Fukushima Daiichi NPP on the public. The purpose of this symposium is to collate data on environmental radioactivity and radiation dose in residents, discuss and verify these data, and clarify the actual situation of environmental contamination and resultant radiation exposed to the residents. We believe that an accurate estimation of the radiation dose is quite essential for planning for the healthy life and mental contentment of the residents, and we hope that many researchers who are studying the radiological effects of the accident will join us for these purposes. The environmental monitoring data are important for the dose assessment for residents. However, the monitoring data in the early stage are not sufficient for dose assessment, particularly near the NPP site, because of the confusion and blackout caused by the earthquake. However, many researchers and organizations in Japan and other countries have independently carried out radiation monitoring. We believe that the publication and reviewing of these data is not only essential but our duty toward future generations.

Approximately 10 invited lectures and 50 scientific papers will be presented in the symposium. Almost all the presentations have been written as original scientific papers, peer reviewed by specialists of the relevant research fields, and included in the proceedings booklet. On behalf of all the participants of the symposium, I sincerely hope that this symposium and its proceedings will contribute to the faster recovery of people who have encountered damages from the accident and will promote further progress in the research on nuclear safety.

Hirotake Moriyama Director, Kyoto University Research Reactor Institute Chair of the organizing committee

## Host Organization

Kyoto University Research Reactor Institute (KURRI)

## Support organization

- ·Japan Radiation Research Society
- Atomic Energy Society of Japan
- ·Japan Health Physics Society
- · Japan Society of Nuclear and Radiochemical

## Organizing Committee

Chair: Hirotake Moriyama (Director, KURRI) Dr. Jiro Inaba (REA) Dr. Kimiaki Saito (JAEA) Dr. Kazuo Sakai (NIRS) Prof. Hirofumi Tsukada (Fukushima Univ.) Dr. Shigeo Uchida (NIRS) Prof. Itsumasa Urabe (Fukuyama Univ.) Prof. Hiromi Yamazawa (Nagoya Univ.) Prof. Akio Koyama (KURRI) Prof. Ken Nakajima (KURRI) Prof. Sentaro Takahashi (KURRI) Prof. Hajimu Yamana (KURRI)

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Prof. Hajimu Yamana (KURRI) Prof. Yoshiharu Yonekura (NIRS) Prof. Williams Lee, (Department of Materials, Imperial College London)

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## Program

| 9:00-10:00  | Registration, Poster Reception  |  |
|-------------|---|--|
| 10:00-10:05 | <b>Opening remarks</b>  | Prof. Hirotake Moriyama, Director of KURRI   |
| 10:05-11:05 | Accident of Fukus<br>-Sequence  | s <b>hima Daiichi Nuclear Power Plant</b><br>es, FP released, Lessons learned–<br>Speaker: Prof. Jun Sugimoto (Kyoto University)<br>Chair: Prof. Ken Nakajima (KURRI)  |
| 11:05-11:50 | IAEA safety standa  | rds for radiological protection of the public in post-accident situations<br>Speaker: Dr.Gerhard Proehl (IAEA)<br>Chair: Hirofumi Tsukada (Fukushima University)   |
| 11:50-13:20 | Lunch and poster session  |  |
| 13:20-14:20 | UNSCEARs assess   | sment of radiation levels/effects from Fukushima accident<br>Speaker: Prof. Wolfgang Weiss<br>(Chair for the fifty-eighth and fifty-ninth sessions of UNSCEAR)<br>Chair: Prof. Hirotake Moriyama (Director of KURRI) |
| 14:20-15:05 | Radiation monitor   | <b>ing and mapping around the Fukushima site</b><br>Speaker: Dr. Kimiaki Saito (JAEA)<br>Chair: Prof. Hiromi Yamazawa (Nagoya University)  |
| 15:05-15:35 | Coffee break and poster session   |  |
| 15:35-15:50 | Implication of the isotopic ratios of radionuclides observed in the contaminated<br>areas surrounding Fukushima-Daiichi NPP<br>Speaker: Prof. Hajimu Yamana (KURRI)<br>Chair: Prof. Itsumasa Urabe (Fukuyama University)              |  |
| 15:50-16:10 | Development of a car-borne survey system, KURAMA<br>Speaker: Prof. Minoru Tanigaki (KURRI)<br>Chair: Prof. Itsumasa Urabe (Fukuyama University)   |  |
| 16:10-16:40 | NIRS's activities for the reconstruction of early internal exposure in the TEPCO<br>Fukushima Daiichi Nuclear Power Station accident<br>Speaker: Dr. Osamu Kurihara (NIRS)<br>Chair: Prof. Nobuhiko Ban (Tokyo Healthcare University) |  |
| 16:40-17:10 | Release of plutoniu   | <b>m isotopes from the Fukushima Daiichi Nuclear Power Plant accident</b><br>Speaker: Dr.Jian Zheng (NIRS)<br>Chair: Prof. Nobuhiko Ban (Tokyo Healthcare University)  |
| 17:20-17:50 | Discussion  | Chair: Dr.Kazuo Sakai (NIRS)<br>Co-chair: Prof. Sentaro Takahashi (KURRI)  |
| 17:50-17:55 | Closing remarks   | Prof. Hajimu Yamana (KURRI)  |
| 18:00-19:30 | Reception   |  |

### Poster sessions

#### **Topics 1** Radiation survey in environment

- 1 Kazuhiro Akimoto Wind-Driven Transport of Resuspended Radioactive Dust in Fukushima Prefecture
- 2 Takao Ebisawa, Seiichi Hirose, Etsuko Furuta, Keiji Kusama, Takeshi Iimoto Environmental radiation status in Bunkyo-ku, Tokyo, after the TEPCO Fukushima Dai-ichi NPP Nuclear Disaster
- 3 Seiichi Someya, Hirofumi Fujii, Takeshi Iimoto Environmental radiation status in Kashiwa City (Chiba Prefecture) after the TEPCO Fukushima Dai-ichi NPP Nuclear Disaster
- 4 Sadao Iiizumi, Hirofumi Fujii, Takeshi Iimoto Environmental radiation status in Nagareyama City (Chiba Prefecture) after the TEPCO Fukushima Dai-ichi NPP Nuclear Disaster
- 5 Takeshi Iimoto, Norio Nogawa, Hiroshi Mitani, Masao Kamiko, Takahiko Suzuki Environmental radiation status in The University of Tokyo after the TEPCO Fukushima Dai-ichi NPP Nuclear Disaster
- 6 Takumi Kubota, Tomoko Ohta Radiation measurement in the East Japan with a GM-tube detector after the Fukushima nuclear accident
- Takumi Kubota, Jun-ichi Hori, Nobuhiro Sato, Koichi Takamiya
  Measurement of radiation dose by car in Fukushima from 19 to 22 March 2011
- 8 Nobuhito Ohte, Masashi Murakami, Kohei Iseda, Keitaro Tanoi, Nobuyoshi Ishii Diffusion and transportation dynamics of <sup>137</sup>Cs deposited on the forested area in Fukushima after the nuclear power plant accident in March 2011
- 9 Shinji Sugihara, Noriyuki Momoshima, Akihiro Maekawa, Ryohei Ichikawa, Hidehisa Kawamura Distribution of gamma-ray dose rate in Fukushima Prefecture by a car borne survey method
- 10 Kazuaki Yajima, Kazuki Iwaoka, So Kamada, Masashi Takada, Hiroyuki Tabe, Hidenori Yonehara, Sin-ya Hohara, Genichiro Wakabayashi, Hirokuni Yamanishi, Tetsuo Itoh, Michio Furukawa Dose rate survey inside and outside three types of public buildings located approximately 40 km northwest from the Fukushima Daiichi Nuclear Power Stations
- 11 Kazuaki Yajima, Kazuki Iwaoka, Hiroshi Yasuda Radiation survey along two trails in Mt. Fuji to investigate the influence of the radioactive contamination due to the Fukushima nuclear accident
- 12 Tomoaki Yamamoto, Kenzo Muroi, Sumito Maruyama, Takahisa Koike, Marina Matsuda, Kenichiro Katsumata Environmental radiation doses due to the accident at the Fukushima Daiichi Nuclear Power Plants

- 13 Tetsuo Itoh , Michio Furukawa, Nobuyuki Sugiura, Hirokuni Yamanishi, Genichiro Wakabayashi Tetsuo Horiguchi, Shin-ya Hohara, Masayo Inagaki, Hiroshi Noma, Kiyoshi Kojima Survey of environmental radiation in Kawamata-machi, Fukushima-ken
- 14 Masahiro Yoshida Environmental radiation measurements immediately after the accident and dose evaluations by soil deposition

#### Topic 2 Environmental Radioactivity

- 1 Tatsuo Aono, Satoshi Igarashi, Yukari Ito, Jyota Kanda, Takashi Ishimaru Radioactivity Survey in Marine Environment in the Pacific off Fukushima after Accident of TEPCO's Fukushima Daiichi Nuclear Power Station
- 2 Satoru Endo, Tsuyoshi Kajimoto, Kiyoshi Shizuma Dose rate estimation for northern Miyagi Prefecture area at the early stage of Fukushima accident
- 3 Naoto Fujinami, Naoto Miyajima, Tetsuya Watanabe, Yoshihiro Tanabe, Hajime Nishiuchi Influence of the Fukushima Daiichi Nuclear Power Plant Accident observed from results of environmental radiation monitoring in Kyoto
- 4 Ryuta Hazama, Akihito Matsushima Comparison between fallout with rain from Fukushima, Chernobyl reactor accidents in Japan, and Hiroshima atomic bomb
- 5 Sin-ya Hohara, Masayo Inagaki, Hirokuni Yamanishi, Genichiro Wakabayashi, Wataru Sugiyama, Tetsuo Itoh Survey of radioactive contamination distribution at Naka-Dori area, Tohoku Region, Japan
- 6 Nobuyoshi Ishii, Hiroyuki Koiso, Keiko Tagami, Shigeo Uchida Elution of radiocesium from soil
- 7 Hidesuke Itadzu, Tetsuo Iguchi, Toshikazu Suzuki Development of rapid self-absorption correction method used for HPGe detector
- 8 Tsuyoshi Kajimoto, Satoru Endo, Takeshi Naganuma, Kiyoshi Shizuma Distribution of radioactive 137Cs and 134Cs in river water and bottom sand for major rivers at Minami-Souma City in Fukushima
- 9 Akihiro Maekawa, Noriyuki Momoshima, Shinji Sugihara, Toshiya Tamari Determination of radiostrontium released from Fukushima Daiichi Nuclear Power Plant by extraction chromatography and liquid scintillation counting
- 10 N. Momoshima, S. Sugihara, R. Ichikawa, A. Maekawa, R. Ozawa, A. Nakama Radioactivity in vegetation at Fukushima area contaminated with radionuclides released from TEPCO's Fukushima Daiichi Nuclear Power Stations
- 11 Kimihito Nakamura, Tetsuo Yasutaka Characteristics of radiocesium concentration in stream water from a catchment in hilly and mountainous area at rainfall event

- 12 Tatsuya Shimazaki, Yoshioki Shiraishi, Kumiko Goto, Akihiro Kojima, Toru Urano, Seiji Okada Specific activity and time dependence of radionuclides in soils affected by the accident of the Fukushima Dai-ichi nuclear power plant.
- 13 Kiyoshi Shizuma, Tsuyoshi Kajimoto, Satoru Endo Early air sampling in Higashi-Hiroshima after the accident of the Fukushima daiichi nuclear power plant and subsequent sampling in Minami-Souma City during October 2011 to September 2012.
- 14 Keiko Tagami, Shigeo Uchida, Nobuyoshi Ishii, Jian Zheng Estimation of Tellurium-132 distribution in Fukushima prefecture
- 15 Yoshito Watanabe, San'ei Ichikawa, Masahide Kubota, Masahiko Mizoguchi, Toshiyuki Takano, Yoshihisa Kubota, Shoichi Fuma, Satoshi Yoshida Effects of radionuclide contamination on forest trees in 20 km exclusion zone around the Fukushima Daiichi Nuclear Power Plant
- 16 Masanobu Ishida, Ryota Nakagawa, Kohei Umetsu, Miyabi Sugimoto, Yuta Yamaguchi, Hideo Yamazaki

Geographical distribution of radioactive nuclides released from the Fukushima Daiichi Nuclear Power Station accident in the metropolitan area, Japan

- 17 Ryota Nakagawa, Masanobu Ishida, Daisuke Baba, Satomi Tanimoto, Yuichi Okamoto, Hideo Yamazaki
   Spatial and temporal distribution of <sup>134</sup>Cs and <sup>137</sup>Cs derived from Fukushima Daiichi Nuclear Power Station in the sediment of Tokyo Bay, Japan
- 18 Tetsuo Yasutaka, Yoshishige Kawabe, Kimihito Nakamura, Akihiro Kurosawa, Takeshi Komai Monitoring dissolved radioactive cesium in the Abukuma river water in Fukushima Prefecture
- 19 Wenting Bu, Jian Zheng, Tatsuo Aono, Keiko Tagami, Shigeo Uchida, Jing Zhang, Makio Honda, Masatoshi Yamada Investigating plutonium contamination in marine sediments off Fukushima following the Fukushima Daiichi Nuclear Power Plant accident

#### **Topics 3** Transfer model and/or parameters

- Shigeto Fujimura, Takeshi Ohno, Yasuyuki Muramatsu, Hirofumi Tsukada, Kunio Yoshioka, Hiroshi Saito, Mutsuto Sato, Makoto Sato, Yuuki Sakuma The use of rice seedlings to estimate the transfer of radiocaesium from soil to plants in Fukushima Prefecture
- Jun Hirouchi, Tian Zhang, Yasuhiro Takamura, Shigekazu Hirao, Jun Moriizumi, Hiromi Yamazawa
   Deduction of useful information from dose rate monitoring data in an emergency
- 3 Nao Ishikawa, Ayumi Ito, Teruyuki Umita Possibility of removing radionuclides in landfill leachate using advanced wastewater treatment processes

- 4 Kayoko Iwata, Keiko Tagami, Shigeo Uchida Estimation of ecological half-lives of radiocesium in marine biota at the offshore of Fukushima, Japan
- 5 Masanori Kimura, Kazumasa Shimada, Shogo Takahara, Fumihisa Nagase, Toshimitsu Homma Estimation of accident source terms for the Fukushima Daiichi Nuclear Power Plant using RAMS/HYPACT
- 6 Hi-Rocky Ohtani, Xiaoguang Lu, Akira Tsuchiya, Shinichiro Yoshida, Takahiro Hirayama Sedimentation diffusion of radioactive cesium in a paddy field.
- 7 Takashi Saito, Satoru Ohkoshi, Shigeto Fujimura, Koji Iwabuchi, Masaaki Saito, Tomoaki Nemoto, Mutsuto Sato, Makoto Sato, Kunio Yoshioka, Hirofumi Tsukada Distribution of radiocesium on cultivated field and suppressive effect of radiocesium uptake in brown rice by potassium
- 8 Yasukazu Suzuki, Takasi Saito, Hirofumi Tsukada Phytoremediation of radiocesium in different soil using cultivated plant
- 9 Guosheng Yang, Jian Zheng, Keiko Tagami, Shigeo Uchida Direct determination of tellurium in soil and plant samples by sector-field inductively coupled plasma mass spectrometry for the study of soil-plant transfer of radioactive tellurium following the Fukushima Daiichi Nuclear Power Plant accident

#### **Topics 4** Source term estimation

1 Shigekazu Hirao, Hironori Hibino, Takuya Nagae, Jun Moriizumi, Hiromi Yamazawa, Source term estimation using environmental monitoring data

#### **Topics 5 Dose estimation**

- 1 Hikaru Amano, Yuji Ohta, Shigeru Banba, Takeshi Maeyama, Yoshihiro Ikeuchi, Takao Morimoto Radiation doses from external and internal by inhalation of atmosphere and ingestion of drinking water contaminated by the Fukushima Daiichi Nuclear Power Plants Accident for the people living in the Chiba district.
- 2 Sakae Kinase, Masanori Kimura, Shinji Hato Internal dosimetry for continuous chronic intake of caesium-137 in cedar pollen after the Fukushima Daiichi Nuclear Power Plant accident
- 3 Kouta Kurihara, Yuko Kinashi, Kenichi Okamoto, Eiko Kakihana, Tomohiro Miyake, Tomoyuki Takahashi, Keiko Fujiwara, Hiroshi Yashima, Hidehito Nakamura, Sentaro Takahashi Internal radiation dose of KURRI volunteers working at evacuation shelters after TEPCO's Fukushima Daiichi nuclear Power Plant accident

#### 4 Shigeru Kumazawa

Distribution of doses to residents evacuated after Fukushima Nuclear Power Station accident

5 Yoshiyasu Nagakawa, Takashi Suzuki, Yasuhito Kinjo, Noboru Sakurai, Takahiro Sotodate, Hiroaki Ise

Measurement of radioactivity in air-borne dust and estimation of public dose in Tokyo after the Fukushima Daiichi Nuclear Power Plant Accident

- 6 Shogo Takahara, Masashi Iijima, Kazumasa Shimada, Masanori Kimura, Sakae KINASE, Toshimitsu HOMMA Assessment of doses to the public in the contaminated areas resulting from the Fukushima Daiichi Nuclear Power Station accident
- 7 Hiroko Yoshida, Noriyasu Hirasawa, Ikuo Kobayashi Initial substantial reduction in air dose rate of Cs-origin and personal dose to residents due to the Fukushima nuclear accident

## Access and Map to Shiran Hall

## Address: Yoshida-Konoe-cho, Sakyo-ku, Kyoto, Japan

#### From Kansai International Airport to Kyoto Station



75min by Airport Express HARUKA (train) 85min by limousine bus



