

Topics Fukushima introduces JAEA's activities related to Fukushima.

Efforts to establish modeling techniques for forecasting the distribution of radioactive materials

On November 6, JAEA held “a meeting on establishing methods to ascertain the long-term impact of radioactive materials released due to the accident at Fukushima Daiichi Nuclear Power Station”. This meeting was held as part of a program for investigating radioactivity distributions, commissioned by the Ministry of Education, Culture, Sports, Science and Technology, with the aim of establishing techniques to forecast future changes in the distribution of radioactive materials which have been released due to the accident at TEPCO's Fukushima Daiichi Nuclear Power Station, and deposited over a wide range in the surrounding area. In this commissioned project, we plan to establish models for forecasting radioactive materials distribution in fiscal year 2013, based on the results of previous surveys of radioactive materials distribution, and measurement results from aircraft monitoring conducted separately.

Since the accident occurred at TEPCO's Fukushima Daiichi Nuclear Power Station, JAEA has been conducting surveys of the radioactive materials distribution situation based on data from mobile surveys employing automobiles, monitoring posts, aircraft monitoring and other sources. Based on these data, we have made efforts to establish techniques to enable forecasting the future distribution of radioactive materials produced by the accident.

In the previous surveys, the zone within 80 km from the TEPCO's Fukushima Daiichi Nuclear Power Station was divided into a mesh, with cells a few km a side, and the air dose rates and deposition of radioactive cesium in each area were periodically measured over the course of one year or more. Changes in air dose rate over time were also investigated, while incorporating the results of mobile surveys. Analysis has been conducted using these data to determine the effects which differences in environmental conditions, such as fields, forests, urban areas, rivers and soil characteristics, have on those changes.

As a result, it was found that the air dose rate attenuates more rapidly in urban areas and locations with water, and more slowly in areas with evergreen trees. It was also found that the apparent tendency for radioactive materials to decrease is related to the concentration of the radioactive materials at the location.

On the other hand, a group led by Professor Yuichi Onda of University of Tsukuba, who is participating in this commissioned project, has conducted detailed surveys of the migration mechanism of radioactive materials, using the Kawamata-machi Yamakiya area as the model district. More specifically, the group has investigated how the radioactive materials which have accumulated in the natural environment migrate in forests and soil, and how they migrate through groundwater, rice paddies and rivers etc.

We are currently developing migration models for radioactive materials, for each type of land use, by analyzing the above data further. The plan is to establish a model forecasting future distribution by next year. Our intention is to put this model to use in evaluating the existing exposure dose of ordinary people, selecting the proper decontamination measures, and making a future plan for the people who live in the affected area.

As a part of this commissioned project, we plan to periodically hold meetings on establishing methods to ascertain the long-term impact of radioactive materials due to the accident at Fukushima Daiichi Nuclear Power Station, and efficiently conduct research while listening carefully to the views of outside experts.