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Topics Fukushima introduces JAEA's activities related to Fukushima.

How do we study radiocesium at the bottom of water?

Introduce a J-SubD new type measuring instrument in a storage reservoir of Fukushima University

Radiocesium was dispersed into the sea, rivers and lakes due to the accident at the Tokyo Electric Power Company (TEPCO)'s Fukushima Daiichi Nuclear Power Station. A part of the radiocesium that blew into mountain forests is considered to have flowed into lakes, etc., through rivers due to rainfall. Most of the radiocesium that diffused in water is considered to have been adsorbed on organic materials, mud, etc., at the bottom. It is therefore important to get an accurate understanding of the distribution of radiocesium at the bottom of water and to obtain fundamental data. Is there any way to carry out accurate measurement widely at the bottom of water? Development of such measurement technologies is urgent. The Japan Atomic Energy Agency (JAEA) and Fukushima University are developing technologies to measure distribution of radioactive materials at the bottom of water by making use of the technologies they have developed until now.

The JAEA measured radiation at the bottom of a storage reservoir in Fukushima University for a period of 5 days from November 26 through 30, 2012. The newly developed submerged gamma radiation spectrometer (J-SubD) was used for the measurement. The detector is 62.5 centimeters high, weighs about 50 kilograms and withstands water pressure at 300 meters depth. This device, which employs a Cerium-Doped Lanthanum Bromide ($LaBr_3(Ce)$) scintilator detector at its detector section, is capable of higher resolution energy spectrum measurement than conventional ones. This enables radiocesium to be distinguishable from other natural radioactive materials.

For the measurement, the device was lowered into the storage reservoir (approx. 84 meters long and 28 meters wide) from a boat. There were 66 locations for measurement in the reservoir. The data was transmitted above the water to the computer and stored, synchronized with position information by GPS setup on the water. As a result of the measurements at different distances from the bottom of the reservoir, it was found that the radiation from the bottom was shielded by water, and had almost no impact over areas above the surface of water.

The measurement device is being lowered in the reservoir (left photo).

Measurement results are sent to the computer in real time and shown on the screen.