

Distribution of ^{137}Cs and ^{129}I in seawater near the Fukushima Daiichi Nuclear Power Plant in May 2011

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About ten days after the Fukushima Daiichi Nuclear Power Plant (F1NPP) accident, the Marine Ecology Research Institute started a seawater sampling program for an environmental radioactivity monitoring study [1]. Recently, we had an opportunity to handle backup seawater samples collected during those sampling cruises. We measured ^{137}Cs and ^{129}I activities in the seawater samples to obtain information on the early stage of dispersion of radionuclides released from F1NPP accident.

The seawater samples were collected at stations located 30-60 km off the coast from the F1NPP (37.4°N 141.0°E) during YK11-E02 cruise in 3-7 May 2011. The seawater samples were acidified by adding nitric acid and stored. The ^{137}Cs activities in the seawater samples were measured with well-type HP-Ge detectors [2]. The counting samples were prepared by evaporation to dryness and ammonium phosphomolybdate (AMP) method for 0.1 and 10 L of seawater samples, respectively. ^{129}I in the seawater samples were purified by solvent extraction method and the concentrations were measured by AMS at MALT (Micro Analysis Laboratory, Tandem accelerator), the University of Tokyo [3].

The ^{137}Cs activities in the surface water samples were 1.5-14, 0.1-1 and 0.8-6 Bq/L in the north (37.6-37.8°N 141.1-141.4°E), the east (37.0-37.5°N 141.4°E) and the south (36.9-37.0°N 141.1-141.3°E), respectively. The ^{129}I activities in the surface water samples were 840-4800, 2.7-260, and 58-300 nBq/L in the north, the east and the south, respectively. In the north, the $^{129}\text{I}/^{137}\text{Cs}$ activity ratios were $(0.3-0.6) \times 10^{-6}$. Since these values are comparable to the core inventory ratio, 0.29×10^{-6} [4], the seawater in this area contain directly discharged water from F1NPP. In the south and the southern part of the east (37.0-37.3°N), the $^{129}\text{I}/^{137}\text{Cs}$ activity ratios were $<0.1 \times 10^{-6}$, which means contribution of ^{129}I depleted material processed on land to these areas.

[1] S. Oikawa et al. (2013) *Biogeosciences* **10**, 5031-5047.

[2] Y. Kumamoto et al. (2014) *Sci. Rep.* **4**, 4276.

[3] H. Nagai et al. (2015) *Nucl. Instr. Meth. B* **361**, 680-684.

[4] K. Nishihara et al. (2012) JAEA-Data/Code 2012-018, Japan Atomic Energy Agency.