

## Rapid recirculation of FNPP1 derived radiocaesium suggesting new pathway of subtropical mode water in the western North Pacific to the Sea of Japan

\*Yayoi Inomata<sup>1</sup>, Michio Aoyama<sup>2</sup>, Yasunori Hamajima<sup>1</sup>, Masatoshi Yamada<sup>3</sup>

1. Kanazawa University, Institute of Nature and Environmental Technology, 2. Fukushima University, Institute of Environmental Radioactivity, 3. Hirosaki University, Institute of Radiation Emergency Medicine

The  $^{137}\text{Cs}$  derived from the Fukushima Nuclear Power Plant Accident (FNPP1- $^{137}\text{Cs}$ ) rapidly transported to the Sea of Japan several years after its release to the environment in March 2011. The inflow of FNPP1- $^{137}\text{Cs}$  had started in 2012 and reached to the maximum in 2015/2016, and has been still continued in the coastal site of Sea of Japan in the year of 2016. In the south of the Japanese islands, the FNPP1- $^{137}\text{Cs}$  activity concentrations showed subsurface peak in the seawater of which density correspond to the Subtropical Mode Water (STMW). These suggests that FNPP1- $^{137}\text{Cs}$  injected into the western North Pacific Ocean at south of Kuroshio were subducted into the ocean interior just after the accident, then transported southward/southwestward. A part of FNPP1- $^{137}\text{Cs}$  in STMW reaches the western boundary at lower latitudes, and obducted from under the Kuroshio, and is transported to the west of Kyushu by Tsushima Warm Current bifurcated from the Kuroshio. This pathway might be new finding of transport process from the western North Pacific Ocean to the SOJ. Almost same value of the  $^{134}\text{Cs}/^{137}\text{Cs}$  activity ratio in the coastal region of the Japanese islands (ECS, SOJ, and south of the Japanese islands in the western north Pacific Ocean) also support this circulation route. The integrated amount of FNPP1- $^{137}\text{Cs}$  entered in the SOJ until 2016 was estimated to be  $0.20 \pm 0.023$  PBq, which corresponds to 4.8 % of the total amount of FNPP1- $^{137}\text{Cs}$  in the STMW. The integrated amount of FNPP1- $^{137}\text{Cs}$  back to the North Pacific Ocean through the Tsugaru Strait in the surface layer was  $0.081 \pm 0.005$  Bq, which corresponds to 1.9 % of the total amount of FNPP1- $^{137}\text{Cs}$  in the STMW.

Keywords: radiocaesium, Fukushima Dai-ichi Nuclear Power Plant accident, re-circulation of Sea of Japan, subduction, obduction, SubTropical Mode Water