

Interannual variation of Fukushima-derived radiocesium in the subtropical region south of Japan Islands

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The Fukushima Dai-ichi Nuclear Power Plant accident in March 2011 resulted in the release of a large amount of radiocesium (¹³⁴Cs and ¹³⁷Cs) into the North Pacific. The Fukushima-derived radiocesium was dispersed eastward with the surface current systems, but southward dispersion was restricted due to the strong eastward current, Kuroshio Extension (KE). In the subtropical region south of KE, subsurface signal of Fukushima-derived radiocesium was observed in subtropical mode water (STMW). Subsurface peaks of Fukushima-derived radiocesium were also observed in central mode water. In contrast to surface dispersion, Fukushima-derived radiocesium trapped in the mode waters were less diluted and transported southward. The subduction and transportation processes of the mode waters are important to describe the destination of Fukushima-derived radiocesium in the ocean environment. Present study focuses on STMW in the subtropical region south of Japan Islands.

The interannual variation of Fukushima-derived radiocesium in the subtropical region (12–34°N, 130–138°E) was summarized from observational data obtained during 2011–2015. The detection of ¹³⁴Cs and increase of water column inventory of ¹³⁷Cs were observed between April and August 2012, which revealed that the main body of Fukushima-derived radiocesium in STMW was transported in this region after two winter seasons from the accident. The ¹³⁴Cs signal in STMW was observed at 16°N but not at 14°N throughout the study period. The southernmost detection of ¹³⁴Cs is well associated with the Kuroshio-recirculation. The concentration of Fukushima-derived radiocesium in STMW and water column inventory of ¹³⁷Cs were gradually decreased between 2012 and 2015.