

VERTICAL PROFILES OF FDNPP-DERIVED RADIOCESIUM CONCENTRATIONS IN SOUTHWESTERN OKHOTSK SEA WATERS

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Using low-background γ -spectrometry, we examined vertical concentration profiles of ^{134}Cs (half-life 2.06 y) and ^{137}Cs (30.2 y) in water samples collected from the southwestern Okhotsk Sea in 2011 and 2013. Temporal changes indicated the delivery and convection mechanisms of radiocesium in this area during the 2 yr period after the Fukushima Dai-ichi Nuclear Power Plant (FDNPP) accident.

1. INTRODUCTION

The 2011 FDNPP accident resulted in the release of large amounts of radiocesium into marine environments over a wide region in eastern Japan. However, extensive studies on FDNPP-derived radiocesium levels have not been conducted in the southwestern Okhotsk Sea, probably due to their markedly lower levels relative to the western North Pacific Ocean. In the present study, we characterized the vertical profiles of ^{134}Cs and ^{137}Cs concentrations and assessed their oceanic behaviors after the FDNPP accident.

2. SAMPLES and EXPERIMENTAL

We collected a total of 15 unfiltered water samples (20-50 L each), from the southwestern Okhotsk Sea during the *Oshoro Maru* expedition in June 2011 (45°23'N, 145°02'E) and the *Soyo Maru* expedition in July 2013 (45°06'N, 144°58'E). ^{134}Cs and ^{137}Cs were separated quantitatively through co-precipitation with ammonium phosphomolybdate. Low-background γ -spectrometry was performed on all samples, using Ge detectors installed at the Ogoya Underground Laboratory.

3. RESULTS and DISCUSSION

The water column in this area is considered to consist of an intermediate cold water (ICW) (50-300 m) and transient layer water (TLW) (300-1200 m) beneath the surface water (above ~50 m) (Takizawa, 1982). In June 2011, water ^{134}Cs concentrations were 0.5-0.1 mBq/L at a 0-100 m depth (<~0.08 mBq/L below 100 m depth), and the ^{137}Cs concentrations were higher than they were in 2009 (Inoue *et al.*, 2012). This is predominantly explained by the radioactive depositions from the FDNPP. On the other hand, in July 2013, ^{134}Cs was below the detectable limit (<~0.03 mBq/L) at 0 m and 25 m depths. However, ^{134}Cs was detected at 50-200 m depths (~0.05 mBq/L), which salinity and temperature indicate to be predominantly occupied by ICW. We plan to collect samples from the same site in 2016. In this conference, adding new data, we discuss the delivery and convection mechanisms of FDNPP-derived radiocesium in the southwestern Okhotsk Sea.

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REFERENCE

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