

Radiocesium in the suspended particles in the western North Pacific

1. Introduction

At 11 March 2011, Tohoku earthquake and tsunami damaged the Fukushima Dai-ichi nuclear power plant (FNPP). The loss of power and disruption of cooling systems occurred at FNPP. Owing to the venting of gases and hydrogen explosions, about 15 PBq (15×10^{15} becquerels) ^{137}Cs (half life, 30 years) were released from FNPP to the atmosphere and ocean (NERH). The direct release of ^{137}Cs to the ocean was estimated as 3.5 PBq (Tsumune et al., 2012). In the western North Pacific Ocean, radiocesium activities in the surface seawater were from several times to three orders of magnitude higher than before the FNPP accident (Honda et al., 2012; Buesseler et al., 2012; Aoyama et al., 2012). Radiocesium was determined in the biological samples in the broad area of the western North Pacific (Buesseler et al., 2012; Kitamura et al., 2013 and 2017). We have made biogeochemical time-series study in the subarctic (since 2001) and subtropical (since 2010) western North Pacific (e.g. Honda et al., 2006; Kawakami and Honda, 2007; Kawakami et al., 2014; Honda et al., 2017). After the accident of FNPP, we have made time-series study in the region off Fukushima (Buesseler et al., 2015). The *in situ* filtration experiments were carried out in the study area from spring 2011 to spring 2012. The suspended particles were collected in the area 1–16 months after the accident of FNPP. Fission-product nuclides ^{134}Cs (half life, 2.1 years) and ^{137}Cs were determined in the suspended particles in the surface and subsurface layers of the western North Pacific.

In this dataset, we present the activities of ^{134}Cs and ^{137}Cs in the suspended particles in the western North Pacific. These data will help further understanding of particle dynamics in the ocean.

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3. Sampling and sample analysis

Suspended particles were taken from the surface and subsurface layers using *in situ* pumping systems (Large Volume Pump WTS-6-1-142V, McLane Inc.) at stations K2 (47°N, 160°E), S1 (30°N, 145°E), and F1 (36.5°N, 141.5°E) in April–May 2011 (MR11-02, doi: 10.17596/0001831), June–August 2011 (MR11-05_leg1, doi: 10.17596/0001832; MR11-05_leg2, doi: 10.17596/0001833), and June–July 2012 (MR12-02_leg1, doi: 10.17596/0001841; MR12-02_leg2, doi: 10.17596/0001842). The stations K2 and S1 are in the subarctic and subtropical parts of the western North Pacific Ocean. The station F1 is the region off Fukushima. 100–500 L of seawater was filtered through a Versapor filter with a nominal pore size of 0.8 μm . Collected samples were dried and weighed. The radioactivities of ^{134}Cs and ^{137}Cs in the suspended particles were measured using ultra-low-background germanium detectors of Kanazawa university and European facility for nuclear reaction and decay data measurements. The counting time varied from a few days to a few weeks. The detection limits of radiocesium was 0.1 mBq per sample. Activity of radiocesium was decay-corrected to the sampling date. The precision of ^{134}Cs and ^{137}Cs was one sigma of the counting error.

3. Dataset

Data obtained from cruises were electrically compiled as an excel file “Sus-Particle_RadioCs.xls”, and were weight of suspended particles, radioactivity of ^{134}Cs (134Cs), ^{137}Cs (137Cs), and radioactivity ratio of ^{134}Cs to ^{137}Cs (134Cs/137Cs). The error of 134Cs and 137Cs was estimated from counting error.

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