Surface isotope concentrations of Cesium 137 from underway NAI system from KOK1108 cruise in June 2011 in the Western equatorial Pacific and Kuroshio Extension (Fukushima Radionuclide Levels project)

Website: https://www.bco-dmo.org/dataset/3633
Version: 28 March 2012
Version Date: 2012-03-28

Project
» Establishing Radionuclide Levels in the Atlantic and Pacific Oceans Originating from the Fukushima Daiichi Nuclear Power Facility (Fukushima Radionuclide Levels)

Contributors	Affiliation	Role
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Dataset Description

Continuous Cesium isotope Cs-137 concentration from surface water flow through a NaI(Tl) enclosure (underway monitoring system) from lab of Katherine Higley, Oregon State University.

Related files and references:

Caffrey, J.A., Higley, K.A., Farsoni, A.T., et al. Development and deployment of an underway radioactive cesium monitor off the Japanese coast near Fukushima Dai' J. Environ. Rad., In Press, 2012. doi: 10.1016/j.jenvrad.2011.12.015

Methods & Sampling

Surface seawater was pumped continuously into a detection chamber located in the ship's laboratory. An OSU-constructed PVC enclosure housed a water-tight 2NaI(Tl) Scintillation detector unit [Canberra Model 802-335]. Pulse signals were processed in a customized compact digital MCA [Avicenna RX1200] and output was captured and displayed on PC through custom spectroscopy software [Avicenna RayPanel].

Pulses in the region corresponding to Cs137 near 662 keV were counted continuously, and background levels of Cs137 measured in the Port of Yokohama were subtracted. Periodic recording of activity was performed manually at varying intervals, dependent upon the seawater activity, to minimize counting error. Concentration was determined through a calibrated linear response curve using known concentrations of Cs137. Signal contributions from the Cs134 co-contaminant (measured in seawater at a 1:1 activity ratio) were mitigated by

including a 1:1 activity ratio of Cs134 in the calibration standard.

Data Processing Description

Cs-137 region of interest counts with high counting uncertainty were grouped with neighboring counts to improve uncertainty, at the expense of some geographic/temporal resolution of concentration.

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Data Files

File
underway_radiation.csv (Comma Separated Values (.csv), 10.21 KB) MD5:767b88fa5474c29548c582474ad1fca6 Primary data file for dataset ID 3633

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Parameters

Parameter	Description	Units
lon	longitude	decimal degrees
lat	latitude	decimal degrees
date	Date of sample	YYYYMMDD
time	time of cast	hhmm
date_local	Date (local) of sample	YYYYMMDD
time_local	time (local) of cast	hhmm
Cs137_NaI	total Cesium-137	Bq/liter
Cs137_NaI_stdv	total Cesium-137 standard deviation	Bq/liter

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Instruments

Dataset-specific Instrument Name	underway radioactive cesium monitor
Generic Instrument Name	Underway radioactive cesium monitor
Generic Instrument Description	An OSU-constructed PVC enclosure housed a water-tight 2"x2" NaI(Tl) Scintillation detector unit [Canberra Model 802-335]. Pulse signals were processed in a customized compact digital MCA [Avicenna RX1200] and output was captured and displayed on PC through custom spectroscopy software [Avicenna RayPanel].

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Deployments

KOK1108

Website	https://www.bco-dmo.org/deployment/58727
Platform	R/V Ka`imikai-O-Kanaloa
Report	http://bcodata.whoi.edu/Fukushima/Fukushima_KOK1108_dailyBlog.pdf
Start Date	2011-06-04
End Date	2011-06-19
Description	The purpose of the 16 day KOK1108 cruise aboard the University of Hawaii research vessel Ka'imikai-o-Kanaloa was to study the fate of radiation released into the ocean from the Fukushima Daiichi nuclear power plant that was badly damaged by a tsunami on March 11, 2011.

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Project Information

Establishing Radionuclide Levels in the Atlantic and Pacific Oceans Originating from the Fukushima Daiichi Nuclear Power Facility (Fukushima Radionuclide Levels)

Website: http://www.whoi.edu/page.do?pid=67796

Coverage: Northwest Pacific Ocean

The March 11, 2011 earthquake in Japan and the subsequent tsunami damaged and disrupted cooling systems at the Fukushima Daiichi nuclear power facility causing contamination of land and seas surrounding the site, as well as food supplies and drinking water. Small but measurable quantities of radioactivity have been detected in the atmosphere over the United States, including aerosol samples collected at the Woods Hole Oceanographic Institution, where I-131 was seen to increase to detectable levels as of March 21-22, 2011.

With major funding from the Moore Foundation, as well as a contribution from the National Science Foundation through a 2011 Grant for Rapid Response Research (RAPID) and support from the Woods Hole Oceanographic Institution, collaborating investigators from the United States, Japan, Spain, Monaco, and the United Kingdom were able to obtain samples off Japan for an early assessment of impacts.

From June 4 through June 19, 2011, a research cruise was carried out aboard the RV Kaimikai-O-Kanaloa, a research vessel operated by the University of Hawaii. During the cruise, hundreds of samples were collected in an area off the coast of Japan as close as 30 kilometers from the Fukushima Nuclear Power Plant and

extending as far out as 600 kilometers off shore. The essential components of the program include: radionuclide measurements of water and particles; a radioecological study of biota, especially species at the base of the food chain and key fish species and a physical oceanographic study to characterize transport and water masses. A baseline radionuclide data set for the Atlantic and Pacific was obtained along an east to west network of sampling stations. Three hundred sampling events took place at thirty major stations for a total of more than 1500 samples. Along with 41 CTD stations, bottle samples of salinity, oxygen, radionuclides, and particulates were taken to depths of about 1000 meters. A list of the radionuclides sampled and a sampling summary map is available. One hundred net tows resulted in approximately fifty pounds of biological samples, including plankton and small fish. Daily samples of aerosol were also taken.

Early investigation following an accidental release of man-made radionuclides is key to understanding the magnitude of the release and the relationship to public health issues The research results also set the stage for the use of the longer lived radionuclides as tracers in subsequent studies by the community to understand ocean processes.

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Funding

Funding Source	Award
Gordon and Betty Moore Foundation (GBMF)	GBMF2724

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