Particulate Th-234 collected with surface-tethered sediment traps at Station ALOHA as part of the EAGER chief scientist training cruise (KM1910) in the subtropical North Pacific gyre in June 2019

Website: https://www.bco-dmo.org/dataset/854241
Data Type: Cruise Results
Version: 1
Version Date: 2021-07-20

Project
» EAGER Collaborative Research: Early career chief scientist training for biological and chemical oceanographers (Chief Sci KM1910)

Contributors	Affiliation	Role
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Abstract
This dataset includes particulate Th-234 collected with surface-tethered sediment traps at Station ALOHA as part of the EAGER chief scientist training cruise (KM1910) in the subtropical North Pacific gyre in June 2019.

Table of Contents

- Coverage
- Dataset Description
  - Methods & Sampling
  - Data Processing Description
- Data Files
- Related Datasets
- Parameters
- Instruments
- Deployments
- Project Information
- Funding

Coverage

Spatial Extent: **N**:23.13 **E**:-157.785 **S**:22.1 **W**:-158.44
Temporal Extent: 2019-06-16 - 2019-06-23

Methods & Sampling

Particle flux measurements from the Chief Scientist Training cruise generally followed the methods of the Hawaii Ocean Time-Series (HOT). Measurements were made at 75 meters, 150 meters, and 300 meters using multiple cylindrical particle interceptor traps deployed on a free-floating array for approximately 3 days twice during

cruise KM1910 at station ALOHA. Sediment trap design and collection methods are described in Winn et al. (1991). Sediment trap tubes were split, with roughly 50% of the split going to Th-234 particulate analysis.

All thorium-234 data were decay corrected back to mid-deployment times. The subsampled trap material was gradually poured into 25 millimeter (mm) filter funnels containing 25 mm QMA or GFF filters (most were QMA and efficiency differences were taken into account). Once all the trap subsample liquid was filtered, the 25 mm filter was dried at low temperature for a few hours (<60 degrees Celsius). Samples were mounted and prepared for beta counting according to the techniques noted in Pike et al., 2005 and Clevenger et al., 2021.

Data Processing Description

Data were flagged with quality indicators: 1 = Good Value.

Data flags are according to the SeaDataNet scheme (https://www.geotraces.org/geotraces-quality-flag-policy/).

BCO-DMO processing description:
- Adjusted field/parameter names to comply with BCO-DMO naming conventions;
- Added a conventional header with dataset name, PI names, version date;
- Converted dates to ISO8601 format: YYYY-MM-DDThh:mmZ;
- Converted longitude values from positive degrees West to negative degrees East;
- Rounded fields as requested by data submitter.

[table of contents | back to top]

Data Files

File
Th-234_traps.csv (Comma Separated Values (.csv), 2.62 KB) MD5:69fec28e290dd980110158542f8c9b95 Primary data file for dataset ID 854241

[table of contents | back to top]

Related Datasets

IsRelatedTo

Kenyon, J., Black, E., Church, M. J. (2021) **Particulate Th-234 collected using large volume McLane pumps (LVPs) as part of the EAGER chief scientist training cruise (KM1910) at Station ALOHA, subtropical North Pacific gyre in June 2019.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2021-07-13 doi:10.26008/1912/bco-dmo.854150.1 [view at BCO-DMO]

[table of contents | back to top]

Parameters

Parameter	Description	Units
Trap_Event_ID	Sediment trap deployments were indicated with a T, followed by the deployment number (1 or 2)	Unitless
Depth	Depth of trap below water surface (zero = water surface and all values are reported as positive)	Meters

Tube_ID	Each letter represents trap material from a different tube at a given depth	Unitless
Start_Date_HAST	Date and time (Hawaii-Aleutian Standard Time, GMT-10) of deployment start; format: MM/DD/YYYY hh:mm	Unitless
End_Date_HAST	Date and time (Hawaii-Aleutian Standard Time, GMT-10) of deployment end; format: MM/DD/YYYY hh:mm	Unitless
Start_ISO_DateTime_UTC	Date and time (UTC) of deployment start in ISO8601 format: YYYY-MM-DDThh:mmZ	Unitless
End_ISO_DateTime_UTC	Date and time (UTC) of deployment end in ISO8601 format: YYYY-MM-DDThh:mmZ	Unitless
Latitude_In	Latitude at time of trap deployment in degrees North	Decimal degrees
Longitude_In	Longitude at time of trap deployment in degrees East	Decimal degrees
Latitude_Out	Latitude at time of trap recovery in degrees North	Decimal degrees
Longitude_Out	Longitude at time of trap recovery in degrees East	Decimal degrees
Volume	Volume of the water sample from the trap tube that was analyzed for thorium-234	Liters
Fraction_Trap_Material_Coll	The G, H, I tubes were subsampled. Approximately 1/2 was used for the thorium-234 measurements. The absolute fraction of the total tube volume (i.e. the total sample collected) is indicated here.	Decimal fraction
Th234_Flux	Sinking flux of 234Th calculated from sediment trap samples	Decays per minute (dpm) per square meter per day (dpm m-2 d-1)
Th234_Flux_SD	Standard deviation of Th234_Flux	Decays per minute (dpm) per square meter per day (dpm m-2 d-1)
Th234_Flux_QF	Quality flag for Th234_Flux (1 = good data)	Unitless

[table of contents | back to top]

Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	Riso Laboratory Anti-coincidence Beta Counter
Dataset-specific Description	Low-level beta detectors manufactured by Risø (now Nutech) in Denmark. These instruments accept samples that can be mounted on a 25mm filter holder. These detectors have very low backgrounds, 0.17 counts per minute, and can have counting efficiencies as high as 55%. Efficiency Calibrations: The detectors are intercalibrated with each other and across the transect using low-energy U standards. Limits of Detection: Limits of detection are not reported because they are not applicable to the 234Th beta counting method. A 'non-detect' for 234Th or a case where there is no 234Th present (initially or after 6 months of decay) will still result in a measurable amount of background radioactivity due to the beta decay of long lived natural radionuclides that are also present. These background values are utilized and therefore, they are not reported as a non-detections of 234Th. See: https://cafethorium.whoi.edu/services/ and https://www.nutech.dtu.dk/english/products-and-services/radiation-instru...
Generic Instrument Description	Low-level beta detectors manufactured by Riso (now Nutech) in Denmark. These instruments accept samples that can be mounted on a 25mm filter holder. These detectors have very low backgrounds, 0.17 counts per minute, and can have counting efficiencies as high as 55%. Typically used in laboratory analyses. Designed to measure low levels of beta particle emission. The systems work on the principle of anticoincidence.

Dataset-specific Instrument Name	
Generic Instrument Name	Sediment Trap
Dataset-specific Description	Sediment trap array (spar buoy, radiotransmitter, strobe light, floats, trap supports, collector tubes)
Generic Instrument Description	Sediment traps are specially designed containers deployed in the water column for periods of time to collect particles from the water column falling toward the sea floor. In general a sediment trap has a jar at the bottom to collect the sample and a broad funnel-shaped opening at the top with baffles to keep out very large objects and help prevent the funnel from clogging. This designation is used when the specific type of sediment trap was not specified by the contributing investigator.

[table of contents | back to top]

Deployments

KM1910

Website	https://www.bco-dmo.org/deployment/841636
Platform	R/V Kilo Moana
Report	https://datadocs.bco-dmo.org/docs/305/Chief_Sci_KM1910/data_docs/matt_church_EAGER_cruise_plan_06_17_2019.pdf
Start Date	2019-06-15
End Date	2019-06-24
Description	NSF Chief Scientist Training Cruise. For more information, see Rolling Deck to Repository (R2R): https://www.rvdata.us/search/cruise/KM1910 (cruise DOI: 10.7284/908380)

[table of contents | back to top]

Project Information

EAGER Collaborative Research: Early career chief scientist training for biological and chemical oceanographers (Chief Sci KM1910)

Coverage: Station ALOHA (22.75N, 158W), North Pacific Ocean

NSF Award Abstract:

Intellectual Merit
The PIs request funds to provide training in leading and organizing research cruises to early career researchers in the areas of Biological and Chemical Oceanography. Participants in this training program would be introduced to pre-cruise planning and logistics, receive training in commonly used oceanographic sampling equipment, and conduct shipboard measurements during a 10-day oceanographic cruise to the North Pacific Subtropical Gyre (NPSG). The goal of this training program is to prepare early career scientists for leading and participating in interdisciplinary oceanographic research at sea.

Broader Impacts
The proposed program addresses the broader impacts criteria successfully. The research cruise and follow-up reports and publications focus on interdisciplinary questions important for advancing the field. Given the rapid changes that oceanic systems are undergoing, it is important to have a cadre of junior scientists who are adept at managing interdisciplinary collaborations and conducting research at sea. The PIs are considering ways to connect with diverse audiences in recruiting participants. The impact on early career oceanographers will be very strong. This will create an experience that will be a major impact on the careers of the trainees, especially if they stay in the oceanography field.

[table of contents | back to top]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1911831
NSF Division of Ocean Sciences (NSF OCE)	OCE-1911990

[table of contents | back to top]