Aerosols, long irradiation neutron activation analysis from R/V Thomas G. Thompson cruises in the Arabian Sea in 1995 (U.S. JGOFS Arabian Sea project)

Website: https://www.bco-dmo.org/dataset/2591
Version: June 30, 1997
Version Date: 1997-06-30

Project
» U.S. JGOFS Arabian Sea (Arabian Sea)

Program
» U.S. Joint Global Ocean Flux Study (U.S. JGOFS)

Contributors	Affiliation	Role
Tindale, Neil	Texas A&M University (TAMU)	Principal Investigator
Chandler, Cynthia L.	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

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Dataset Description

PI: Neil Tindale
of: Texas A&M University
dataset: Aerosols, long irradiation neutron activation analysis
dates: January 08, 1995 to December 18, 1995
location: N: 22.8459 S: 09.8871 W: 57.2609 E: 68.2687
project: Arabian Sea
ship: Thomas Thompson

PI Notes and Methodology
A note from DMO on supplementary fields

HiVol pump sampler methods are described in: N. W. Tindale and P. P. Pease, Aerosols over the Arabian Sea: Atmospheric transport pathways and concentrations of dust and sea salt, Deep Sea Research Part II: Topical Studies in OceanographyVolume 46, Issues 8-9, August 1999, Pages 1577-1595. (view article at ScienceDirect)

Methods & Sampling

Dr. Neil Tindale, Texas A & M Univ.
JGOFS/Arabian Sea
Aerosols, short and long irradiation neutron activation analysis

JGOFS Arabian Sea Aerosol Data

This mineral aerosol concentration data set is from samples collected during several cruises on the R/V Thomas Thompson during the JGOFS Arabian Sea field program.

Air Sampling Pump System

The air sampling pumps, controller, electronics, and a clean bench were mounted in a 6-m shipping container located on the foredeck's container storage rack. The air sampler was a HiVol system loaded with a single unwashed Whatman 41 filter and with a flow rate of about 1.2-1.4 m3 min-1. Air flow rates were measured daily using an orifice-type flow tube that had been calibrated to a National Institute of Standards and Technology (NIST) certified EG&G FT32 turbine flowmeter. Air volume errors were between 5 and 10%; the total combined air volume and analytical error was about 10%. The experimental equipment was similar to that described in Schwartze et al. (1988) and used on previous atmospheric-oceanographic programs (Betzer et al., 1988).

References:

Betzer, P.R., Carder, K.L., Duce, R.A., Merrill, J.T., Tindale, N.W., Uematsu, M., Costello, D., Young, R., Feely, R.A., Breland, J.A., Bernstein, R., Greco, T., 1988. A pulse of Asian dust to the central North Pacific: long-range transport of giant mineral aerosols. Nature 336, pp. 568-571.

Schwartze, G., Boldi, R., Wasco, T., Duce, R., 1988. PASS: a portable atmospheric sampling system for chemical studies in the marine troposphere. Journal of Atmospheric and Oceanic Technology 5, pp. 561-570.

The data set includes the sampling period for each sample; the "Day of Year", yrday, number for the start of the sampling period for each sample; and the concentration of different elements for each sample, in micrograms per cubic meter. For the sampling period, "nd" is used as a filler to indicate "no data" gaps in the data array. The dust values are estimated using aluminum concentrations determined by neutron activation analysis. While most samples cover a multi-day period, we only have data for about 150 days. We didn't participate in all of the cruises and, on the cruises where samples were collected, often sampling conditions were less than ideal (bad weather, ship maneuvering, relative wind from astern etc.). A few samples that were collected showed obvious contamination from local sources, presumably from material from the R/V Thompson or from nearby fishing boats, and these samples were discarded and are not included in the data set. While the sampling period represents the period during which sampling occurred, sampling was usually not continuous. Sampling was frequently stopped, whenever sampling conditions were no longer suitable. Thus the concentration value at any particular date represents a time integrated sample which is usually non-continuous.

Cautionary comments:
1. There may be a problem with the estimate for the mineral "dust" concentration. Most researchers use the average crustal ratio to estimate mineral dust concentrations using elemental concentration data (Al, Fe, etc.). Surface sand and silt samples that were collected in Oman in the Wahibah Sands region have distinct, non-crustal ratios. If individual aerosol samples are comprised of material from distinct sources, including Oman, then it is not unreasonable for their elemental ratios to differ from the published "average" crustal ratio that is used in most aerosol studies.

2. The amount of Ti in all the aerosol samples was small, despite there being a reasonable amount of dust material in most samples. The peaks for Cr and Ti overlap in the neutron activation short irradiation analysis and if significant quantities of Cr are present, this will interfere with the Ti analysis. With the exception of one sample, the Ti values are at or below the detection limit. The sole value above the detection limit was corrected for the Cr contribution using a correction based on the Cr values from the

long irradiations. The correction changed the Ti value by less than 5%. The Ti data flagged as being at or below the detection limit was not corrected for possible Cr interference.

Data management office notes on supplementary fields - aerosols data

lat, lon

A nominal ship location is given in lat/lon. The location is the noon position most near the middle of the sampling period, e.g. for a sample which was pumped intermittently from Jan. 3 - 5, the location is given for noon, Jan. 4. Intended as an aid to understanding, not a discrete location.

date_begin, date_end

We have included the start and stop day for each sample which we believe constrains the sample time about as well as is useful for these data. We also have pump volume and thus a mean concentration of dust per cubic meter of air for that time frame. The actual number of hours sampled during a time block (number of days) is complicated to present. Pumps were turned on and off repetitively depending upon ship maneuvers and relative wind direction (to prevent ship exhaust contamination). Also, the total number of hours the pumps were on is a less useful measure than pump volume, because of the variability in pump efficiency due to changing barometric pressures. An hours worth of pumping does not always yield the same volume of air.

Data Processing Description

Data management office notes on supplementary fields - aerosols data

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Data Files

File
aerosols_long.csv (Comma Separated Values (.csv), 16.36 KB) MD5:62c4c0ada8d18f518301fe6d8fee691a Primary data file for dataset ID 2591

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Parameters

Parameter	Description	Units
cruise	Arabian Sea, Thomas Thompson cruise identifier	
date_begin	date sampling pump turned on for a given sample,	as YYYYMMDD
date_end	date sampling pump turned off for a given sample, as YYYYMMDD	
yrday	day of year, 1995	
lat_n	Nominal latitude (minus indicates South)	decimal degrees
lon_n	Nominal longitude (minus indicates West)	decimal degrees
vol_pump	volume of air pumped to accumulate sample	cubic meters
As	concentration of arsenic	ug/m^3
Br	concentration of bromine	ug/m^3
Ce	concentration of cerium	ug/m^3
Co	concentration of cobolt	ug/m^3
Cr	concentration of chromium	ug/m^3
Cs	concentration of cesium	ug/m^3
Eu	concentration of europium	ug/m^3
Fe	concentration of iron	ug/m^3
Gd	concentration of gadolinium	ug/m^3
Hf	concentration of hafnium	ug/m^3
Hg	concentration of mercury	ug/m^3
La	concentration of lanthanum	ug/m^3
Lu	concentration of lutetium	ug/m^3
Nd	concentration of neodymium	ug/m^3
Rb	concentration of rubidium	ug/m^3
Sb	concentration of antimony	ug/m^3
Sc	concentration of scandium	ug/m^3
Se	concentration of selenium	ug/m^3
Sm	concentration of samarium	ug/m^3
Sr	concentration of strontium	ug/m^3
Ta	concentration of tantalum	ug/m^3
Tb	concentration of terbium	ug/m^3
Th	concentration of thorium	ug/m^3
Tm	concentration of thulium	ug/m^3
U	concentration of uranium	ug/m^3
Yb	concentration of ytterbium	ug/m^3
Zn	concentration of zinc	ug/m^3

dust	total sample mass estimated by assuming the Al content represented 8 percent, based on an 8% crustal average for Al	ug/m^3
As_err	Arsenic combined sampling and analytical error	ug/m^3
As_dl	Arsenic detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
Br_err	Bromine combined sampling and analytical error	ug/m^3
Br_dl	Bromine detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
Ce_err	Cerium combined sampling and analytical error	ug/m^3
Ce_dl	Cerium detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
Co_err	Cobalt combined sampling and analytical error	ug/m^3
Co_dl	Cobalt detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
Cr_err	Chromium combined sampling and analytical error	ug/m^3
Cr_dl	Chromium detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
Cs_err	Cesium combined sampling and analytical error	ug/m^3
Cs_dl	Cesium detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
Eu_err	Europium combined sampling and analytical error	ug/m^3
Eu_dl	Europium detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
Fe_err	Iron combined sampling and analytical error	ug/m^3
Fe_dl	Iron detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
Gd_err	Gadolinium combined sampling and analytical error	ug/m^3

Gd_dl	Gadolinium detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
Hf_err	Hafnium combined sampling and analytical error	ug/m^3
Hf_dl	Hafnium detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
Hg_err	Mercury combined sampling and analytical error	ug/m^3
Hg_dl	Mercury detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
La_err	Lanthanum combined sampling and analytical error	ug/m^3
La_dl	Lanthanum detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
Lu_err	Lutetium combined sampling and analytical error	ug/m^3
Lu_dl	Lutetium detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
Nd_err	Neodymium combined sampling and analytical error	ug/m^3
Nd_dl	Neodymium detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
Rb_err	Rubidium combined sampling and analytical error	ug/m^3
Rb_dl	Rubidium detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
Sb_err	Antimony combined sampling and analytical error	ug/m^3
Sb_dl	Antimony detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
Sc_err	Scandium combined sampling and analytical error	ug/m^3
Sc_dl	Scandium detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	

Se_err	Selenium combined sampling and analytical error	ug/m^3
Se_dl	Selenium detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
Sm_err	Samarium combined sampling and analytical error	ug/m^3
Sm_dl	Samarium detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
Sr_err	Strontium combined sampling and analytical error	ug/m^3
Sr_dl	Strontium detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
Ta_err	Tantalum combined sampling and analytical error	ug/m^3
Ta_dl	Tantalum detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
Tb_err	Terbium combined sampling and analytical error	ug/m^3
Tb_dl	Terbium detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
Th_err	Thorium combined sampling and analytical error	ug/m^3
Th_dl	Thorium detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
Tm_err	Thulium combined sampling and analytical error	ug/m^3
Tm_dl	Thulium detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
U_err	Uranium combined sampling and analytical error	ug/m^3
U_dl	Uranium detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
Yb_err	Ytterbium combined sampling and analytical error	ug/m^3

Yb_dl	Ytterbium detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	
Zn_err	Zinc combined sampling and analytical error	ug/m^3
Zn_dl	Zinc detection level: a '1' indicates that while a peak was detected, the isotope sample was below the level of detection relative to background "noise". The element concentration reported therefore represents the amount of the isotope which would have had to have been present for it to have been detected. a '0' indicates no flag - concentration is as measured.	

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Instruments

Dataset-specific Instrument Name	Pump Air Sampler
Generic Instrument Name	Pump Air Sampler
Dataset-specific Description	Air sampling pumps. were mounted in a 6-m shipping container located on the foredeck's container storage rack. The air sampler was a HiVol system loaded with a single unwashed Whatman 41t "lter and with a #ow rate of&1.2}1.4 m3 min~1.
Generic Instrument Description	A Pump Air Sampler is an instrument that continuously supplies a flow of air either to an analytical instrument, over a sensor, through filters or from which discrete samples may be drawn for subsequent analysis. This instrument designation is used when specific make and model are not known.

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Deployments

TT043

Website	https://www.bco-dmo.org/deployment/57704
Platform	R/V Thomas G. Thompson
Report	http://osprey.bcodmo.org/datasetDeployment.cfm?ddid=2580&did=353&flag=view
Start Date	1995-01-08
End Date	1995-02-05

Description	Purpose: Process Cruise #1 (Late NE Monsoon) **Methods & Sampling** PI: Neil Tindale of: Texas A&M University dataset: Aerosols, long irradiation neutron activation analysis dates: January 08, 1995 to December 18, 1995 locations: N: 22.8459 S: 09.8871 W: 57.2609 E: 68.2687 project: Arabian Sea ship: Thomas Thompson Dr. Neil Tindale, Texas A & M Univ. JGOFS/Arabian Sea Aerosols, short and long irradiation neutron activation analysis JGOFS Arabian Sea Aerosol Data This mineral aerosol concentration data set is from samples collected during several cruises on the R/V Thomas Thompson during the JGOFS Arabian Sea field program. The data set includes the sampling period for each sample; the "Day of Year", yrday, number for the start of the sampling period for each sample; and the concentration of different elements for each sample, in micrograms per cubic meter. For the sampling period, "nd" is used as a filler to indicate "no data" gaps in the data array. The dust values are estimated using aluminum concentrations determined by neutron activation analysis. While most samples cover a multi-day period, we only have data for about 150 days. We didn't participate in all of the cruises and, on the cruises where samples were collected, often sampling conditions were less than ideal (bad weather, ship maneuvering, relative wind from astern etc.). A few samples that were collected showed obvious contamination from local sources, presumably from material from the R/V Thompson or from nearby fishing boats, and these samples were discarded and are not included in the data set. While the sampling period represents the period during which sampling occurred, sampling was usually not continuous. Sampling was frequently stopped, whenever sampling conditions were no longer suitable. Thus the concentration value at any particular date represents a time integrated sample which is usually non-continuous. Cautionary comments: 1. There may be a problem with the estimate for the mineral "dust" concentration. Most researchers use the average crustal ratio to estimate mineral dust concentrations using elemental concentration data (Al, Fe, etc.). Surface sand and silt samples that were collected in Oman in the Wahibah Sands region have distinct, non-crustal ratios. If individual aerosol samples are comprised of material from distinct sources, including Oman, then it is not unreasonable for their elemental ratios to differ from the published "average" crustal ratio that is used in most aerosol studies. 2. The amount of Ti in all the aerosol samples was small, despite there being a reasonable amount of dust material in most samples. The peaks for Cr and Ti overlap in the neutron activation short irradiation analysis and if significant quantities of Cr are present, this will interfere with the Ti analysis. With the exception of one sample, the Ti values are at or below the detection limit. The sole value above the detection limit was corrected for the Cr contribution using a correction based on the Cr values from the long irradiations. The correction changed the Ti value by less than 5%. The Ti data flagged as being at or below the detection limit was not corrected for possible Cr interference. **Processing Description** Data management office notes on supplementary fields - aerosols data lat, lon A nominal ship location is given in lat/lon. The location is the noon position most near the middle of the sampling period, e.g. for a sample which was pumped intermittently from Jan. 3 - 5, the location is given for noon, Jan. 4. Intended as an aid to understanding, not a discrete location. date_begin, date_end We have included the start and stop day for each sample which we believe constrains the sample time about as well as is useful for these data. We also have pump volume and thus a mean concentration of dust per cubic meter of air for that time frame. The actual number of hours sampled during a time block (number of days) is complicated to present. Pumps were turned on and off repetitively depending upon ship maneuvers and relative wind direction (to prevent ship exhaust contamination). Also, the total number of hours the pumps were on is a less useful measure than pump volume, because of the variability in pump efficiency due to changing barometric pressures. An hours worth of pumping does not always yield the same volume of air.

TT044

Website	https://www.bco-dmo.org/deployment/57705
Platform	R/V Thomas G. Thompson
Start Date	1995-02-09
End Date	1995-02-28
Description	**Methods & Sampling** PI: Neil Tindale of: Texas A&M University dataset: Aerosols, long irradiation neutron activation analysis dates: January 08, 1995 to December 18, 1995 locations: N: 22.8459 S: 09.8871 W: 57.2609 E: 68.2687 project: Arabian Sea ship: Thomas Thompson Dr. Neil Tindale, Texas A & M Univ. JGOFS/Arabian Sea Aerosols, short and long irradiation neutron activation analysis JGOFS Arabian Sea Aerosol Data This mineral aerosol concentration data set is from samples collected during several cruises on the R/V Thomas Thompson during the JGOFS Arabian Sea field program. The data set includes the sampling period for each sample; the "Day of Year", yrday, number for the start of the sampling period for each sample; and the concentration of different elements for each sample, in micrograms per cubic meter. For the sampling period, "nd" is used as a filler to indicate "no data" gaps in the data array. The dust values are estimated using aluminum concentrations determined by neutron activation analysis. While most samples cover a multi-day period, we only have data for about 150 days. We didn't participate in all of the cruises and, on the cruises where samples were collected, often sampling conditions were less than ideal (bad weather, ship maneuvering, relative wind from astern etc.). A few samples that were collected showed obvious contamination from local sources, presumably from material from the R/V Thompson or from nearby fishing boats, and these samples were discarded and are not included in the data set. While the sampling period represents the period during which sampling occurred, sampling was usually not continuous. Sampling was frequently stopped, whenever sampling conditions were no longer suitable. Thus the concentration value at any particular date represents a time integrated sample which is usually non-continuous. Cautionary comments: 1. There may be a problem with the estimate for the mineral "dust" concentration. Most researchers use the average crustal ratio to estimate mineral dust concentrations using elemental concentration data (Al, Fe, etc.). Surface sand and silt samples that were collected in Oman in the Wahibah Sands region have distinct, non-crustal ratios. If individual aerosol samples are comprised of material from distinct sources, including Oman, then it is not unreasonable for their elemental ratios to differ from the published "average" crustal ratio that is used in most aerosol studies. 2. The amount of Ti in all the aerosol samples was small, despite there being a reasonable amount of dust material in most samples. The peaks for Cr and Ti overlap in the neutron activation short irradiation analysis and if significant quantities of Cr are present, this will interfere with the Ti analysis. With the exception of one sample, the Ti values are at or below the detection limit. The sole value above the detection limit was corrected for the Cr contribution using a correction based on the Cr values from the long irradiations. The correction changed the Ti value by less than 5%. The Ti data flagged as being at or below the detection limit was not corrected for possible Cr interference. Data management office notes on supplementary fields - aerosols data lat, lon A nominal ship location is given in lat/lon. The location is the noon position most near the middle of the sampling period, e.g. for a sample which was pumped intermittently from Jan. 3 - 5, the location is given for noon, Jan. 4. Intended as an aid to understanding, not a discrete location. date_begin, date_end We have included the start and stop day for each sample which we believe constrains the sample time about as well as is useful for these data. We also have pump volume and thus a mean concentration of dust per cubic meter of air for that time frame. The actual number of hours sampled during a time block (number of days) is complicated to present. Pumps were turned on and off repetitively depending upon ship maneuvers and relative wind direction (to prevent ship exhaust contamination). Also, the total number of hours the pumps were on is a less useful measure than pump volume, because of the variability in pump efficiency due to changing barometric pressures. An hours worth of pumping does not always yield the same volume of air.

TT045

Website	https://www.bco-dmo.org/deployment/57706
Platform	R/V Thomas G. Thompson
Start Date	1995-03-14
End Date	1995-04-10
Description	**Methods & Sampling** PI: Neil Tindale of: Texas A&M University dataset: Aerosols, long irradiation neutron activation analysis dates: January 08, 1995 to December 18, 1995 locations: N: 22.8459 S: 09.8871 W: 57.2609 E: 68.2687 project: Arabian Sea ship: Thomas Thompson Dr. Neil Tindale, Texas A & M Univ. JGOFS/Arabian Sea Aerosols, short and long irradiation neutron activation analysis JGOFS Arabian Sea Aerosol Data This mineral aerosol concentration data set is from samples collected during several cruises on the R/V Thomas Thompson during the JGOFS Arabian Sea field program. The data set includes the sampling period for each sample; the "Day of Year", yrday, number for the start of the sampling period for each sample; and the concentration of different elements for each sample, in micrograms per cubic meter. For the sampling period, "nd" is used as a filler to indicate "no data" gaps in the data array. The dust values are estimated using aluminum concentrations determined by neutron activation analysis. While most samples cover a multi-day period, we only have data for about 150 days. We didn't participate in all of the cruises and, on the cruises where samples were collected, often sampling conditions were less than ideal (bad weather, ship maneuvering, relative wind from astern etc.). A few samples that were collected showed obvious contamination from local sources, presumably from material from the R/V Thompson or from nearby fishing boats, and these samples were discarded and are not included in the data set. While the sampling period represents the period during which sampling occurred, sampling was usually not continuous. Sampling was frequently stopped, whenever sampling conditions were no longer suitable. Thus the concentration value at any particular date represents a time integrated sample which is usually non-continuous. Cautionary comments: 1. There may be a problem with the estimate for the mineral "dust" concentration. Most researchers use the average crustal ratio to estimate mineral dust concentrations using elemental concentration data (Al, Fe, etc.). Surface sand and silt samples that were collected in Oman in the Wahibah Sands region have distinct, non-crustal ratios. If individual aerosol samples are comprised of material from distinct sources, including Oman, then it is not unreasonable for their elemental ratios to differ from the published "average" crustal ratio that is used in most aerosol studies. 2. The amount of Ti in all the aerosol samples was small, despite there being a reasonable amount of dust material in most samples. The peaks for Cr and Ti overlap in the neutron activation short irradiation analysis and if significant quantities of Cr are present, this will interfere with the Ti analysis. With the exception of one sample, the Ti values are at or below the detection limit. The sole value above the detection limit was corrected for the Cr contribution using a correction based on the Cr values from the long irradiations. The correction changed the Ti value by less than 5%. The Ti data flagged as being at or below the detection limit was not corrected for possible Cr interference. Data management office notes on supplementary fields - aerosols data lat, lon A nominal ship location is given in lat/lon. The location is the noon position most near the middle of the sampling period, e.g. for a sample which was pumped intermittently from Jan. 3 - 5, the location is given for noon, Jan. 4. Intended as an aid to understanding, not a discrete location. date_begin, date_end We have included the start and stop day for each sample which we believe constrains the sample time about as well as is useful for these data. We also have pump volume and thus a mean concentration of dust per cubic meter of air for that time frame. The actual number of hours sampled during a time block (number of days) is complicated to present. Pumps were turned on and off repetitively depending upon ship maneuvers and relative wind direction (to prevent ship exhaust contamination). Also, the total number of hours the pumps were on is a less useful measure than pump volume, because of the variability in pump efficiency due to changing barometric pressures. An hours worth of pumping does not always yield the same volume of air.

TT048

Website	https://www.bco-dmo.org/deployment/57709
Platform	R/V Thomas G. Thompson
Start Date	1995-06-21
End Date	1995-07-13
Description	**Methods & Sampling** PI: Neil Tindale of: Texas A&M University dataset: Aerosols, long irradiation neutron activation analysis dates: January 08, 1995 to December 18, 1995 locations: N: 22.8459 S: 09.8871 W: 57.2609 E: 68.2687 project: Arabian Sea ship: Thomas Thompson Dr. Neil Tindale, Texas A & M Univ. JGOFS/Arabian Sea Aerosols, short and long irradiation neutron activation analysis JGOFS Arabian Sea Aerosol Data This mineral aerosol concentration data set is from samples collected during several cruises on the R/V Thomas Thompson during the JGOFS Arabian Sea field program. The data set includes the sampling period for each sample; the "Day of Year", yrday, number for the start of the sampling period for each sample; and the concentration of different elements for each sample, in micrograms per cubic meter. For the sampling period, "nd" is used as a filler to indicate "no data" gaps in the data array. The dust values are estimated using aluminum concentrations determined by neutron activation analysis. While most samples cover a multi-day period, we only have data for about 150 days. We didn't participate in all of the cruises and, on the cruises where samples were collected, often sampling conditions were less than ideal (bad weather, ship maneuvering, relative wind from astern etc.). A few samples that were collected showed obvious contamination from local sources, presumably from material from the R/V Thompson or from nearby fishing boats, and these samples were discarded and are not included in the data set. While the sampling period represents the period during which sampling occurred, sampling was usually not continuous. Sampling was frequently stopped, whenever sampling conditions were no longer suitable. Thus the concentration value at any particular date represents a time integrated sample which is usually non-continuous. Cautionary comments: 1. There may be a problem with the estimate for the mineral "dust" concentration. Most researchers use the average crustal ratio to estimate mineral dust concentrations using elemental concentration data (Al, Fe, etc.). Surface sand and silt samples that were collected in Oman in the Wahibah Sands region have distinct, non-crustal ratios. If individual aerosol samples are comprised of material from distinct sources, including Oman, then it is not unreasonable for their elemental ratios to differ from the published "average" crustal ratio that is used in most aerosol studies. 2. The amount of Ti in all the aerosol samples was small, despite there being a reasonable amount of dust material in most samples. The peaks for Cr and Ti overlap in the neutron activation short irradiation analysis and if significant quantities of Cr are present, this will interfere with the Ti analysis. With the exception of one sample, the Ti values are at or below the detection limit. The sole value above the detection limit was corrected for the Cr contribution using a correction based on the Cr values from the long irradiations. The correction changed the Ti value by less than 5%. The Ti data flagged as being at or below the detection limit was not corrected for possible Cr interference. Data management office notes on supplementary fields - aerosols data lat, lon A nominal ship location is given in lat/lon. The location is the noon position most near the middle of the sampling period, e.g. for a sample which was pumped intermittently from Jan. 3 - 5, the location is given for noon, Jan. 4. Intended as an aid to understanding, not a discrete location. date_begin, date_end We have included the start and stop day for each sample which we believe constrains the sample time about as well as is useful for these data. We also have pump volume and thus a mean concentration of dust per cubic meter of air for that time frame. The actual number of hours sampled during a time block (number of days) is complicated to present. Pumps were turned on and off repetitively depending upon ship maneuvers and relative wind direction (to prevent ship exhaust contamination). Also, the total number of hours the pumps were on is a less useful measure than pump volume, because of the variability in pump efficiency due to changing barometric pressures. An hours worth of pumping does not always yield the same volume of air.

TT049

Website	https://www.bco-dmo.org/deployment/57710
Platform	R/V Thomas G. Thompson
Start Date	1995-07-17
End Date	1995-08-15
Description	**Methods & Sampling** PI: Neil Tindale of: Texas A&M University dataset: Aerosols, long irradiation neutron activation analysis dates: January 08, 1995 to December 18, 1995 locations: N: 22.8459 S: 09.8871 W: 57.2609 E: 68.2687 project: Arabian Sea ship: Thomas Thompson Dr. Neil Tindale, Texas A & M Univ. JGOFS/Arabian Sea Aerosols, short and long irradiation neutron activation analysis JGOFS Arabian Sea Aerosol Data This mineral aerosol concentration data set is from samples collected during several cruises on the R/V Thomas Thompson during the JGOFS Arabian Sea field program. The data set includes the sampling period for each sample; the "Day of Year", yrday, number for the start of the sampling period for each sample; and the concentration of different elements for each sample, in micrograms per cubic meter. For the sampling period, "nd" is used as a filler to indicate "no data" gaps in the data array. The dust values are estimated using aluminum concentrations determined by neutron activation analysis. While most samples cover a multi-day period, we only have data for about 150 days. We didn't participate in all of the cruises and, on the cruises where samples were collected, often sampling conditions were less than ideal (bad weather, ship maneuvering, relative wind from astern etc.). A few samples that were collected showed obvious contamination from local sources, presumably from material from the R/V Thompson or from nearby fishing boats, and these samples were discarded and are not included in the data set. While the sampling period represents the period during which sampling occurred, sampling was usually not continuous. Sampling was frequently stopped, whenever sampling conditions were no longer suitable. Thus the concentration value at any particular date represents a time integrated sample which is usually non-continuous. Cautionary comments: 1. There may be a problem with the estimate for the mineral "dust" concentration. Most researchers use the average crustal ratio to estimate mineral dust concentrations using elemental concentration data (Al, Fe, etc.). Surface sand and silt samples that were collected in Oman in the Wahibah Sands region have distinct, non-crustal ratios. If individual aerosol samples are comprised of material from distinct sources, including Oman, then it is not unreasonable for their elemental ratios to differ from the published "average" crustal ratio that is used in most aerosol studies. 2. The amount of Ti in all the aerosol samples was small, despite there being a reasonable amount of dust material in most samples. The peaks for Cr and Ti overlap in the neutron activation short irradiation analysis and if significant quantities of Cr are present, this will interfere with the Ti analysis. With the exception of one sample, the Ti values are at or below the detection limit. The sole value above the detection limit was corrected for the Cr contribution using a correction based on the Cr values from the long irradiations. The correction changed the Ti value by less than 5%. The Ti data flagged as being at or below the detection limit was not corrected for possible Cr interference. Data management office notes on supplementary fields - aerosols data lat, lon A nominal ship location is given in lat/lon. The location is the noon position most near the middle of the sampling period, e.g. for a sample which was pumped intermittently from Jan. 3 - 5, the location is given for noon, Jan. 4. Intended as an aid to understanding, not a discrete location. date_begin, date_end We have included the start and stop day for each sample which we believe constrains the sample time about as well as is useful for these data. We also have pump volume and thus a mean concentration of dust per cubic meter of air for that time frame. The actual number of hours sampled during a time block (number of days) is complicated to present. Pumps were turned on and off repetitively depending upon ship maneuvers and relative wind direction (to prevent ship exhaust contamination). Also, the total number of hours the pumps were on is a less useful measure than pump volume, because of the variability in pump efficiency due to changing barometric pressures. An hours worth of pumping does not always yield the same volume of air.

TT050

Website	https://www.bco-dmo.org/deployment/57711
Platform	R/V Thomas G. Thompson
Start Date	1995-08-18
End Date	1995-09-15
Description	**Methods & Sampling** PI: Neil Tindale of: Texas A&M University dataset: Aerosols, long irradiation neutron activation analysis dates: January 08, 1995 to December 18, 1995 locations: N: 22.8459 S: 09.8871 W: 57.2609 E: 68.2687 project: Arabian Sea ship: Thomas Thompson Dr. Neil Tindale, Texas A & M Univ. JGOFS/Arabian Sea Aerosols, short and long irradiation neutron activation analysis JGOFS Arabian Sea Aerosol Data This mineral aerosol concentration data set is from samples collected during several cruises on the R/V Thomas Thompson during the JGOFS Arabian Sea field program. The data set includes the sampling period for each sample; the "Day of Year", yrday, number for the start of the sampling period for each sample; and the concentration of different elements for each sample, in micrograms per cubic meter. For the sampling period, "nd" is used as a filler to indicate "no data" gaps in the data array. The dust values are estimated using aluminum concentrations determined by neutron activation analysis. While most samples cover a multi-day period, we only have data for about 150 days. We didn't participate in all of the cruises and, on the cruises where samples were collected, often sampling conditions were less than ideal (bad weather, ship maneuvering, relative wind from astern etc.). A few samples that were collected showed obvious contamination from local sources, presumably from material from the R/V Thompson or from nearby fishing boats, and these samples were discarded and are not included in the data set. While the sampling period represents the period during which sampling occurred, sampling was usually not continuous. Sampling was frequently stopped, whenever sampling conditions were no longer suitable. Thus the concentration value at any particular date represents a time integrated sample which is usually non-continuous. Cautionary comments: 1. There may be a problem with the estimate for the mineral "dust" concentration. Most researchers use the average crustal ratio to estimate mineral dust concentrations using elemental concentration data (Al, Fe, etc.). Surface sand and silt samples that were collected in Oman in the Wahibah Sands region have distinct, non-crustal ratios. If individual aerosol samples are comprised of material from distinct sources, including Oman, then it is not unreasonable for their elemental ratios to differ from the published "average" crustal ratio that is used in most aerosol studies. 2. The amount of Ti in all the aerosol samples was small, despite there being a reasonable amount of dust material in most samples. The peaks for Cr and Ti overlap in the neutron activation short irradiation analysis and if significant quantities of Cr are present, this will interfere with the Ti analysis. With the exception of one sample, the Ti values are at or below the detection limit. The sole value above the detection limit was corrected for the Cr contribution using a correction based on the Cr values from the long irradiations. The correction changed the Ti value by less than 5%. The Ti data flagged as being at or below the detection limit was not corrected for possible Cr interference. Data management office notes on supplementary fields - aerosols data lat, lon A nominal ship location is given in lat/lon. The location is the noon position most near the middle of the sampling period, e.g. for a sample which was pumped intermittently from Jan. 3 - 5, the location is given for noon, Jan. 4. Intended as an aid to understanding, not a discrete location. date_begin, date_end We have included the start and stop day for each sample which we believe constrains the sample time about as well as is useful for these data. We also have pump volume and thus a mean concentration of dust per cubic meter of air for that time frame. The actual number of hours sampled during a time block (number of days) is complicated to present. Pumps were turned on and off repetitively depending upon ship maneuvers and relative wind direction (to prevent ship exhaust contamination). Also, the total number of hours the pumps were on is a less useful measure than pump volume, because of the variability in pump efficiency due to changing barometric pressures. An hours worth of pumping does not always yield the same volume of air.

TT053

Website	https://www.bco-dmo.org/deployment/57714
Platform	R/V Thomas G. Thompson
Start Date	1995-10-29
End Date	1995-11-26
Description	**Methods & Sampling** PI: Neil Tindale of: Texas A&M University dataset: Aerosols, long irradiation neutron activation analysis dates: January 08, 1995 to December 18, 1995 locations: N: 22.8459 S: 09.8871 W: 57.2609 E: 68.2687 project: Arabian Sea ship: Thomas Thompson Dr. Neil Tindale, Texas A & M Univ. JGOFS/Arabian Sea Aerosols, short and long irradiation neutron activation analysis JGOFS Arabian Sea Aerosol Data This mineral aerosol concentration data set is from samples collected during several cruises on the R/V Thomas Thompson during the JGOFS Arabian Sea field program. The data set includes the sampling period for each sample; the "Day of Year", yrday, number for the start of the sampling period for each sample; and the concentration of different elements for each sample, in micrograms per cubic meter. For the sampling period, "nd" is used as a filler to indicate "no data" gaps in the data array. The dust values are estimated using aluminum concentrations determined by neutron activation analysis. While most samples cover a multi-day period, we only have data for about 150 days. We didn't participate in all of the cruises and, on the cruises where samples were collected, often sampling conditions were less than ideal (bad weather, ship maneuvering, relative wind from astern etc.). A few samples that were collected showed obvious contamination from local sources, presumably from material from the R/V Thompson or from nearby fishing boats, and these samples were discarded and are not included in the data set. While the sampling period represents the period during which sampling occurred, sampling was usually not continuous. Sampling was frequently stopped, whenever sampling conditions were no longer suitable. Thus the concentration value at any particular date represents a time integrated sample which is usually non-continuous. Cautionary comments: 1. There may be a problem with the estimate for the mineral "dust" concentration. Most researchers use the average crustal ratio to estimate mineral dust concentrations using elemental concentration data (Al, Fe, etc.). Surface sand and silt samples that were collected in Oman in the Wahibah Sands region have distinct, non-crustal ratios. If individual aerosol samples are comprised of material from distinct sources, including Oman, then it is not unreasonable for their elemental ratios to differ from the published "average" crustal ratio that is used in most aerosol studies. 2. The amount of Ti in all the aerosol samples was small, despite there being a reasonable amount of dust material in most samples. The peaks for Cr and Ti overlap in the neutron activation short irradiation analysis and if significant quantities of Cr are present, this will interfere with the Ti analysis. With the exception of one sample, the Ti values are at or below the detection limit. The sole value above the detection limit was corrected for the Cr contribution using a correction based on the Cr values from the long irradiations. The correction changed the Ti value by less than 5%. The Ti data flagged as being at or below the detection limit was not corrected for possible Cr interference. Data management office notes on supplementary fields - aerosols data lat, lon A nominal ship location is given in lat/lon. The location is the noon position most near the middle of the sampling period, e.g. for a sample which was pumped intermittently from Jan. 3 - 5, the location is given for noon, Jan. 4. Intended as an aid to understanding, not a discrete location. date_begin, date_end We have included the start and stop day for each sample which we believe constrains the sample time about as well as is useful for these data. We also have pump volume and thus a mean concentration of dust per cubic meter of air for that time frame. The actual number of hours sampled during a time block (number of days) is complicated to present. Pumps were turned on and off repetitively depending upon ship maneuvers and relative wind direction (to prevent ship exhaust contamination). Also, the total number of hours the pumps were on is a less useful measure than pump volume, because of the variability in pump efficiency due to changing barometric pressures. An hours worth of pumping does not always yield the same volume of air.

TT054

Website	https://www.bco-dmo.org/deployment/57715
Platform	R/V Thomas G. Thompson
Start Date	1995-11-30
End Date	1995-12-28
Description	**Methods & Sampling** PI: Neil Tindale of: Texas A&M University dataset: Aerosols, long irradiation neutron activation analysis dates: January 08, 1995 to December 18, 1995 locations: N: 22.8459 S: 09.8871 W: 57.2609 E: 68.2687 project: Arabian Sea ship: Thomas Thompson Dr. Neil Tindale, Texas A & M Univ. JGOFS/Arabian Sea Aerosols, short and long irradiation neutron activation analysis JGOFS Arabian Sea Aerosol Data This mineral aerosol concentration data set is from samples collected during several cruises on the R/V Thomas Thompson during the JGOFS Arabian Sea field program. The data set includes the sampling period for each sample; the "Day of Year", yrday, number for the start of the sampling period for each sample; and the concentration of different elements for each sample, in micrograms per cubic meter. For the sampling period, "nd" is used as a filler to indicate "no data" gaps in the data array. The dust values are estimated using aluminum concentrations determined by neutron activation analysis. While most samples cover a multi-day period, we only have data for about 150 days. We didn't participate in all of the cruises and, on the cruises where samples were collected, often sampling conditions were less than ideal (bad weather, ship maneuvering, relative wind from astern etc.). A few samples that were collected showed obvious contamination from local sources, presumably from material from the R/V Thompson or from nearby fishing boats, and these samples were discarded and are not included in the data set. While the sampling period represents the period during which sampling occurred, sampling was usually not continuous. Sampling was frequently stopped, whenever sampling conditions were no longer suitable. Thus the concentration value at any particular date represents a time integrated sample which is usually non-continuous. Cautionary comments: 1. There may be a problem with the estimate for the mineral "dust" concentration. Most researchers use the average crustal ratio to estimate mineral dust concentrations using elemental concentration data (Al, Fe, etc.). Surface sand and silt samples that were collected in Oman in the Wahibah Sands region have distinct, non-crustal ratios. If individual aerosol samples are comprised of material from distinct sources, including Oman, then it is not unreasonable for their elemental ratios to differ from the published "average" crustal ratio that is used in most aerosol studies. 2. The amount of Ti in all the aerosol samples was small, despite there being a reasonable amount of dust material in most samples. The peaks for Cr and Ti overlap in the neutron activation short irradiation analysis and if significant quantities of Cr are present, this will interfere with the Ti analysis. With the exception of one sample, the Ti values are at or below the detection limit. The sole value above the detection limit was corrected for the Cr contribution using a correction based on the Cr values from the long irradiations. The correction changed the Ti value by less than 5%. The Ti data flagged as being at or below the detection limit was not corrected for possible Cr interference. Data management office notes on supplementary fields - aerosols data lat, lon A nominal ship location is given in lat/lon. The location is the noon position most near the middle of the sampling period, e.g. for a sample which was pumped intermittently from Jan. 3 - 5, the location is given for noon, Jan. 4. Intended as an aid to understanding, not a discrete location. date_begin, date_end We have included the start and stop day for each sample which we believe constrains the sample time about as well as is useful for these data. We also have pump volume and thus a mean concentration of dust per cubic meter of air for that time frame. The actual number of hours sampled during a time block (number of days) is complicated to present. Pumps were turned on and off repetitively depending upon ship maneuvers and relative wind direction (to prevent ship exhaust contamination). Also, the total number of hours the pumps were on is a less useful measure than pump volume, because of the variability in pump efficiency due to changing barometric pressures. An hours worth of pumping does not always yield the same volume of air.

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Project Information

U.S. JGOFS Arabian Sea (Arabian Sea)

Website: http://usjgofs.whoi.edu/research/arabian.html

Coverage: Arabian Sea

The U.S. Arabian Sea Expedition which began in September 1994 and ended in January 1996, had three major components: a U.S. JGOFS Process Study, supported by the National Science Foundation (NSF); Forced Upper Ocean Dynamics, an Office of Naval Research (ONR) initiative; and shipboard and aircraft measurements supported by the National Aeronautics and Space Administration (NASA). The Expedition consisted of 17 cruises aboard the R/V Thomas Thompson, year-long moored deployments of five instrumented surface buoys and five sediment-trap arrays, aircraft overflights and satellite observations. Of the seventeen ship cruises, six were allocated to repeat process survey cruises, four to SeaSoar mapping cruises, six to mooring and benthic work, and a single calibration cruise which was essentially conducted in transit to the Arabian Sea.

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Program Information

U.S. Joint Global Ocean Flux Study (U.S. JGOFS)

Website: http://usjgofs.whoi.edu/

Coverage: Global

The United States Joint Global Ocean Flux Study was a national component of international JGOFS and an integral part of global climate change research.

The U.S. launched the Joint Global Ocean Flux Study (JGOFS) in the late 1980s to study the ocean carbon cycle. An ambitious goal was set to understand the controls on the concentrations and fluxes of carbon and associated nutrients in the ocean. A new field of ocean biogeochemistry emerged with an emphasis on quality measurements of carbon system parameters and interdisciplinary field studies of the biological, chemical and physical process which control the ocean carbon cycle. As we studied ocean biogeochemistry, we learned that our simple views of carbon uptake and transport were severely limited, and a new "wave" of ocean science was born. U.S. JGOFS has been supported primarily by the U.S. National Science Foundation in collaboration with the National Oceanic and Atmospheric Administration, the National Aeronautics and Space Administration, the Department of Energy and the Office of Naval Research. U.S. JGOFS, ended in 2005 with the conclusion of the Synthesis and Modeling Project (SMP).

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Funding

Funding Source	Award
National Aeronautics & Space Administration (NASA)	unknown Arabian Sea NASA

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