



On the Dynamics of the Aerosol Plume in Common Bottlenose Dolphin Respiratory Events

Office of Response and Restoration

Data Set (DS) | ID: 73366 | Published / External
Created: 2024-09-04 | Last Modified: 2024-09-06

ID: 73366
Data Set (DS)

Parent: Methods Development
 Project (PRJ) | ID: 69300

* Discovery
• First Pass
» Metadata Rubric

Item Identification

* » Title	On the Dynamics of the Aerosol Plume in Common Bottlenose Dolphin Respiratory Events
Short Name	Cetacean Surface Oil Phase 1a
* Status	Completed
Creation Date	2024
Revision Date	
• Publication Date	2024
* » Abstract	<p>This study examines the trajectories, size, and spatial distribution of aerosolâ€™s during breathing events of common bottlenose dolphins (<i>Tursiops truncatus</i>) in the National Aquarium in Baltimore. Accounting for the terminal velocity of small droplets, the trajectories are used for estimating the volumes and flow rates of the exhaled and inhaled air. Data areâ€™ acquired by training two male and four female dolphins to breathe at the side of the pool within the field-of- view of a high-speed holography system. Droplet-tracking and size measurements are performed for twenty-six datasets involving normal, chuff, and post-exercise breaths, some repeated to assess repeatability. The exhaled liquid originates either from the respiratory system or from the water trapped above the blowhole. The 150-400 ms exhalations have multiple velocity peaks, with the maximum air speed occurring during the first peak for post-exercise breaths. The droplet concentrations and sizes peak at the time of maximum velocity and then gradually decrease. The exhaled liquid volumes vary from 0.1 to 16 mL, peaking for post-exercise breaths. About 0.5% of the exhaled aerosol travels 3-5 times faster than the surrounding air and droplets, presumably due to ejection from deep within the respiratory tract. A fraction of the airborne liquid (0.2-0.5 mL) is subsequently inhaled during the more than 600 ms long inhalation phase, characterized by low speeds and small (150-1000 Î¼m) droplets. The exhaled and inhaled tidal volumes</p>

	and air flow rates estimated from the trajectories are consistent with prior measurements of dolphins in the wild and other facilities
* Purpose	The present study aims to measure the water droplet production during exhalation and the resulting aspirated droplets and liquid volume during inhalation by bottlenose dolphins.
Notes	
Other Citation Details	
• Supplemental Information	
DOI (Digital Object Identifier)	
DOI Registration Authority	
DOI Issue Date	

Keywords

Theme Keywords

Thesaurus	Keyword
Global Change Master Directory (GCMD) Data Center Keywords	DOC/NOAA > National Oceanic & Atmospheric Administration
Global Change Master Directory (GCMD) Science Keywords	EARTH SCIENCE
Global Change Master Directory (GCMD) Science Keywords	EARTH SCIENCE > BIOLOGICAL CLASSIFICATION > ANIMALS/VERTEBRATES > MARINE MAMMALS > DOLPHINS
Global Change Master Directory (GCMD) Science Keywords	EARTH SCIENCE > OCEANS

Global Change Master Directory (GCMD) Service Keywords	EARTH SCIENCE SERVICES > DATA MANAGEMENT/DATA HANDLING > DATA ACCESS/RETRIEVAL

Temporal Keywords

Thesaurus	Keyword

* Spatial Keywords

Thesaurus	Keyword
Global Change Master Directory (GCMD) Location Keywords	CONTINENT > NORTH AMERICA > UNITED STATES OF AMERICA > MARYLAND

Stratum Keywords

Thesaurus	Keyword

Instrument Keywords

Thesaurus	Keyword

Platform Keywords

Thesaurus	Keyword

Physical Location

• » Organization	
• » City	
• » State/Province	
• Country	
• » Location Description	

Data Set Information

* Data Set Scope Code	Non-Geographic Data Set
• Data Set Type	CSV Files
• Maintenance Frequency	None Planned
Maintenance Note	
» Data Presentation Form	
• Entity Attribute Overview	
Entity Attribute Detail Citation	
Entity Attribute Detail URL	

Distribution Liability	
Data Set Credit	

Support Roles

» At least one Distributor Org, one Metadata Contact, one Point of Contact, and one Data Steward should be listed.

* » Support Role	Data Steward
* » Date Effective From	2024
Date Effective To	
Organization	Office of Response and Restoration (ORR)
Address	1305 East-West Highway Silver Spring, MD 20910
Email Address	
Phone	
Fax	
Mobile	
URL	https://response.restoration.noaa.gov/
Business Hours	
Contact Instructions	

* » Support Role	Distributor
* » Date Effective From	2024
Date Effective To	
Organization	Office of Response and Restoration (ORR)
Address	1305 East-West Highway Silver Spring, MD 20910
Email Address	
Phone	
Fax	
Mobile	

URL	https://response.restoration.noaa.gov/
Business Hours	
Contact Instructions	

* » Support Role	Metadata Contact
* » Date Effective From	2024
Date Effective To	
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Email Address	
Phone	
Fax	
Mobile	
URL	https://response.restoration.noaa.gov/
Business Hours	
Contact Instructions	

* » Support Role	Originator
* » Date Effective From	2021
Date Effective To	2023
Organization	Johns Hopkins Whiting School of Engineering
Email Address	
Phone	
Fax	
Mobile	
URL	https://engineering.jhu.edu/contact/
Business Hours	
Contact Instructions	

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* » Support Role	
* » Date Effective From	
Date Effective To	
* » Contact	
* Contact Instructions	

* » Support Role	
* » Date Effective From	
Date Effective To	
* » Contact	
* Contact Instructions	

* » Support Role	
* » Date Effective From	
Date Effective To	
* » Contact	
* Contact Instructions	

Extents

Currentness Reference	
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Extent Group 1

Extent Description	
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Extent Group 1 / Geographic Area 1

* » W° Bound	
* » E° Bound	
* » N° Bound	
* » S° Bound	
* » Description	Data were collected at the National Aquarium in Baltimore, MD. Analysis was conducted at Johns Hopkins University

Extent Group 1 / Vertical Extent

EPSG Code	
Vertical Minimum	
Vertical Maximum	

Extent Group 1 / Time Frame 1

* » Time Frame Type	Discrete
* » Start	2022
End	
Alternate Start As Of Info	
Alternate End As Of Info	
Description	

Spatial Information

Spatial Resolution

Angular Distance	
Angular Distance Units	
Horizontal Distance	

Horizontal Distance Units	
Vertical Distance	
Vertical Distance Units	
Equivalent Scale Denominator	
Level of Detail Description	

Spatial Representation

Grid Representation Used?	
Vector Representation Used?	
Text / Table Representation Used?	
TIN Representation Used?	
Stereo Model Representation Used?	
Video Representation Used?	

Grid Representation

Dimension Count	
Cell Geometry	
Transformation Parameter Available?	

Axis Dimension

Dimension Type	
Size	

Resolution	
Resolution Units	
Resolution Type	
Description	

Axis Dimension

Dimension Type	
Size	
Resolution	
Resolution Units	
Resolution Type	
Description	

Vector Representation

Topology Level	
Complex Object Present?	
Complex Object Count	
Composite Object Present?	
Composite Object Count	
Curve Object Present?	
Curve Object Count	
Point Object Present?	
Point Object Count	
Solid Object Present?	

Solid Object Count	
Surface Object Present?	
Surface Object Count	

Reference Systems

Reference System

EPSG Code	
Horizontal Resolution	
Horizontal Encoding Method	
Latitude Resolution	
Longitude Resolution	
Coordinate X Resolution	
Coordinate Y Resolution	
Row Resolution	
Column Resolution	
Horizontal Units	
Distance Resolution	
Distance Units	
Bearing Resolution	
Bearing Units	
Reference Direction	
Reference Meridian	
Vertical Resolution	

Vertical Encoding Method	
Vertical Resolution	
Vertical Units	

Access Information

Data License	CC0-1.0
Data License URL	https://creativecommons.org/publicdomain/zero/1.0/
Data License Statement	These data were produced by NOAA and are not subject to copyright protection in the United States. NOAA waives any potential copyright and related rights in these data worldwide through the Creative Commons Zero 1.0 Universal Public Domain Dedication (CC0-1.0) .
* » Security Class	Unclassified
* Security Classification System	
Security Handling Description	
• Data Access Policy	
» Data Access Procedure	
• » Data Access Constraints	None
• Data Use Constraints	
Metadata Access Constraints	

Metadata Use Constraints	
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Distribution Information

Start Date	2024
End Date	Present
» Download URL	https://www.diver.orr.noaa.gov/documents/d/guest/aerosols_exhaled_and_inhaled_by_dolphins_plots
Distributor	Office of Response and Restoration (ORR) (2024 - Present)
File Name	Aerosols_Exhaled_and_Inhaled_by_Dolphins_plots.zip
Description	
File Date/Time	
File Type (Deprecated)	
Distribution Format	CSV - Comma Separated Values (Text)
File Size	6.9 MB
Application Version	
Compression	Zip
Review Status	

Start Date	
End Date	
» Download URL	
Distributor	
File Name	
Description	
File Date/Time	

File Type	
FGDC Content Type	
File Size	
Application Version	
Compression	
Review Status	

Start Date	
End Date	
» Download URL	
Distributor	
File Name	
Description	
File Date/Time	
File Type	
FGDC Content Type	
File Size	
Application Version	
Compression	
Review Status	

Start Date	
End Date	
» Download URL	
Distributor	
File Name	
Description	
File Date/Time	

File Type	
FGDC Content Type	
File Size	
Application Version	
Compression	
Review Status	

Archive Information

Location	
File Identifier	
File Name	
URL	
Description	
DOI	
Archive Date	
Archive Update Frequency	

Location	
File Identifier	
File Name	
URL	
Description	
DOI	
Archive Date	
Archive Update Frequency	

Location	
File Identifier	

File Name	
URL	
Description	
DOI	
Archive Date	
Archive Update Frequency	

URLs

URL	https://engineering.jhu.edu/
Name	Johns Hopkins Whiting School of Engineering
URL Type	Online Resource
File Resource Format	
Description	Johns Hopkins Whiting School of Engineering home page

URL	https://response.restoration.noaa.gov/
Name	NOAA Office of Response and Restoration
URL Type	Online Resource
File Resource Format	
Description	NOAA Office of Response and Restoration home page

URL	
Name	
URL Type	
File Resource Format	
Description	

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URL	
Name	
URL Type	
File Resource Format	
Description	

URL	
Name	
URL Type	
File Resource Format	
Description	

Activity Log

Activity Time	
Activity Type	
Responsible Party	
Description	

Activity Time	
Activity Type	
Responsible Party	
Description	

Activity Time	
Activity Type	
Responsible Party	
Description	

Issues

Issue Date	
Author	
Issue	

Issue Date	
Author	
Issue	

Issue Date	
Author	
Issue	

Technical Environment

Description	
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Data Quality

Representativeness	
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Accuracy	While NOAA makes every effort to ensure that its databases are error-free, errors do occur. We ask that you notify us immediately of any errors that you discover in our data.
Analytical Accuracy	
Horizontal Positional Accuracy	
Vertical Positional Accuracy	
Quantitation Limits	
Bias	
Comparability	
Completeness Measure	
Precision	
Analytical Precision	
Field Precision	
Sensitivity	

Detection Limit	
Completeness Report	
Conceptual Consistency	
» Quality Control Procedures Employed	

Data Management

» Have Resources for Management of these Data Been Identified?	
» Approximate Percentage of Budget for these Data Devoted to Data Management	Unknown
» Do these Data Comply with the Data Access Directive?	No
» Is Access to the Data Limited Based on an Approved Waiver?	No
» If Distributor (Data Hosting Service) is Needed, Please Indicate	
» Approximate Delay Between	

Data Collection and Dissemination	
» If Delay is Longer than Latency of Automated Processing, Indicate Under What Authority Data Access is Delayed	
» Actual or Planned Long-Term Data Archive Location	
» If World Data Center or Other, Specify	
» If To Be Determined, Unable to Archive, or No Archiving Intended, Explain	
» Approximate Delay Between Data Collection and Archiving	
» How Will the Data Be Protected from Accidental or Malicious Modification or Deletion Prior to Receipt by the Archive?	

Lineage

» Lineage Statement	The experiments were performed at the National Aquarium in Baltimore by training four female and two male bottlenose dolphins to swim just under the field-of-view of a high-speed holography system and offer, on cue, three different breath types: normal, chuff (forced exhale) and post-exercise.
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Sources

Citation Title	On the Dynamics of the Aerosol Plume in Common Bottlenose Dolphin Respiratory Events
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Contact Role Type	Originator
Contact Type	Organization
Contact Name	Johns Hopkins Whiting School of Engineering
Publish Date	
Extent Type	
Extent Start Date/Time	
Extent End Date/Time	
Scale Denominator	
Citation URL	
Citation URL Name	
Citation URL Description	
Source Contribution	

Citation Title	
Contact Role Type	
Contact Type	
Contact Name	
Publish Date	
Extent Type	
Extent Start Date/Time	
Extent End Date/Time	
Citation URL	
Citation URL Name	
Citation URL Description	

Scale Denominator	
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Citation Title	
Contact Role Type	
Contact Type	
Contact Name	
Publish Date	
Extent Type	
Extent Start Date/Time	
Extent End Date/Time	
Citation URL	
Citation URL Name	
Citation URL Description	
Scale Denominator	

Citation Title	
Contact Role Type	
Contact Type	
Contact Name	
Publish Date	
Extent Type	
Extent Start Date/Time	
Extent End Date/Time	
Citation URL	
Citation URL Name	
Citation URL Description	

Scale Denominator	
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Process Steps

Process Step Number	
» Description	
Process Date/Time	
Process Contact	
Phone (Voice)	
Email Address	
Source	

Process Step Number	
» Description	
Process Date/Time	
Process Contact	
Phone (Voice)	
Email Address	
Source	

Process Step Number	
» Description	
Process Date/Time	
Process Contact	
Phone (Voice)	

Email Address	
Source	

Acquisition Information

Instruments

Identifier	Phantom v2640 high-speed CMOS
Docucomp UUID	
Instrument / Gear	Instrument
Instrument Type	Camera
Description	The Phantom v2640 is a high-speed CMOS camera from Vision Research that has a 4 megapixel (MPx) sensor and can capture images at up to 6,600 frames per second (fps)

Identifier	
Docucomp UUID	
Instrument / Gear	
Instrument Type	
Description	

Identifier	
Docucomp UUID	
Instrument / Gear	
Instrument Type	
Description	

Identifier	
Docucomp UUID	
Instrument / Gear	

Instrument Type	
Description	

Platforms

Identifier	Aquarium Tank
Docucomp UUID	
Description	National Aquarium in Baltimore dolphin tank

Mounted Instruments

Identifier	Phantom v2640 high-speed CMOS
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Identifier	
Docucomp UUID	
Description	

Mounted Instruments

Identifier	
Identifier	
Identifier	

Identifier	
Docucomp UUID	
Description	

Mounted Instruments

Identifier	
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Identifier	
Identifier	

Identifier	
Docucomp UUID	
Description	

Mounted Instruments

Identifier	
Identifier	
Identifier	

FAQs

Date	
Author	
Question	
Answer	

Child Items

Rubric scores updated every 15m

Score	Type	Title

Related Items

Item Type	Relationship Type	Title
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Catalog Details

Catalog Item ID	73366
Metadata Record Created By	Jay Coady
Metadata Record Created	2024-09-04 17:24+0000
Metadata Record Last Modified By	Adam Rotert
» Metadata Record Last Modified	2024-09-06 17:10+0000
Metadata Record Published	2024-09-06
Owner Org	ORR
Metadata Publication Status	Published Externally
Do Not Publish?	N
Metadata Workflow State	Published / External
Metadata Last Review Date	2024-09-06
Metadata Review Frequency	1 Year
Metadata Next Review Date	2025-09-06
Tags	