


# Nishchitha Sandeepana Silva Etige

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## Education

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**Ph.D. in Earth and Environment**, Boston University 2024

Dissertation: Influence of the Kuroshio Extension on the Pacific Decadal Precession and Marine environment in the Northeast Pacific

Advisor: Professor Bruce Anderson

**M.S. in Marine Science & Technology**, University of Massachusetts 2019

Thesis: Understanding thirty-eight years of gulf stream's warm core rings: Variability, regimes and survival

Advisor: Professor Avijit Gangopadhyay

**B.S. in Aquatic Resources Technology**, Uva Wellassa University of Sri Lanka 2015

(Second Class Upper Division)

## Awards

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**NCAR Earth System Science Internship** 2023

National Center for Atmospheric Research, Boulder, CO

**Warren McLeod Summer Fellowship in Marine Science** 2022

Boston University Marine Program

**Pardee Summer Fellowship** 2021

The Frederick S. Pardee Center for the Study of the Longer-Range Future – Boston University

## Publications (Publishing name - E.N.S. Silva)

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### Journal Articles

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1. Welandawe, S.V. et al., (2025) **Machine Learning Techniques for Marine Heatwave Prediction: A comprehensive Review**. Intell. Mar. Technol. Syst. 3, 28. <https://doi.org/10.1007/s44295-025-00076-1>
2. Little, C.M. et al., 2025: Pan-Pacific low-frequency modes of sea level and climate variability. Science Advances 11(22). <https://doi.org/10.1126/sciadv.adw3661>
3. **Silva, E.N.S.**, Anderson, B.T. 2024: Influence of Kuroshio Extension's sea surface temperature variability on the North Pacific atmosphere and Pacific Decadal Precession. Clim Dyn 62, 8947–8960. <https://doi.org/10.1007/s00382-024-07372-2>
4. **Silva, E.N.S.**, Anderson, B.T. 2023: Northeast Pacific marine heatwaves linked to Kuroshio Extension variability. Commun Earth Environ 4, 367. <https://doi.org/10.1038/s43247-023-01010-1>
5. Silver, A., Gangopadhyay, A., Gawarkiewicz, G., **Silva, E.N.S.** and Clark, J. 2021. Interannual and seasonal asymmetries in Gulf Stream Ring Formations from 1980 to 2019. Scientific Reports, 11(1), pp.1-7. <https://doi.org/10.1038/s41598-021-81827-y>
6. **Silva, E.N.S.**, A. Gangopadhyay, G. Fay, A., M. Welandawe, G. Gawarkiewicz, A. M. Silver, and J. Clark, 2020: A survival analysis of the warm core rings of the Gulf Stream. Journal of Geophysical Research: Oceans, 125(10), p.e2020JC016507. <https://doi.org/10.1029/2020JC016507>

7. Gangopadhyay, A., Gawarkiewicz, G., **Silva, E. N. S.**, Silver, A. M., Monim, M., & Clark, J. 2020. **A census of the warm-core rings of the Gulf Stream: 1980–2017**. Journal of Geophysical Research: Oceans, 125, e2019JC016033. <https://doi.org/10.1029/2019JC016033>
8. Gangopadhyay, A., Gawarkiewicz, G., **Silva, E. N. S.**, Monim, M., & Clark, J. 2019. **An observed regime shift in the formation of Warm core rings from the Gulf Stream**. Scientific Reports, 9(1). doi:10.1038/s41598-019-48661-9
9. Muthuwatta L., Sood A., McCartney M., **Silva E.N.S.**, Opere A. 2018. **Understanding the impacts of climate change in the Tana river basin, Kenya**. Proc IAHS 379:37-42. <https://doi.org/10.5194/piahs-379-37-2018>
10. Silva E.I.L. and **Silva E.N.S.** 2017. **Mini-hydro, an injurious novel threat to highland forest ecosystems of Sri Lanka**. The Sri Lanka Forester 38:67-73.
11. Silva E.I.L., Manthrithilake H., Pitigala D., **Silva E.N.S.** 2014. **Environmental flow in Sri Lanka: Ancient anicuts versus modern dams**. Sri Lanka Journal of Aquatic Sciences 19:3-14. doi: 10.4038/slj.as.v19i0.7447
12. Silva E.I.L., Rott E., Thumpela I., Athukorala N., **Silva E.N.S.** 2013. **Species composition and relative dominance of reservoir phytoplankton in Sri Lanka: Indicators of environmental quality**. International Journal of Biological Science and Engineering 4(4):92-102.

## Conference Proceedings

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1. Ponte, R.M., **Silva, N.**, Zhao, M., Wang, O., & Fukumori, I. **Improving ocean bottom pressure fields through use of space gravity data in state estimation in GRACE-FO** in 2025 GRACE Science Team Meeting, Online.
2. Little, C.M., Yeager, S.G., Fasullo, J., Karnauskas, K.B., Nerew, R.S. and **Etige, N.S.** **Pan-pacific low frequency modes of climate variability since 1950 and their influence on altimeter-era sea level trends** in AGU Annual Meeting 2024, Washington DC.
3. **Etige, N.S.**, Anderson, B.T., Deppenmeier A.L., & Little C.M. 2024 **Northeast Pacific Marine Heatwaves and links to the Kuroshio Extension in a high-resolution climate model** in AGU Annual Meeting 2024, Washington DC.
4. Abeywickrama, T., **Etige, N. S.**, Randombage, A. G., Abeygunawardana, A. P., & Gunathilaka, I. T., 2024, February. **Influence of Indian Ocean Dipole on Coastal Primary Production in Sri Lanka: A 25-Year Analysis** in Ocean Sciences Meeting 2024. AGU.
5. **Etige, N.S.**, Deppenmeier A.L & Anderson, B.T. 2023. **The Relationship between Kuroshio Extension, the Pacific Decadal Precession, and Marine Heatwaves in a High-Resolution Global Climate Model** in Graduate Climate Conference 2023. Marine Biological Laboratory, Woods Hole, MA.
6. **Etige, N.S.**, Deppenmeier A.L & Anderson, B.T. 2023. **Influence of Large-scale Kuroshio Extension Variability on the Pacific Decadal Precession in the High-Resolution Version of the Community Earth System Model** in 2023 NCAR|UCAR|UCP Summer Student Poster Research Symposium. National Center for Atmospheric Research, Boulder, CO.
7. **Etige, N.S.** & Anderson, B. 2022, February. **A Link between Kuroshio Extension Variations, Northeast Pacific Marine Heatwaves, and Marine Ecosystems in the Gulf of Alaska** in AGU Fall Meeting 2022. AGU.
8. **Silva, E.N.S.** & Anderson, B.T. 2022, March. **Influence of Kuroshio Extension Variations on the Formation of Marine Heatwaves in the Gulf of Alaska** in Ocean Science Meeting 2022. AGU.
9. **Etige, N.S.** & Anderson, B. 2020, February. **What Scale of Kuroshio Extension Variability Influences the Downstream Atmosphere that Links with the Pacific Decadal Precession?** in AGU Fall Meeting 2021. AGU.

10. Silver, A., Gangopadhyay, A., **Etige, N.S.**, Gawarkiewicz, G., Bisagni, J.J., Monim, M. and Clark, J., 2020, February. **A Census of Gulf Stream Warm and Cold Core Rings (1980-2017)** in Ocean Sciences Meeting 2020. AGU.
11. **Silva E.N.S.**, Rajasuriya A. and Sosai S. 2017. **Testing attitudes of fishers towards conservation; a snapshot.** Proceedings of third national symposium on marine environment; 10/17/2017; Colombo, Sri Lanka. Sri Lanka: Marine Environment Protection Authority, Sri Lanka. 37-38 p.
12. **Silva E.N.S.**, Liyanage N.P.P. and Jayamanne S.C. 2016. **Possible effects of climate change driven sea level rise on small islet complex of Negombo lagoon sea entrance with respect to mangrove floral community and fisheries.** Proceedings of 6th research symposium of Uva Wellassa University - Towards emerging trends in value addition; 01/28/2016 - 01/28/2016; Uva Wellassa University. Sri Lanka: Uva Wellassa University. 131 p.
13. **Silva E.N.S.**, Liyanage N.P.P., Jayamanne S.C. and Silva E.I.L. 2016. **The fate of Negombo lagoon sea entrance in the face of climate change driven sea-level rise.** International workshop on climate change and anthropogenic activities: Impact on coastal development and management; 10/28/2016-10/29/2016; Colombo, Sri Lanka. Sri Lanka: University of Colombo. 61-63 p.
14. Silva E.I.L. and **Silva E.N.S.** 2016. **Mini-hydro, an injurious novel threat to highland forest ecosystems of Sri Lanka.** Proceedings of international research symposium on valuation of forest ecosystems and their services; 10/18/2016; Colombo, Sri Lanka. Sri Lanka: UN-REDD. 47 p.
15. Silva E.I.L., Jayawardhana R.A.S.N., **Silva E.N.S.** and Liyanage N.P.P. 2016. **The effects of escalating small hydropower development on hill stream fish fauna endemic to Sri Lanka.** Asia 2016 - International conference on water resources and hydropower development in Asia; 03/01/2016-03/03/2016; Vientiane, Laos.
16. Silva E.I.L., Jayawardhana R.A.S.N., Liyanage N.P.P. and **Silva E.N.S.** 2015. **Effects of construction and operation of mini hydropower plants on fish fauna endemic to Sri Lanka - A case study on Kelani river basin.** Symposium proceedings of the water professionals' day - Water resources research in Sri Lanka; 10/01/2015; Post Graduate Institute of Agriculture, University of Peradeniya. Sri Lanka: Geo-Informatics Society of Sri Lanka. 45-55 p.

## Books

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1. Silva E.I.L. and **Silva E.N.S.** 2016. **Handbook on small hydropower development and environment: A case study on Sri Lanka.** 1st ed. Colombo, Sri Lanka: Water Resources Science and Technology.

## Reports

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1. Sood A., Muthuwatta L., **Silva N.S.**, McCartney M. 2017. **Understanding the hydrological impacts of climate change in the Tana river basin, Kenya.** Colombo Sri Lanka: International Water Management Institute (IWMI). Report IWMI Working Paper 178. 40 p.

## Magazine Articles

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1. **Silva E.N.S.**, Liyanage N.P.P., Jayamanne S.C. 2016. **Negombo lagoon sea entrance - vulnerable to climate change?** Neela Haritha - the Climate Change Magazine of Sri Lanka 1:52-53.

## Invited Talks

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1. **"Climate 101 – Our Planet's Future is Our Future"** Invited talk at the North Shore Youth Climate Leadership Program (YCLP) Annual Summit. Peabody-Essex Museum, Salem, Massachusetts. Mar 22, 2025.

2. **"The Kuroshio Extension, Pacific Decadal Precession, & Marine Heatwaves in the Northeast Pacific: Exploring Teleconnections and Consequences"** Invited talk for DEOS Seminar at University of Massachusetts Dartmouth's School for Marine Science & Technology, New Bedford, Massachusetts. Sep 20, 2023.
3. **"The Kuroshio Extension, Pacific Decadal Precession, & Marine Heatwaves in the Northeast Pacific: Exploring Teleconnections and Consequences"** Invited job talk, AER – Verisk, Lexington, Massachusetts. Sep 14, 2023
4. **"Kuroshio Extension's Role on Influencing Downstream Atmosphere & the Northeast Pacific Marine Environment"** Invited talk for a graduate course at University of Massachusetts Dartmouth's School for Marine Science & Technology, New Bedford, Massachusetts. Sep 22, 2022.
5. **"Climate Change: Livestock and Fisheries & Aquaculture Sector Vulnerability and Adaptation"** Online Workshop Resource Person. Department of Animal Science, Uva Wellassa University, Sri Lanka. Dec 09, 2021.
6. **"Ocean Currents and Ocean Pollution"** World Ocean Day Webinar: Panelist, Aqua Club of Uva Wellassa University, Sri Lanka. Jun 08, 2021.
7. **"MV X-Press Pearl: Beyond the Disaster"** Sri Lankan Twitter Space Discussion: Invited speaker. Jun 04, 2021.
8. **"Thirty-eight Years of Gulf Stream's Warm Core Rings: Variability, Regimes, and Survival"** Shelf and Slope Processes Informal Series, Woods Hole Oceanographic Institute, Woods Hole MA. Jul 17, 2019.

## Research Experience

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### Senior Research Associate I

2023 – Present

Atmospheric and Environmental Research – JANUS Research Group

- Conduct oceanographic research on multiple projects funded by the National Science Foundation (NSF), National Oceanic and Atmospheric Administration (NOAA), and National Aeronautics and Space Administration (NASA).
- Leading research proposal development on Marine extreme events, their consequences, and predictability.
- Leading research proposal development on utilization of NASA PACE mission data to provide productivity snapshots for heat extreme monitoring.
- Analyze ocean bottom pressure variability in NASA's GRACE (Gravity Recovery and Climate Experiment) estimates to compare with ECCO (Estimating the Circulation and Climate of the Ocean), GLORYS and VIKING models.
- Studied the representation of the along-coast mean dynamic sea-level tilt of the US East Coast in HighResMIP models.
- Developed process-oriented diagnostic (POD) for the NOAA Model Diagnostics Taskforce Framework named Mean Dynamic Sea-Level (MDSL). Involved in collaborative backend development with NOAA MDTF, code writing, POD implementation and launching, documentation, and GitHub workflow management.
- Investigate low-frequency variability in Pacific Ocean sea level using reanalysis datasets, numerical models, and tide-gauge observations.

### Independent Mentoring

2023 – Present

A mentor for undergraduate research students from multiple institutions

- Reviewed novel Machine Learning and Deep Learning techniques used for the identification of marine heatwaves.

- Studying the association between the variability of primary productivity of the coastal waters surrounding Sri Lanka and the Indian Ocean Dipole
- Development of machine learning approaches to predict Marine Heatwaves in the Indian Ocean and their links to influence on primary production.

#### **Doctoral Candidate**

**2019 – 2024**

Department of Earth and Environment, Boston University

- Investigated the links between Kuroshio Current Extension variability and Pacific Decadal Precession using ocean-atmospheric reanalysis data and spatial analysis techniques.
- Discovered how Kuroshio Extension variations link with the occurrence of Marine Heatwaves in the Gulf of Alaska region.

#### **NCAR Earth System Science Intern (NESSI)**

**2023**

National Center for Atmospheric Research (NCAR)

- Analyzed the presence of links between Kuroshio Extension and Pacific Decadal Precession in future climates using the high-resolution Community Earth System Model on NCAR's high performance computing system (in collaboration with the Ocean Section of NCAR's Climate and Global Dynamics Lab).

#### **Warren Mcleod Summer Fellow**

**2022**

Boston University Marine Program

- A fellowship to examine the influence of Kuroshio Extension on northeast Pacific marine environments in terms of Marine Heatwave formations.

#### **Pardee Summer Fellow**

**2021**

The Frederick S. Pardee Center for the Study of the Longer-Range Future, Boston University

- A fellowship to examine the links between the Kuroshio Extension variations and the formation of Marine Heatwaves in the Gulf of Alaska via atmospheric modifications.

#### **Graduate Research Assistant**

**2018 - 2019**

Oceanographic Modeling and Analysis Laboratory, Department of Estuarine and Ocean Science, School for Marine Science and Technology, University of Massachusetts Dartmouth

- Developed a geo-coded database of the Gulf Stream's Warm Core Rings (WCRs) using 38 years of Gulf Stream charts.
- Conducted a census and analysis to determine regime shifts, seasonal and interannual variability, and survivability of the Gulf Stream's WCRs.

#### **Consultant**

**2017**

International Union for Conservation of Nature (IUCN), Sri Lanka Office

- Developed and supplied inputs for the determination of a new marine protected area in the Gulf of Mannar, Indian Ocean.
- Investigated the willingness of fishing communities for the conservation of Dugong and Seagrass in the Gulf of Mannar and Palk Bay, Indian Ocean.

#### **Intern**

**2015 - 2017**

International Water Management Institute (IWMI), Sri Lanka

- Analyzed hydrological data for multiple climate change scenarios to understand the hydrological impacts of climate change in the Tana River basin, Kenya.
- Studied the potentials of utilizing groundwater and surface water conjunctively for irrigation in North-Central Sri Lanka.
- Processed and maintained a geo-coded agro-well database for North-Central Sri Lanka to determine potential cropping intensities.
- Developed a repository of case studies to utilize as input for a policy model established for the management of reservoirs in Kazakhstan.

### **Undergraduate Research**

**2015**

Uva Wellassa University

- Thesis research on the effects of climate change driven sea-level rise on a unique islet complex at a sea-lagoon interface on the west coast of Sri Lanka.

### **Volunteer Researcher**

**2013 - 2017**

Water Resources Science and Technology, Sri Lanka

- Studied the impacts of small-scale hydropower generation on mountain streams of Sri Lanka.
- Conducted a case study on small-scale hydropower generation impacts on mountain streams.

## **Teaching Experience**

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### **Senior Teaching Fellow**

**2022 Spring**

Department of Earth and Environment, Boston University

- Instructor: Natural Environments: The Atmosphere                      EE101

### **Teaching Fellow**

**2019 - 2023**

Department of Earth and Environment, Boston University

Led labs and discussions. Conducted grading and proctoring responsibilities.

- Environmental Change and Sustainability                      EE100
- Natural Environments: The Atmosphere                      EE101
- Introduction to Climate and Earth System Science                      EE107
- Introduction to Oceanography                      EE144

### **Teaching Assistant**

**2018 - 2019**

School for Marine Science and Technology, University of Massachusetts Dartmouth

Conducted grading and proctoring responsibilities.

- Introduction to Climate Sciences                      MAR115

## **Reviewer**

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Journal of Geophysical Research: Oceans	2021
Natural Hazards and Earth System Sciences	2024
Journal of Geophysical Research: Atmospheres	2024

Heliyon	2024
Oceans	2025

## Work Experience

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Senior Research Associate I Atmospheric and Environmental Research – JANUS Research Group	Nov 2023 – Present
Senior / Teaching Fellow Department of Earth and Environment, Boston University	Sep 2019 – Nov 2023
Graduate Research Assistant Oceanographic Modeling and Analysis Laboratory, Department of Estuarine and Ocean Science, School for Marine Science and Technology, University of Massachusetts Dartmouth	Jan 2018 – Aug 2019
Intern / Consultant International Union for Conservation of Nature (IUCN), Sri Lanka Office	Jan 2017 – Aug 2017
Intern International Water Management Institute (IWMI), Sri Lanka	Oct 2015- Dec 2016

## Technical Skills

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- High Performance Computing:
  - Boston University Shared Computing Cluster
  - NCAR High Performing Computer
- Programming languages: MATLAB, Python, R.
- Git version control
- Diagnostic development for NOAA MDTF
- Management, pre-processing and analysis of CMIP6 data.
- Software packages: SPSS, Minitab, ArcGIS, QGIS, LaTeX.
- Languages: English (fluent), Sinhala (fluent), Tamil (basic reading)

## Workshops, Training, and Conferences

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1. AGU Fall Meeting 2024, Washington DC, Dec 10 – Dec 12, 2024.
2. Graduate Climate Conference 2023, Woods Hole, MA. Nov 02 – Nov 04, 2023.
3. NCAR|UCAR|UCP Summer Student Poster Research Symposium, National Center for Atmospheric Research, Boulder, CO. Aug 03, 2023.
4. AGU Fall Meeting 2022, Chicago, IL. Dec 12 – Dec 16, 2022.
5. Ocean Science Meeting 2022, Online, Feb 24 – Mar 4, 2022.
6. AGU Fall Meeting 2021, New Orleans, LA. Dec 13 – Dec 17, 2021.
7. UMass Intercampus Marine Science Research Symposium, School for Marine Science and Technology, UMass Dartmouth, New Bedford MA. Apr 04, 2019.
8. NOAA Coast Watch East Coast Satellite Data Training Class, University of Rhode Island, Narragansett Bay Campus, Narragansett RI. Jul 30 - Aug 1, 2018.

9. International Workshop on Climate Change and Anthropogenic Activities: Impact on Coastal Development and Management, Colombo, Sri Lanka. Oct 28, 2016.
10. International Research Symposium on Valuation of Forest Ecosystems and their Services, Colombo, Sri Lanka. Oct 18, 2016.
11. Awareness Program on Hill-stream Landscape of Sri Lanka, Post Graduate Institute of Agriculture, University of Peradeniya, Sri Lanka. May 27, 2016.
12. Two-day Training Workshop on "Stream Ecology & Environmental Flow, Kotmale International Training Institute, Sri Lanka. Mar 9 - Mar 10, 2016.
13. 6th Research Symposium of Uva Wellassa University: Towards Emerging Trends in Value Addition; Environmental Science Track, Uva Wellasa University, Sri Lanka. Jan 28, 2016.
14. Aqua Forum 2015: Blue Revolution; Challenging New Frontiers through Value Addition, Uva Wellassa University, Sri Lanka. Dec 11, 2015.
15. Seminar on Length Based Spawning Potential - A new approach to assess and manage data poor fisheries, National Aquatic Resources Research & Development Agency, Sri Lanka. Aug 11, 2015.
16. SLAFAR Pre-symposium workshop on Monitoring Water Quality for Safe Drinking Water, University of Kelaniya, Sri Lanka. May 16, 2015.

## Services and Other Experience

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### Mentorship

Domain Expert - Undergraduate thesis at Robert Gordon University	2025
Scholar-X Mentor for three Sri Lankan Undergraduate students	2023
Mentor for two Sri Lankan Schoolteachers on conducting research	2023

### Memberships

BU Earth and Environment Diversity, Equity, and Inclusion Steering Committee	2020 - 2021
BU Earth and Environment International Student Committee	2020 - 2022
American Geophysical Union	2018 – Present
The Oceanography Society	2019 - Present

### Student Representative

UMass Dartmouth SMAST Graduate Student Association	2018 – 2019
Facilitator to conduct science demonstrations to Massachusetts middle school student	

### Grantee Representative

	2015 – 2016
“Escalating Small Hydropower Development and Aquatic Biodiversity of Mountain Streams in Sri Lanka”, a grant awarded by Asia Pacific Network for Global Change Research	

### Coordinator and Translator

	January 2016
For an international student group from Johns Hopkins University, USA for a one week during a case study conducted in Negombo Lagoon in Sri Lanka	

### Founder President

	2013-2014
Aqua Club of Uva Wellassa University, Sri Lanka	



<b>Faculty Board Student Representative</b>	2013-2014
Faculty of Animal Science and Export Agriculture, Uva Wellassa University, Sri Lanka	
<b>Degree Program Student Representative</b>	2013-2014
Aquatic Resources Technology Degree Program, Uva Wellassa University, Sri Lanka	
<b>Managing Director (Voluntary)</b>	2013 – 2018
Water Resources Science and Technology, a Sri Lankan organization conducting research and dissemination activities on water resources of Sri Lanka	

## References

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Bruce Anderson, Professor  
 Department of Earth and Environment  
 Boston University  
 (617) 353-4807, [brucea@bu.edu](mailto:brucea@bu.edu)

Avijit Gangopadhyay, Commonwealth Professor  
 School for Marine Science and Technology  
 University of Massachusetts Dartmouth  
 (508) 910-6330, [avijit.gangopadhyay@umassd.edu](mailto:avijit.gangopadhyay@umassd.edu)

Glen Gawarkiewicz, Senior Scientist  
 Physical Oceanography  
 Woods Hole Oceanographic Institution  
 (508) 289-2913, [ggawarkiewicz@whoi.edu](mailto:ggawarkiewicz@whoi.edu)