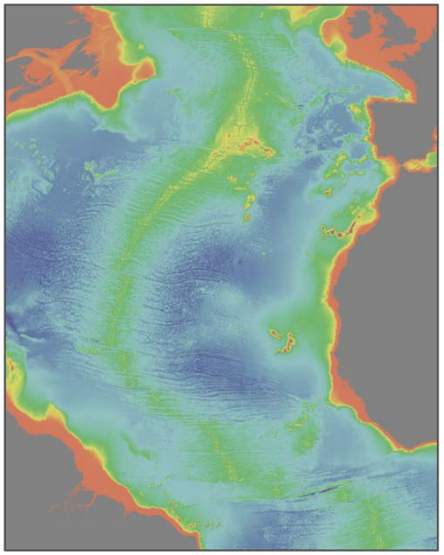
# Review of regional scientific data/information/maps compiled

WORKSHOP ON THE REGIONAL ENVIRONMENTAL MANAGEMENT PLAN FOR THE AREA OF THE NORTHERN MID-ATLANTIC RIDGE

25 November 2019
Evora, Portugal



Patrick Halpin, Jesse Cleary, Sarah DeLand, Elisabetta Menini, Sena McCrory, Kharia Ismail
Marine Geospatial Ecology Lab, Duke University, USA

# Workshop Data Report

DRAFT: This draft will be further refined based on the comments from the workshop participants.

## DRAFT Data Report:
## Workshop on the Regional Environmental Management Plan for the Area of the Northern Mid-Atlantic Ridge

Evora, Portugal
25-29 November, 2019

Jesse Cleary, Sarah DeLand, Elisabetta Menini, Sena McCrory, Khaira Ismail, Patrick N. Halpin
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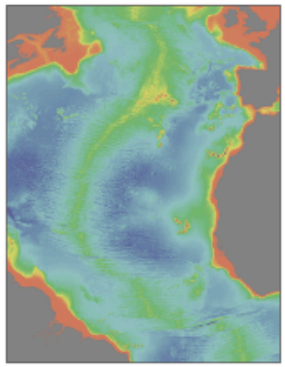


*Supported by*

European Commission

This work was supported by the Atlantic REMP project, funded under Service Contract EASME/EMFF/2017/1.3.1.1 - SI2.775068 to the European Commission.

# Funding

This work was supported by the Atlantic REMP project, funded under Service Contract EASME/EMFF/2017/1.3.1.1 - SI2.775068 to the European Commission.

The project is executed by a consortium of scientists and scientific organisations:

- Seascape Consultants Ltd, UK
- Deep Seas Environmental Solutions Ltd, UK
- Instituto do Mar (University of the Azores), Portugal
- Institute for Advanced Sustainability Studies, Germany
- Duke University Marine Geospatial Ecology Lab, USA
- Environmental Resources Management Ltd, UK
- Jose Angel Alvarez Perez, Universidade do Vale do Itajaí – UNIVALI, Brazil
- Alexander Turra, Universidade de São Paulo, Brazil



# Acknowledgements

The data collection team gratefully acknowledge contributions from:

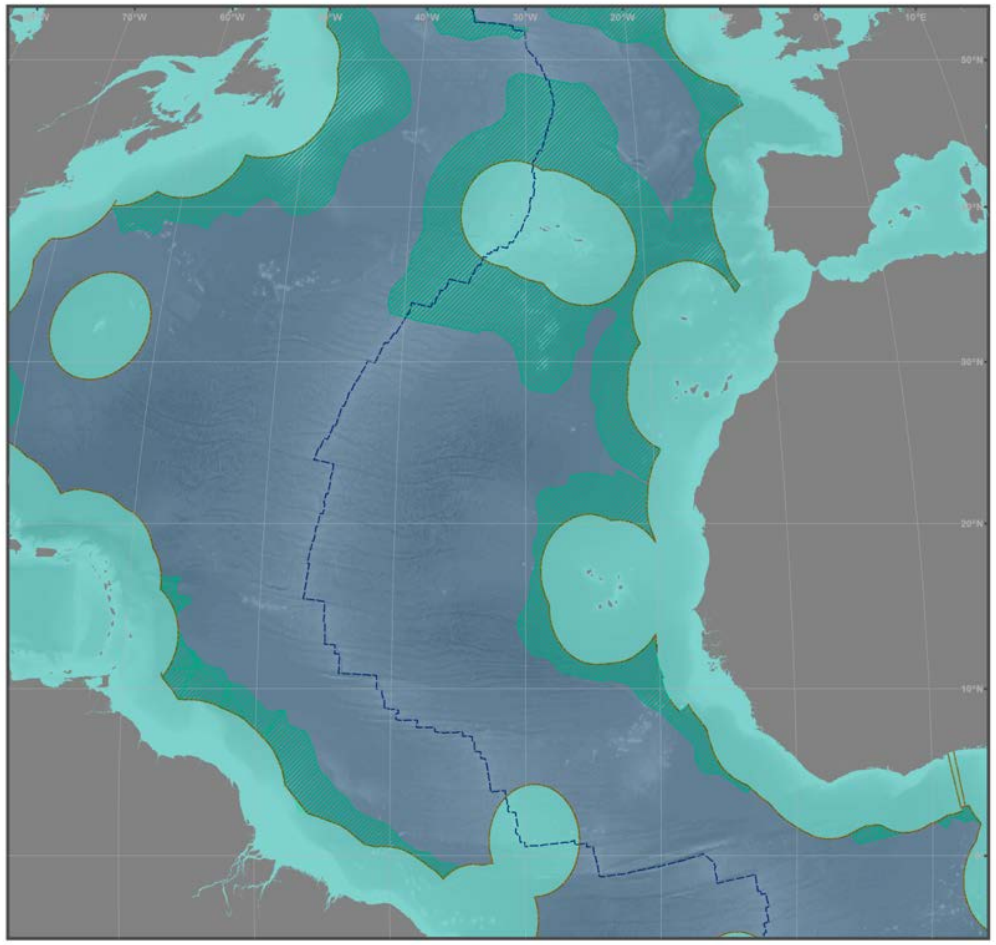
- Phil Weaver, Rachel Boschen-Rose - Seascape Consultants
- Ward Appletans, Pieter Provoost - Ocean Biogeographic Information System
- Cindy Van Dover - Duke University
- Daniel C. Dunn - University of Queensland, Duke University
- Jihyun Lee, Luciana De Melo Santos Genio, Sheldon Carter - ISA Secretariat
- Telmo Morato, Gerald H. Taranto, Frederic Vandeperre, Christopher K. Pham, Daniel C. Dunn, Ana Colaço - SEMPIA workshop data collection team
- Piers Dunstan, Skip Woolley - CSIRO Australia

# Workshop Data Report

Data collection scope:
Mid Atlantic Ridge and surrounding ocean areas

- Southern end of Icelandic ECS submission (~57° N)

- South of the Romanche Fracture Zone (~9° S)

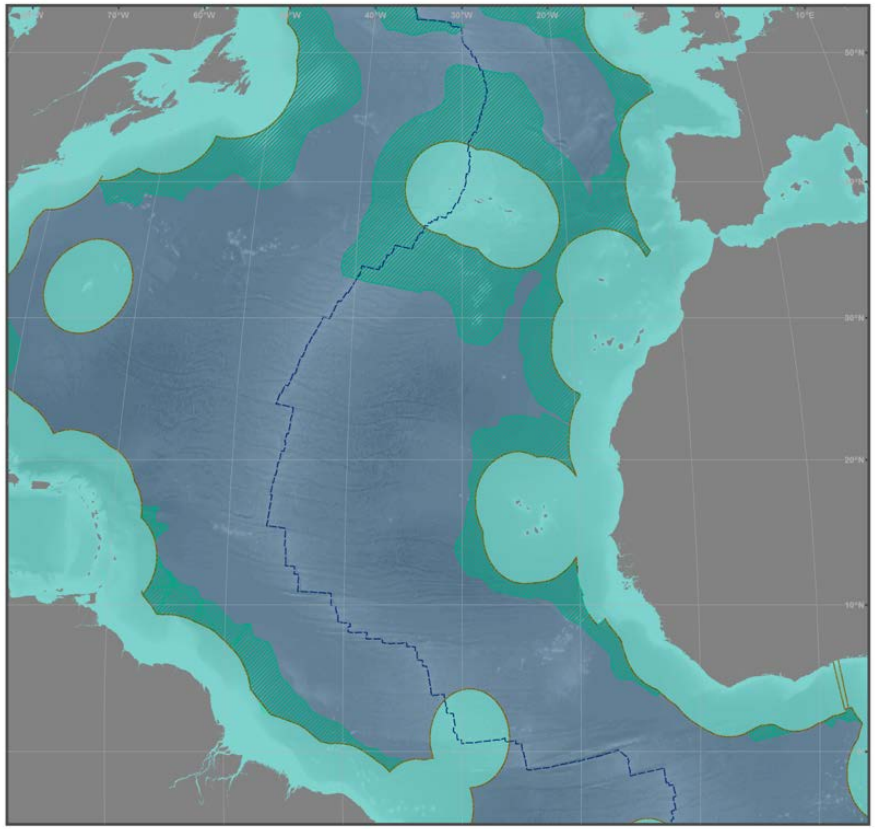


Area inclusive of the broader region to provide regional context and does not represent the REMP planning area.

# Workshop Data Report

Purpose

- Aid in understanding of available data
- Help identify data gaps
- Discovery of datasets that could be used during the workshop process



# Compilation of scientific data & information

## Describe the data

~100 GIS data layers

DRAFT: This draft will be further refined based on the comments from the workshop participants.

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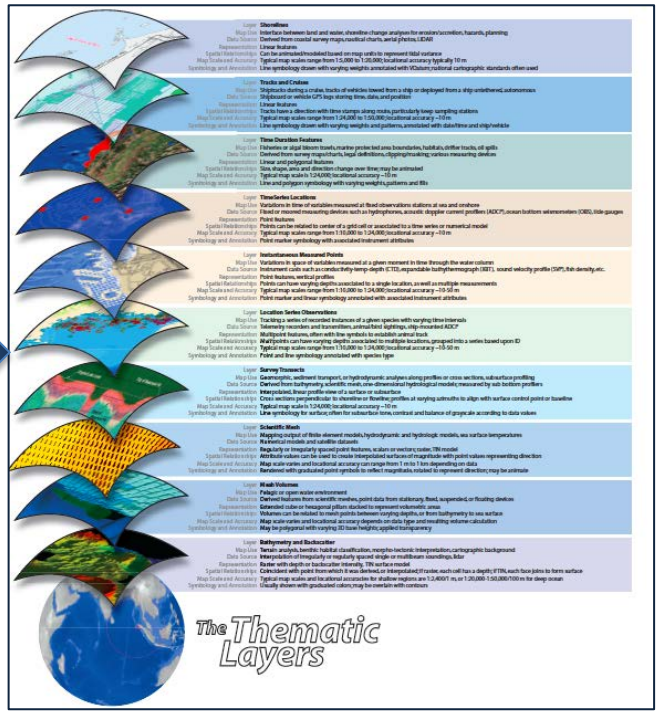
## Consider possible analyses to support the workshop…

Overlay & Analysis



# Workshop Data Report

Northern Mid-Atlantic Ridge

- Environmental Data
- Biological Data
- Biogeographic Classifications
- Human Uses
- Areas Defined for Management and/or Conservation Objectives

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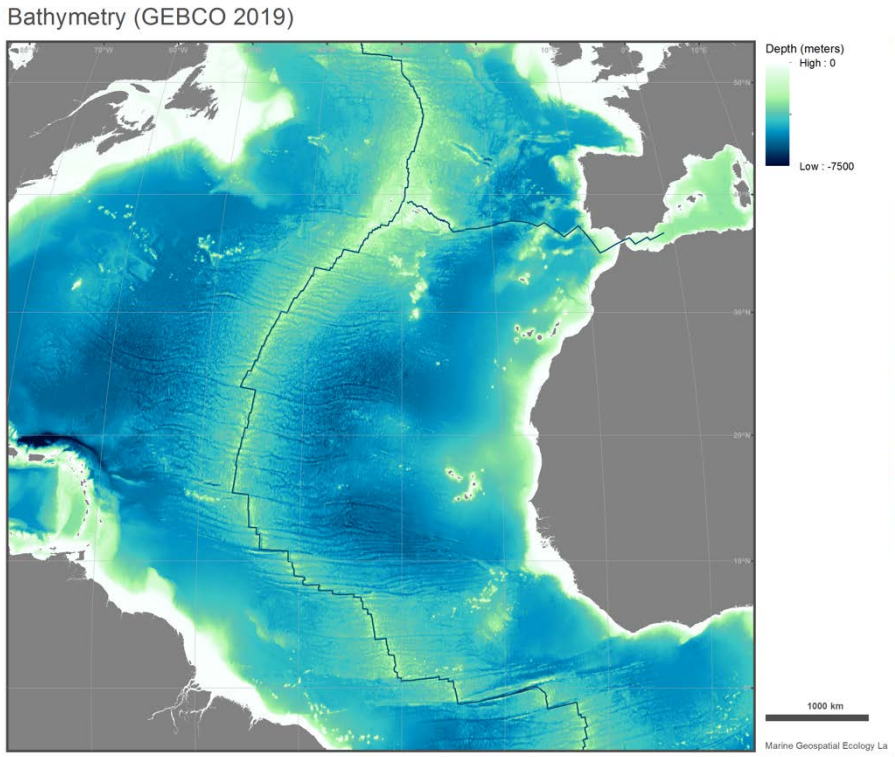
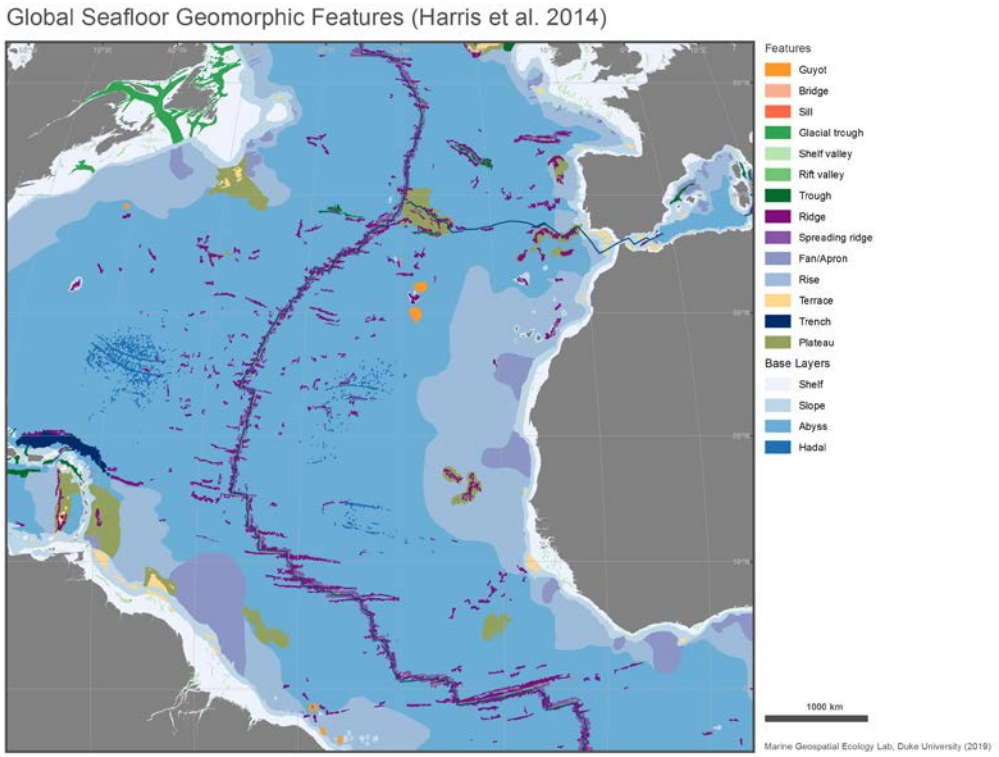
# Environmental Data

GEBCO Bathymetry

Seafloor Geomorphic Features

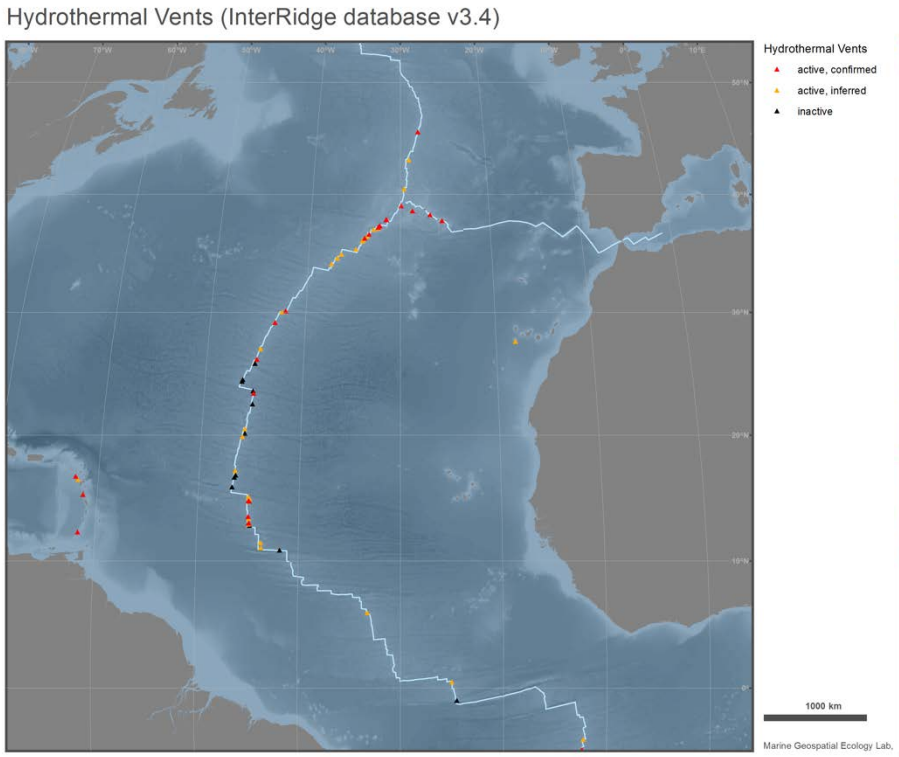


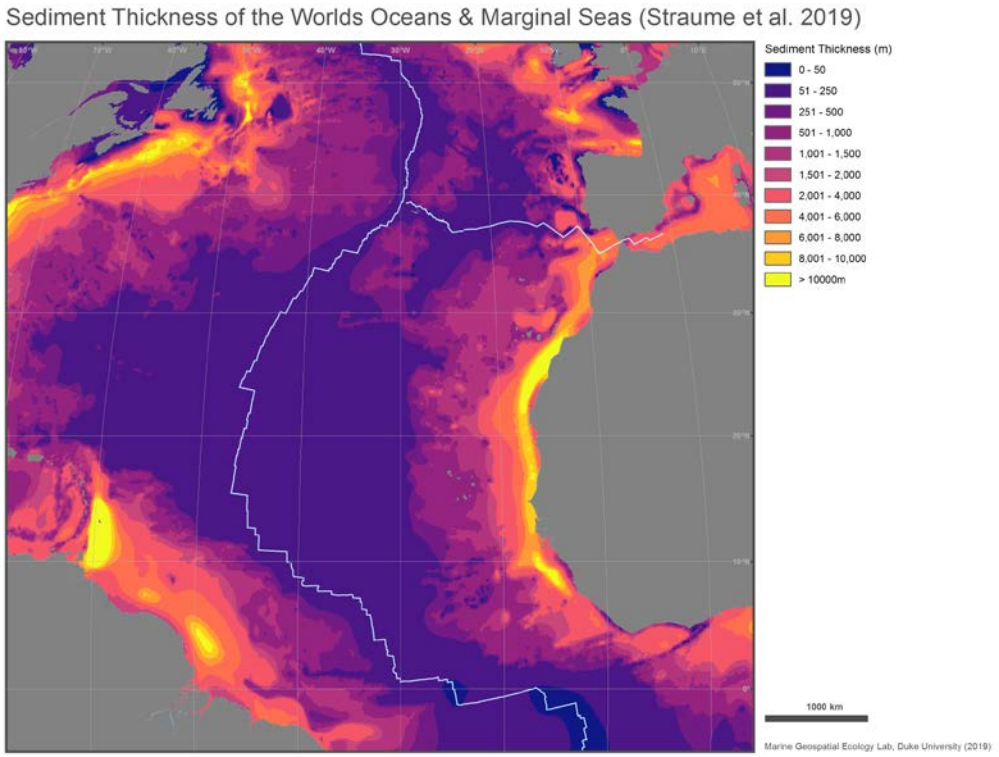



# Environmental Data

Interridge Vent Database

Sediment Thickness



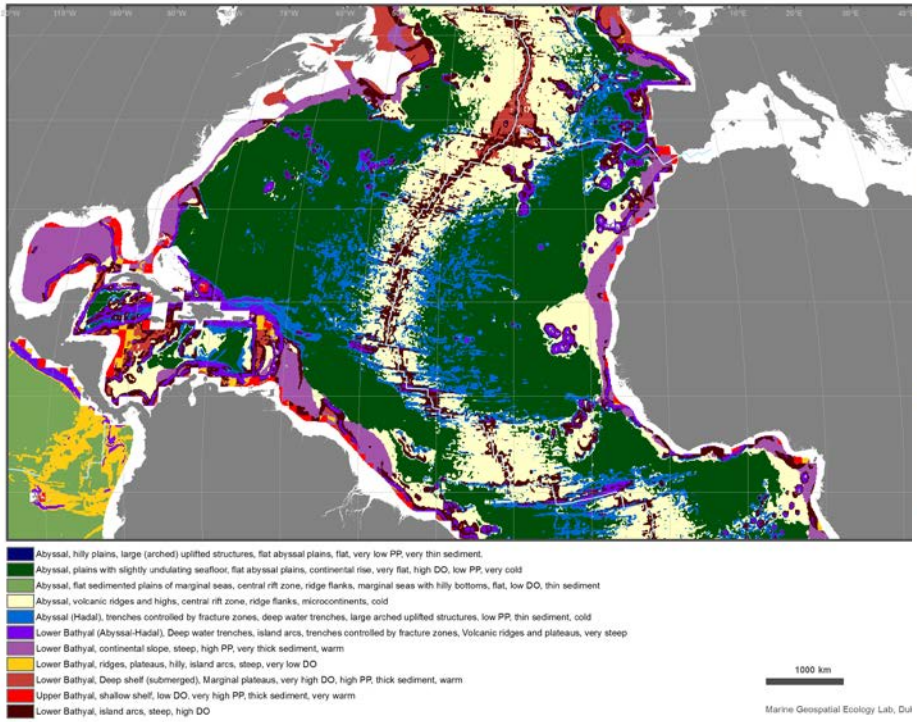



# Environmental Data

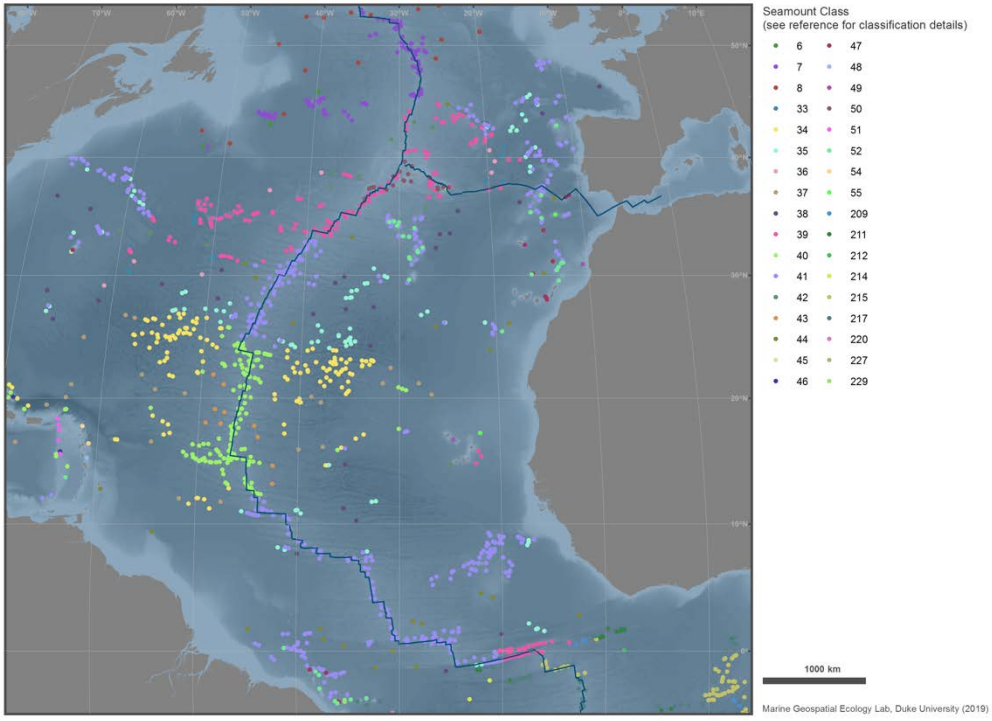
Global Seascapes

Seamount Classification

Global Seascapes (Harris and Whiteway 2009)

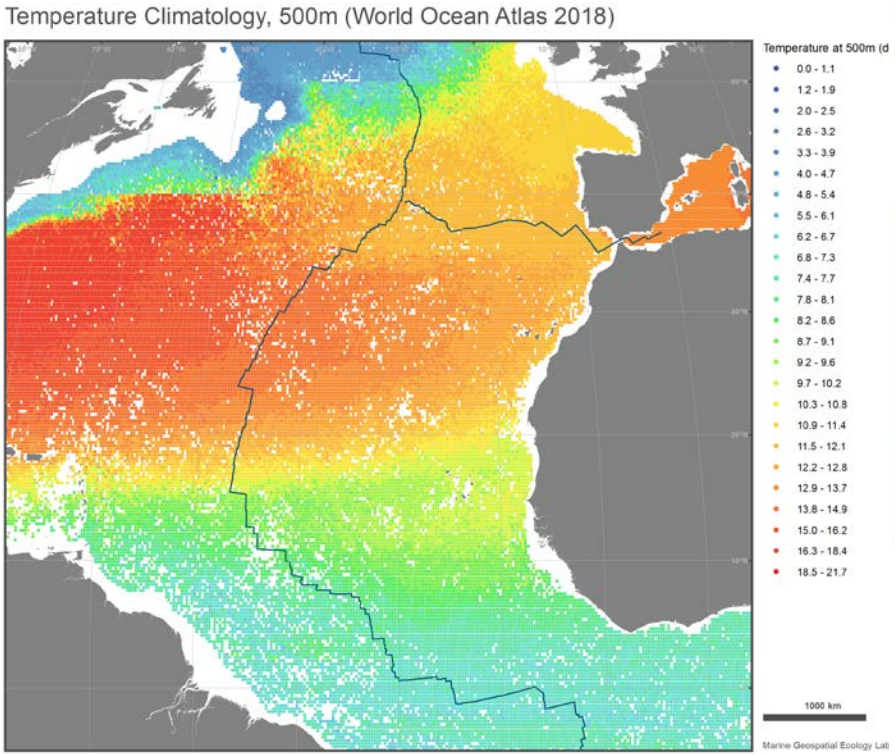



Global Seamount Classification (Clark et al. 2011)

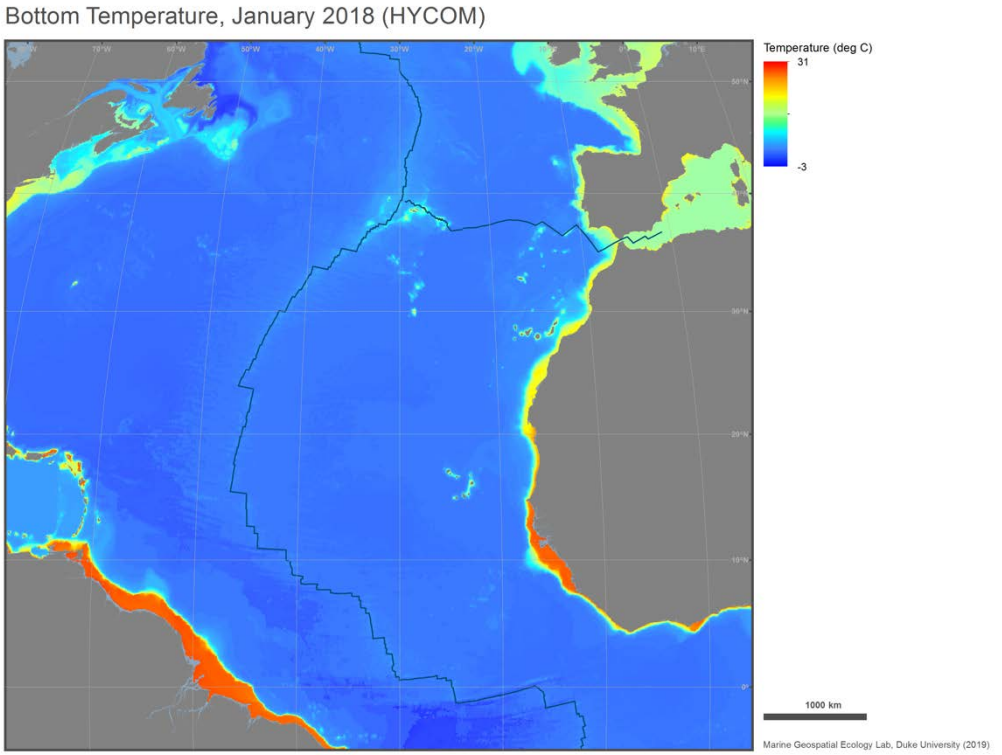


# Environmental Data

World Ocean Atlas Temperature Climatology - multiple depth zones



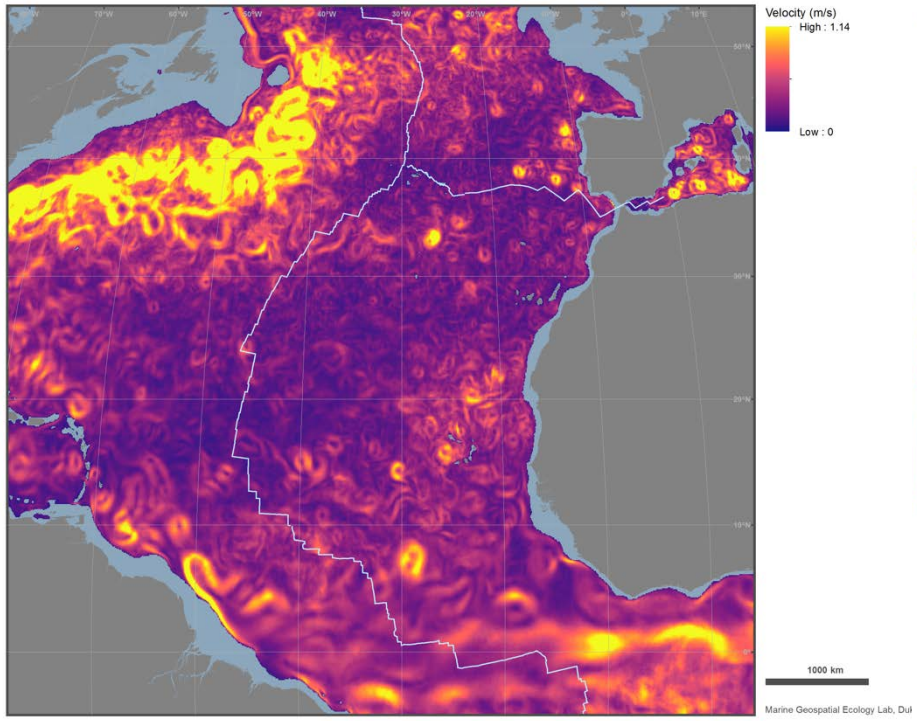

HYCOM modeled temperature - multiple depth zones



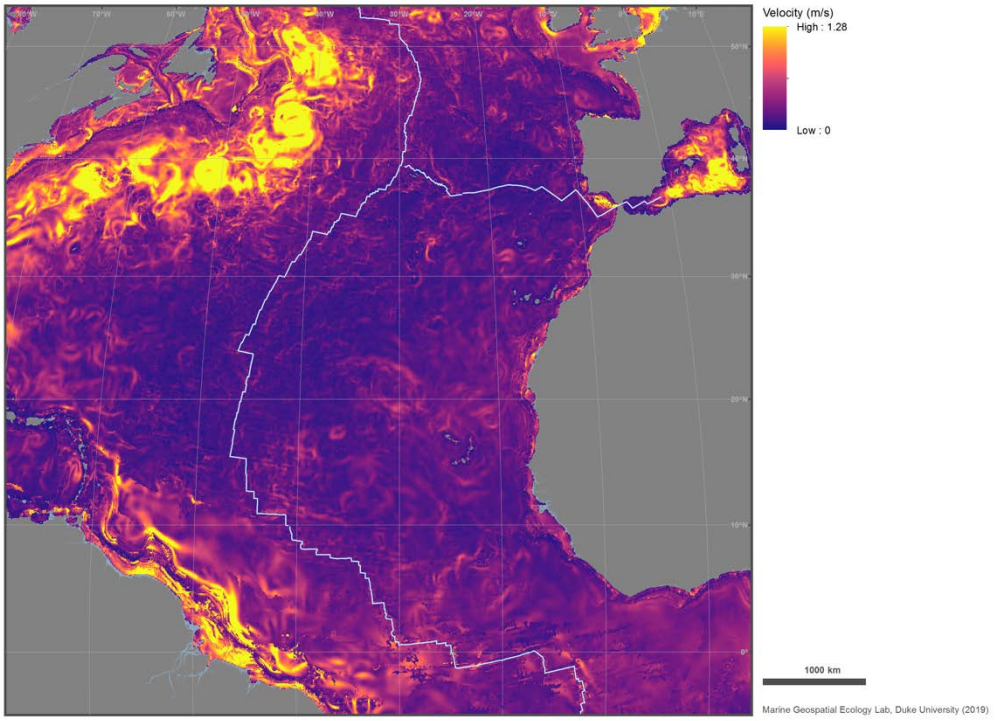
# Environmental Data

HYCOM Current Velocity – multiple depth zones

Current Velocity, 500m, January 2018 (HYCOM)

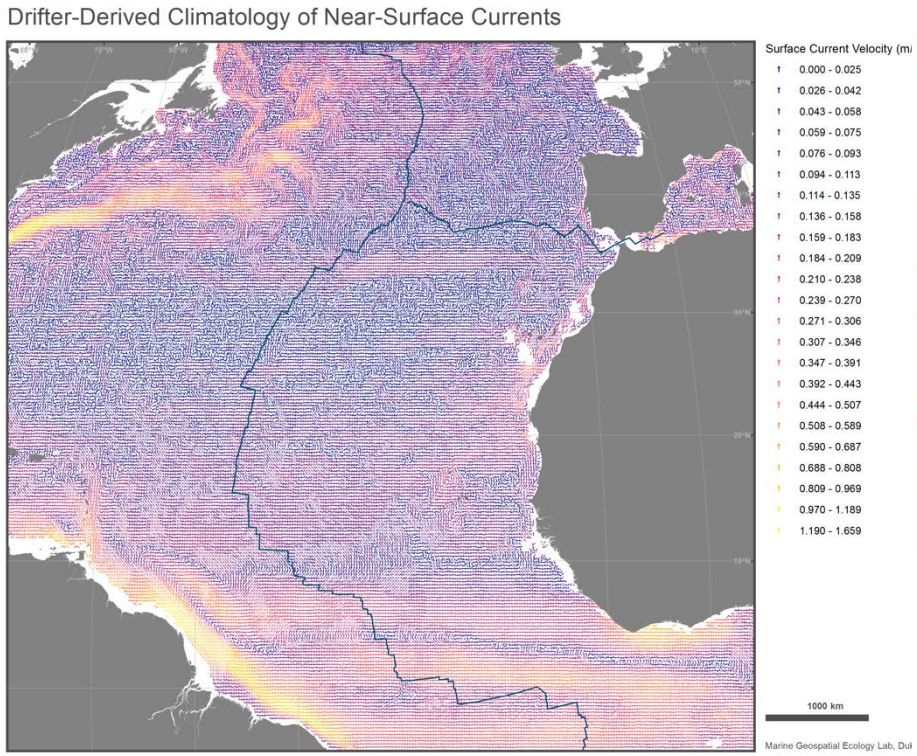



Current Velocity, Bottom, January 2018 (HYCOM)

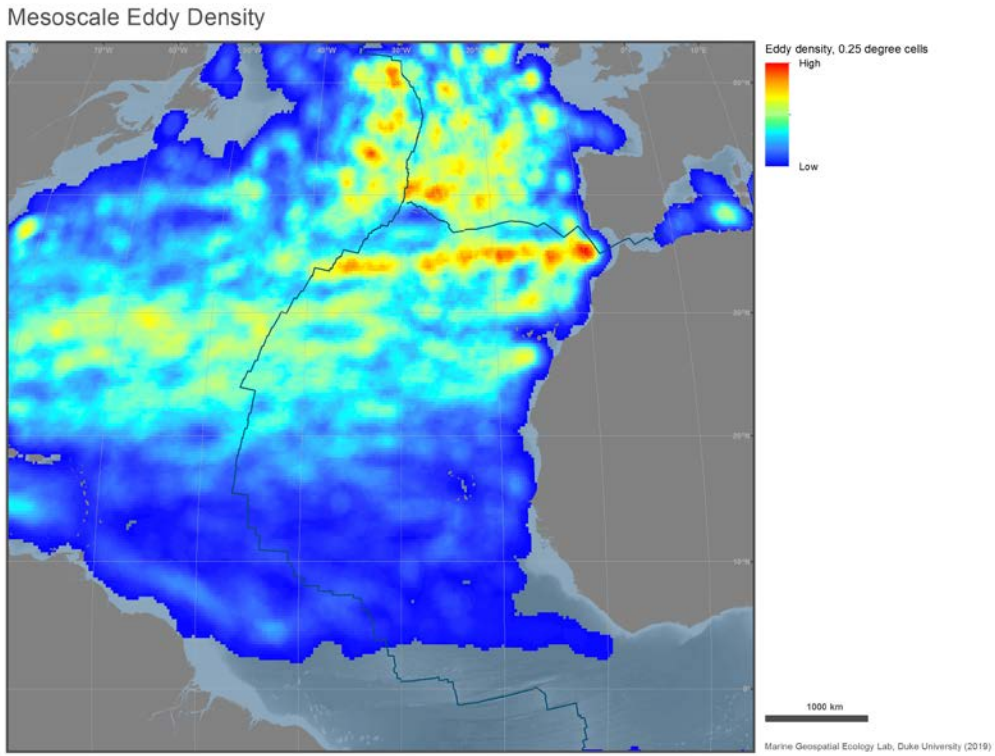


# Environmental Data

Drifter-derived Surface Currents



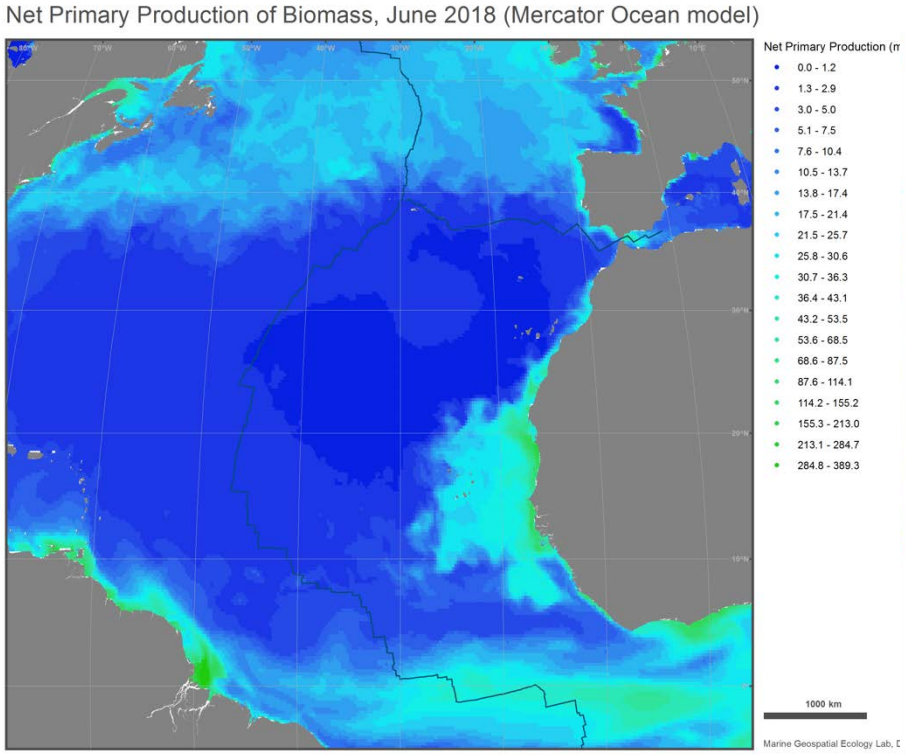

Mesoscale Eddy Density Climatology

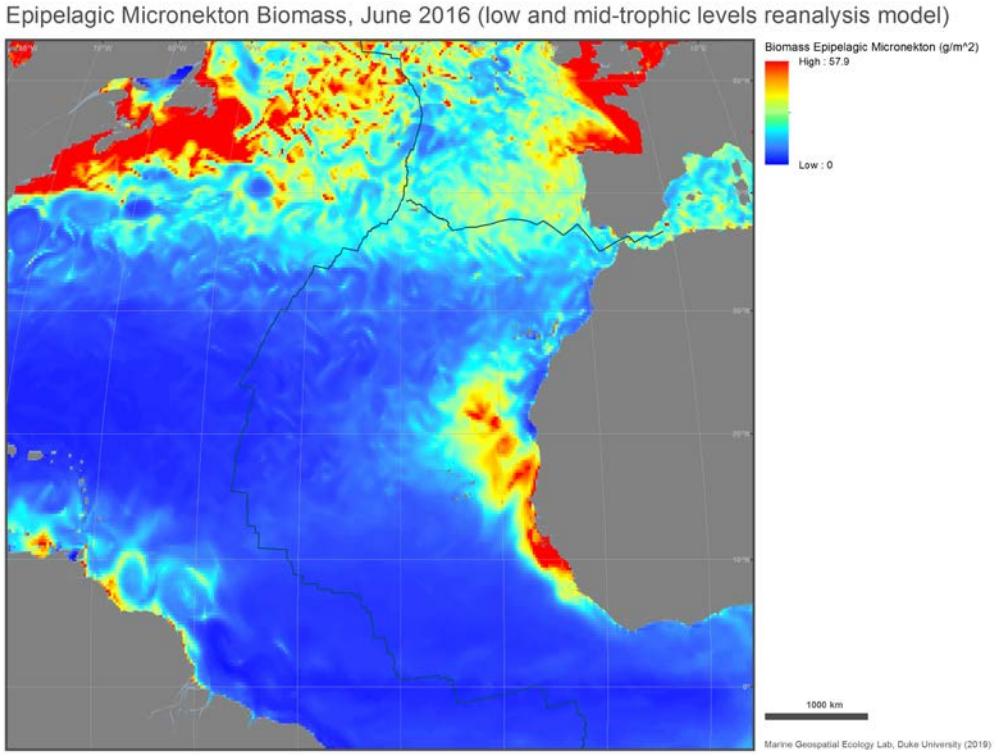


# Environmental Data

Net Primary Productivity

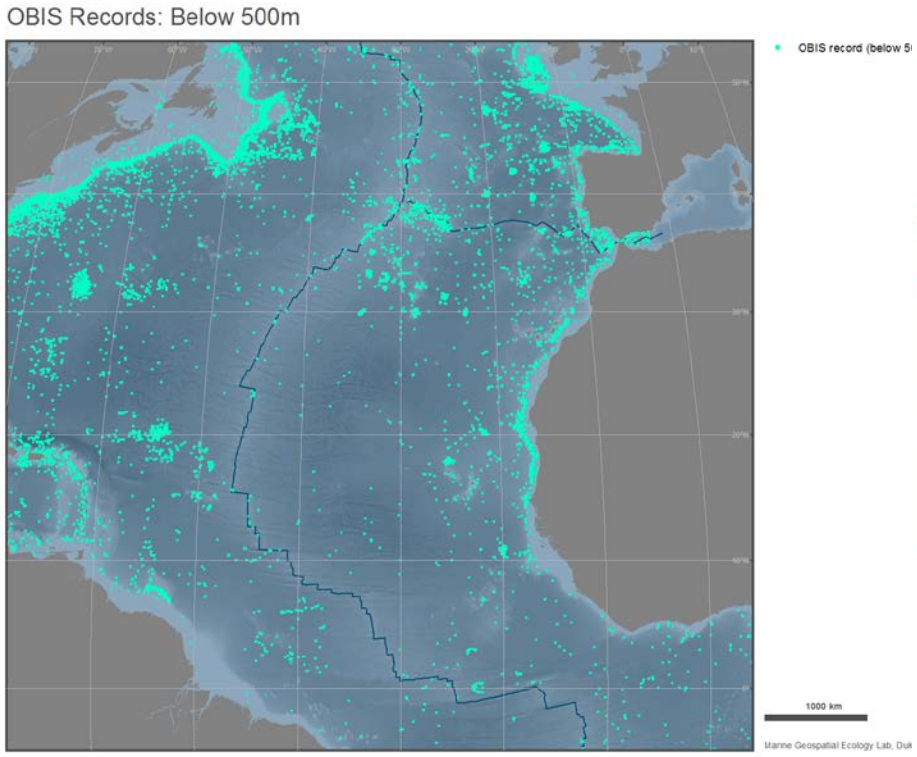
Epipelagic Micronekton Biomass



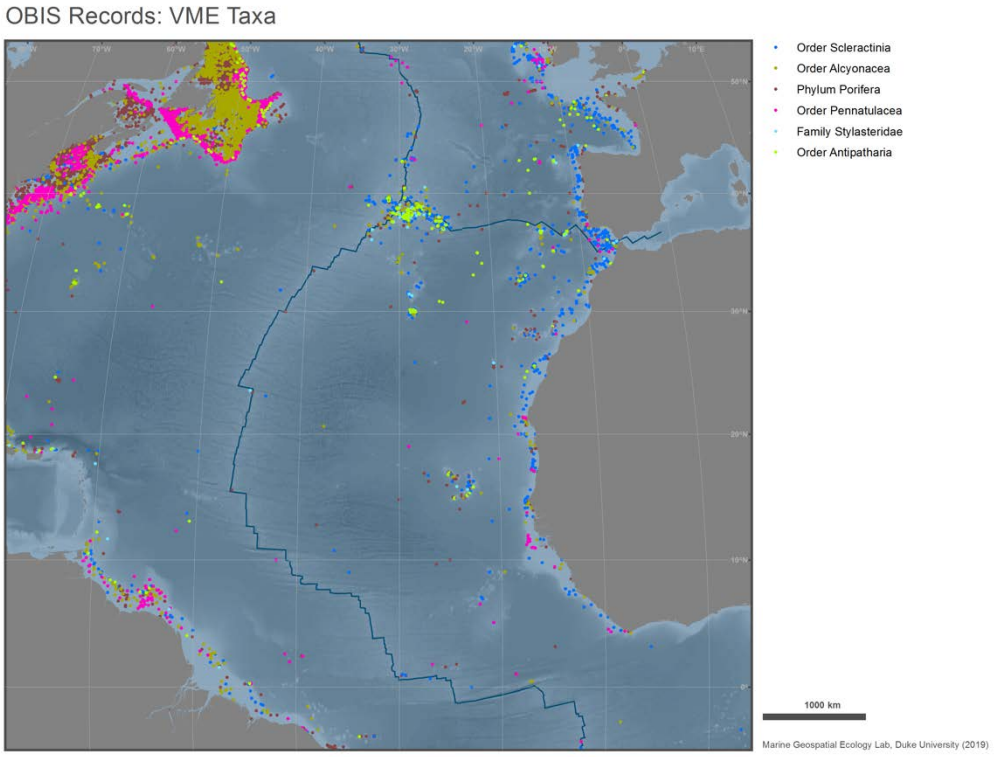



# Biological Data

OBIS Observations: below 500m



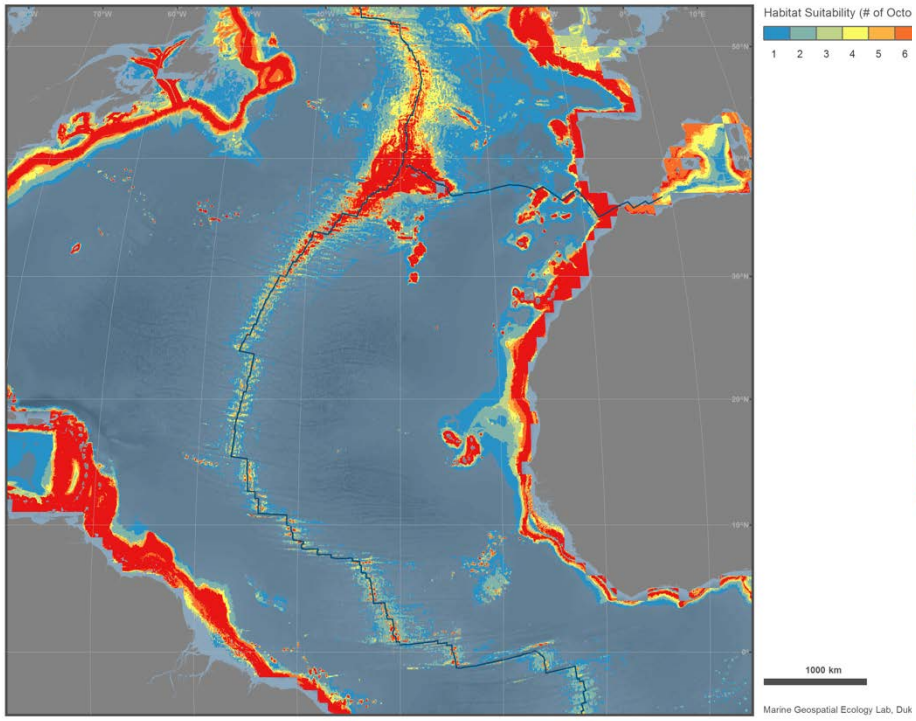

OBIS Observations: VME Taxa



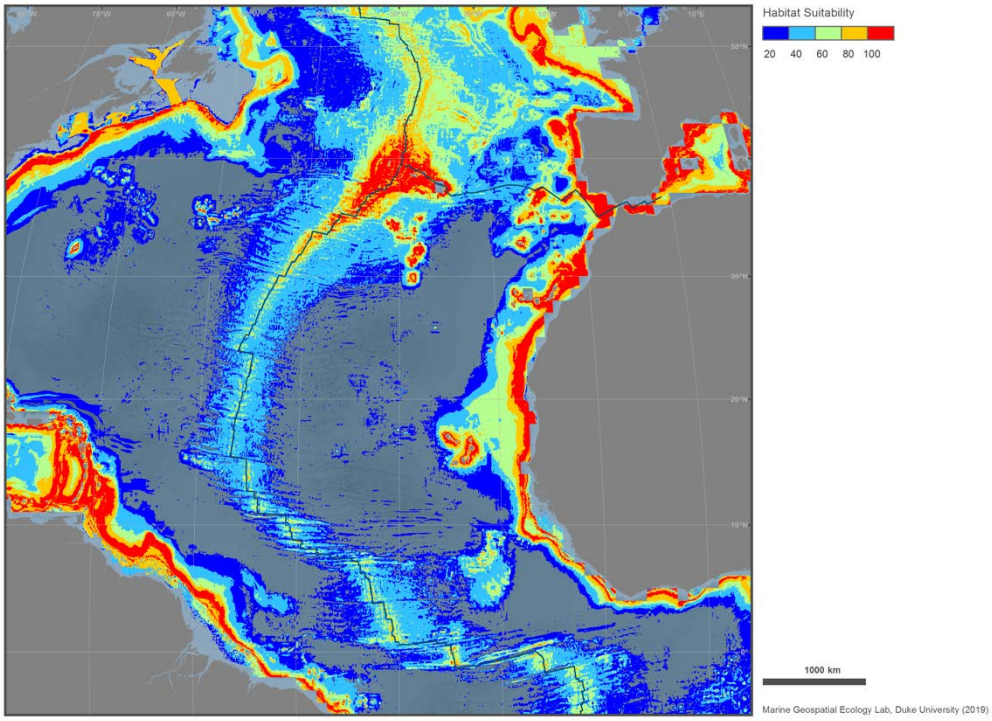
# Biological Data

Habitat Suitability for Cold-water Octocorals

Habitat Suitability of Cold-Water Octocorals (Yesson et al. 2012)



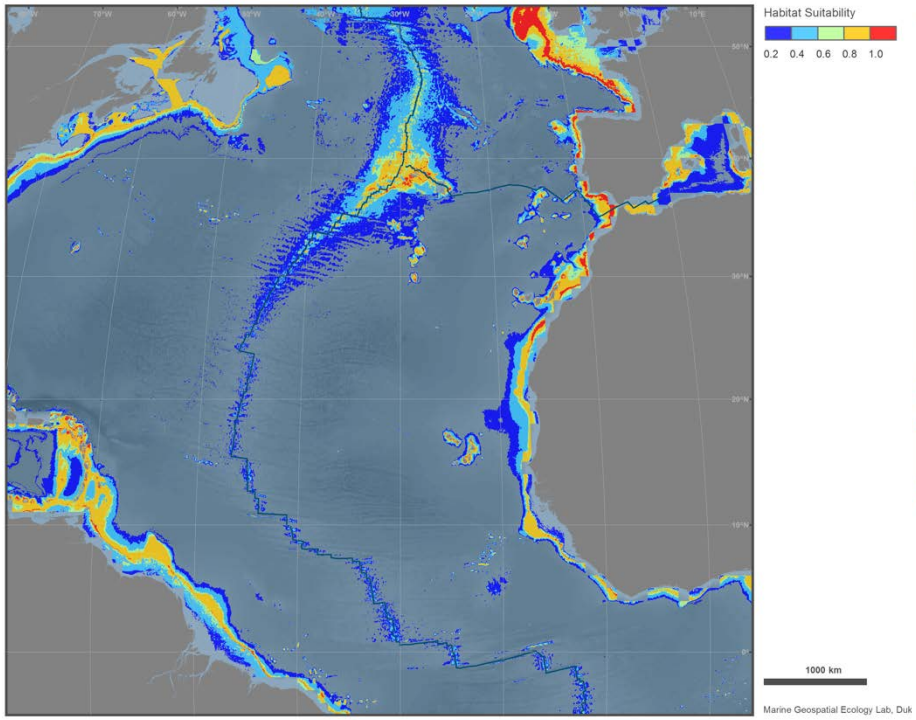

Habitat Suitability of the suborder Sessiliflorae (Yesson et al. 2012)



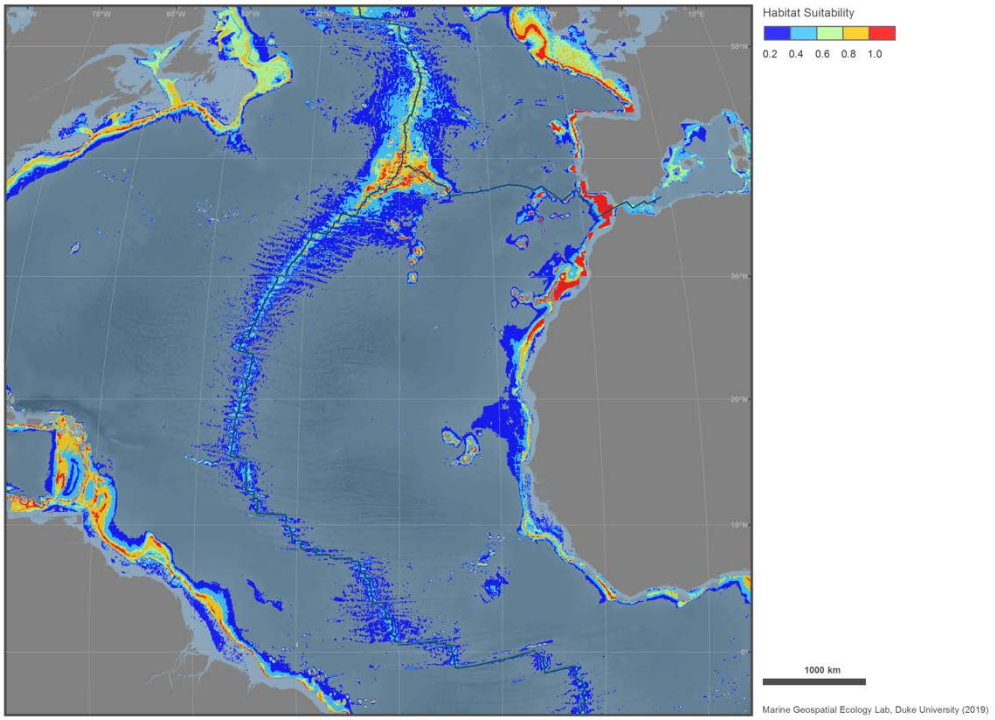
# Biological Data

Habitat Suitability for Framework-Forming Cold-water Corals

Habitat Suitability of Scleractinia (Davies and Guinotte 2011)



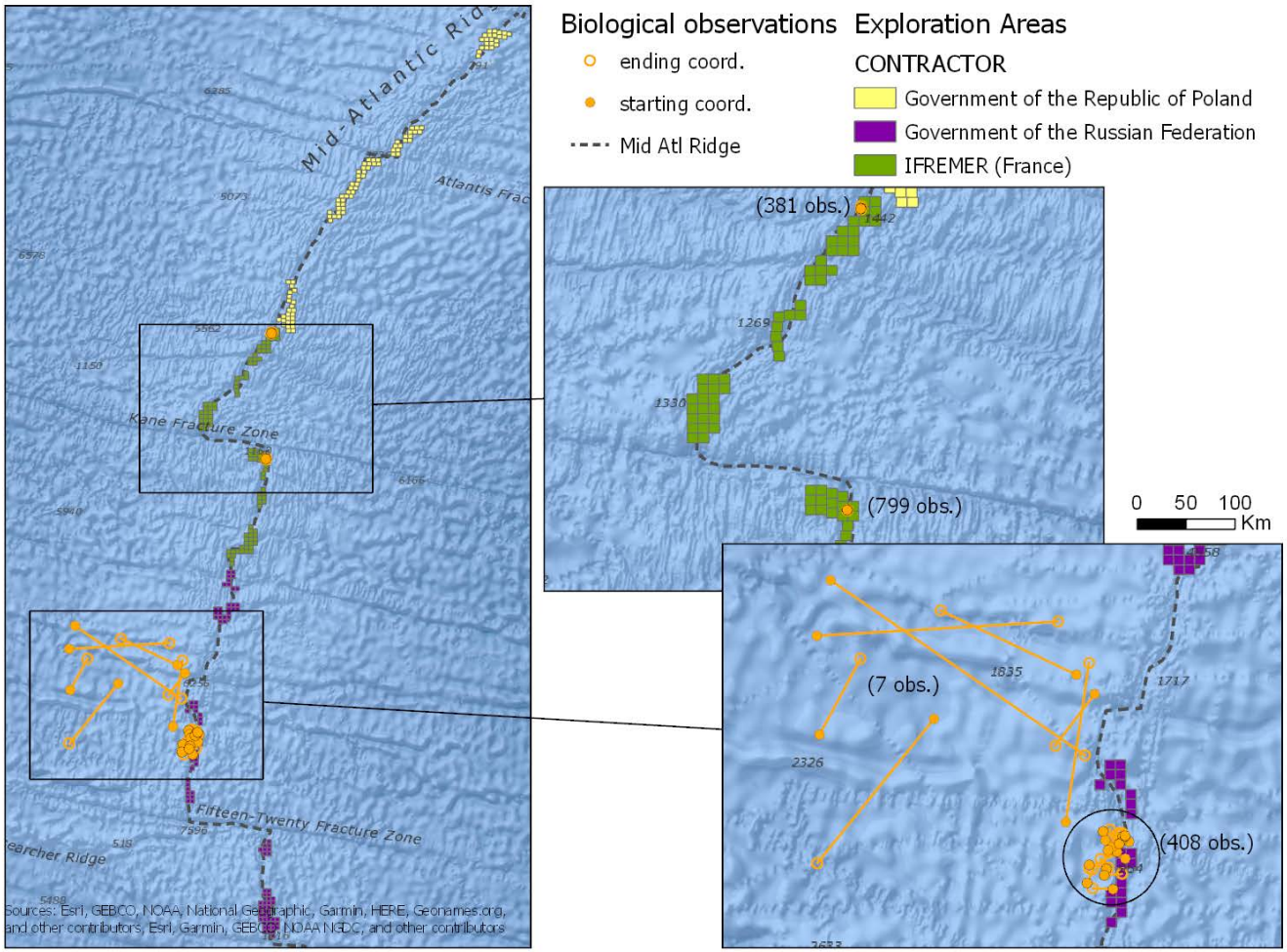

Habitat Suitability of *Solenosmillia variabilis* (Davies and Guinotte 2011)



# Biological Data

## ISA Deep Data

### Deep Data - All observations



# Biological Data

## Taxonomic resolution

| | FR (n=1180) | | RUS (n=416) | | ALL (n=1597) | |
|---|---|---|---|---|---|---|
| | count | % | count | % | count | % |
| Phylum | 740 | 62.7% | 409 | 98.3% | 1150 | 72.0% |
| Class | 718 | 60.8% | 392 | 94.2% | 1111 | 69.6% |
| Order | 630 | 53.4% | 295 | 70.9% | 926 | 58.0% |
| Family | 575 | 48.7% | 333 | 80.0% | 909 | 56.9% |
| Genus | 469 | 39.7% | 335 | 80.5% | 805 | 50.4% |
| Species | 412 | 34.9% | 134 | 32.2% | 547 | 34.3% |

# Biological Data

## Number of unique taxa

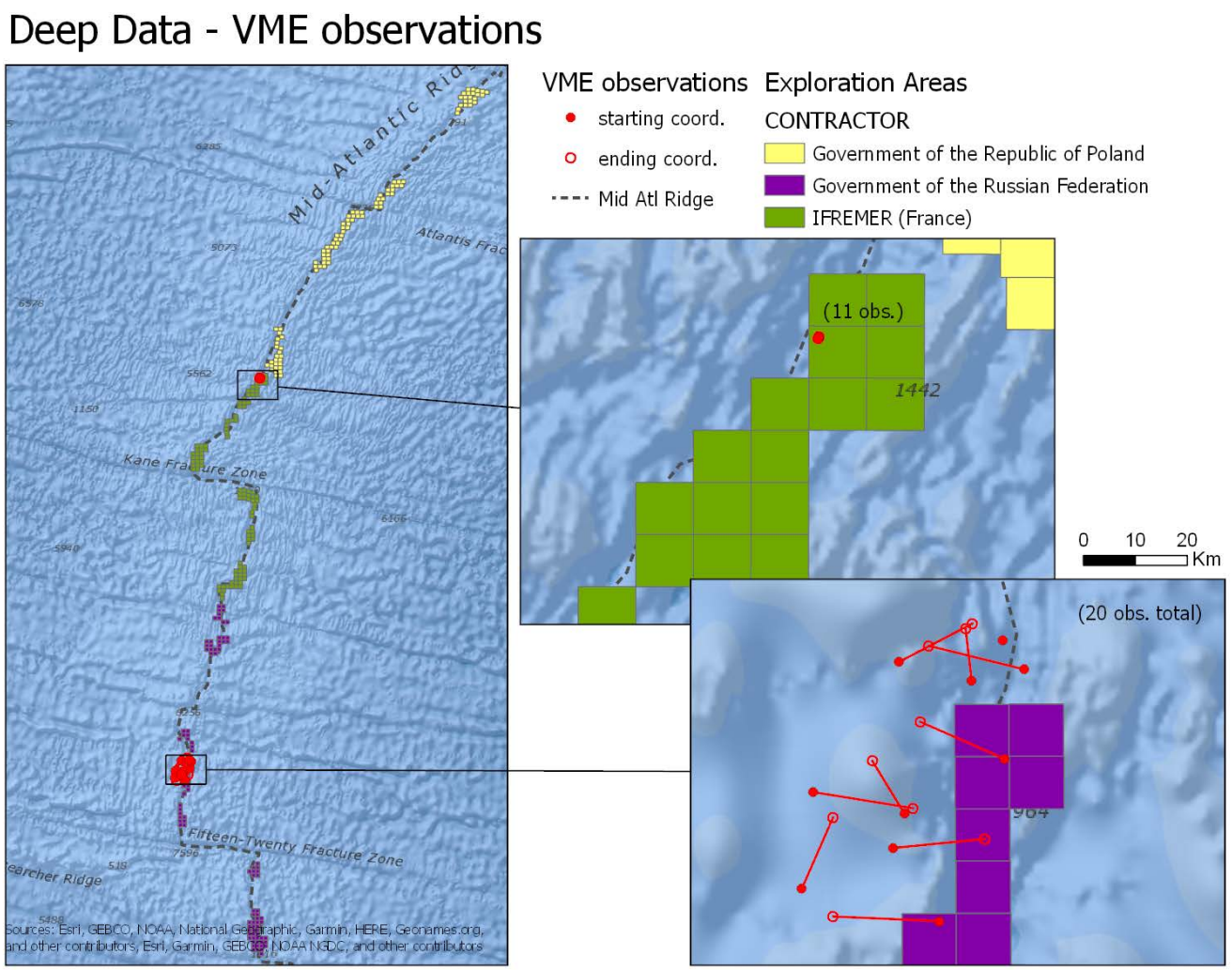
| | FR | RUS | Total |
|---|---|---|---|
| Phylum | 8 | 12 | 12 |
| Class | 14 | 22 | 25 |
| Order | 21 | 57 | 65 |
| Family | 22 | 97 | 114 |
| Genus | 18 | 139 | 156 |
| Species | 9 | 84 | 93 |

# Biological Data

## VME taxa observations

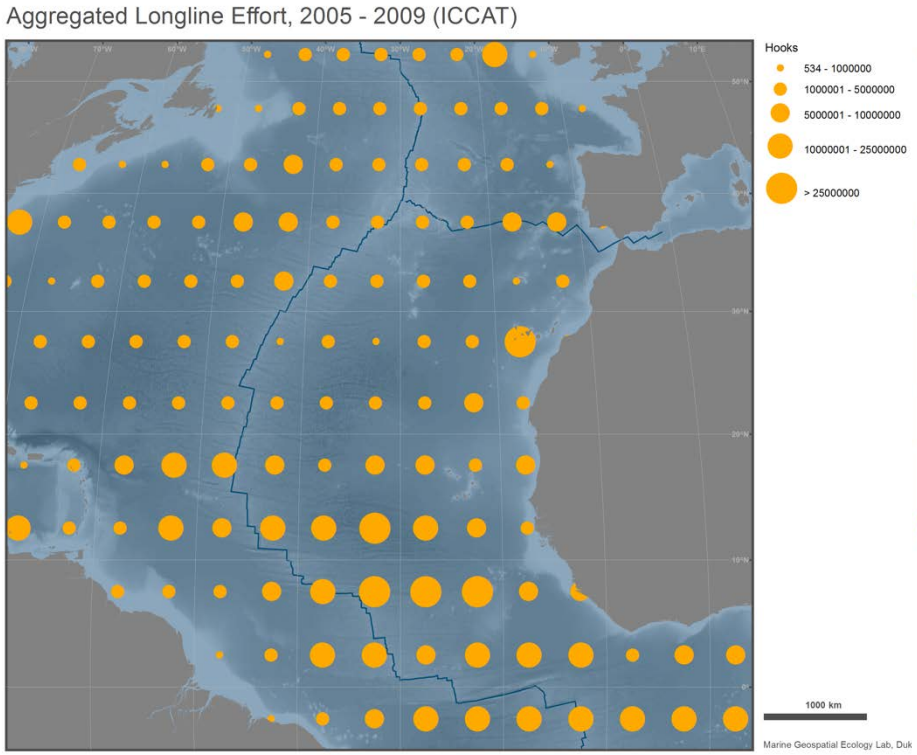
| VME taxa | FR (n=11) | RUS (n=20 | Total (n=31) |
|---|---|---|---|
| Phylum Porifera | 8 | 4 | 12 |
| Order Scleractinia | - | 9 | 9 |
| Order Alcyonacea | - | 4 | 4 |
| Order Antipatharia | 3 | 1 | 4 |
| Order Pennatulacea | - | 1 | 1 |
| Family Stylasteridae | - | 1 | 1 |

# Biological Data

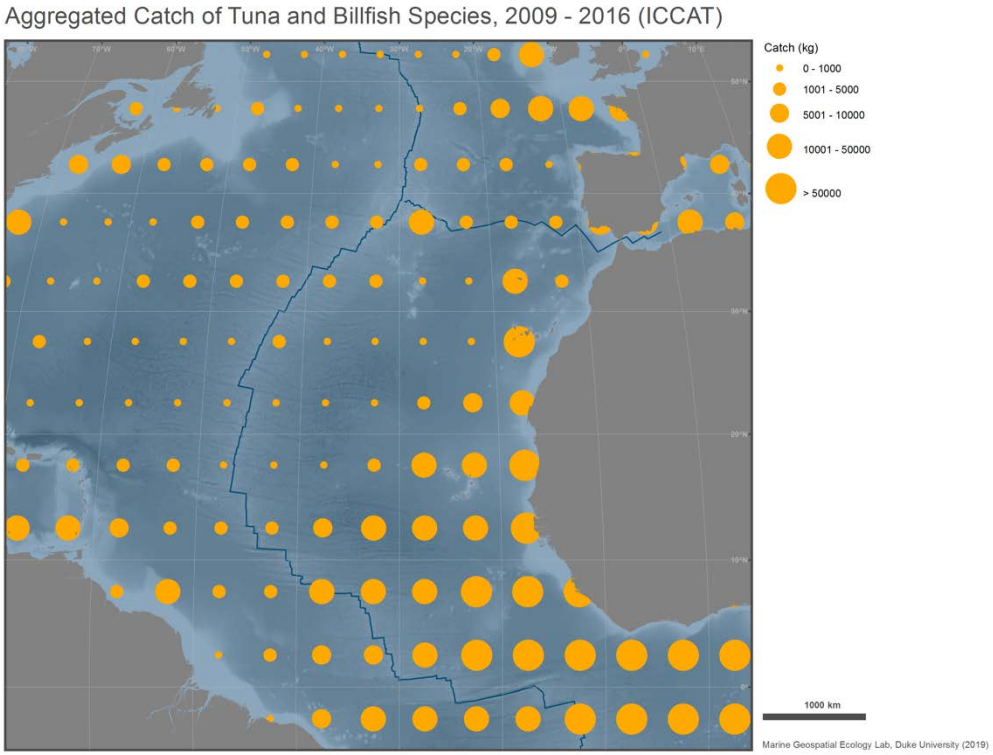


# Biological Data

Longline Fishing Effort

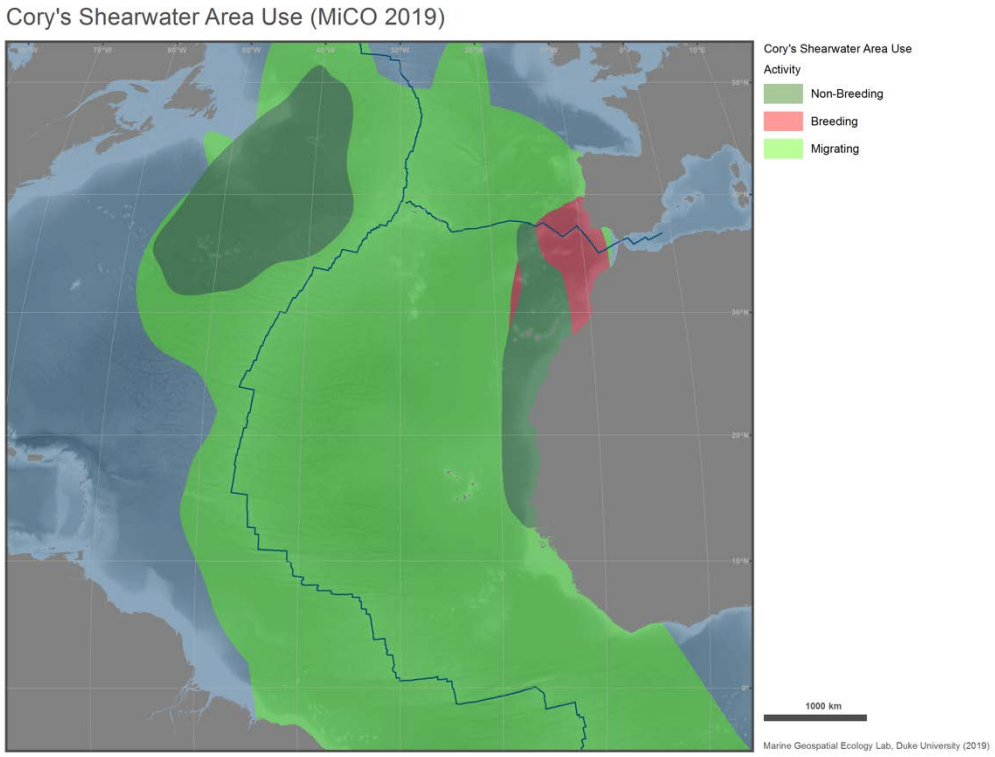



Tuna and Billfish Catch

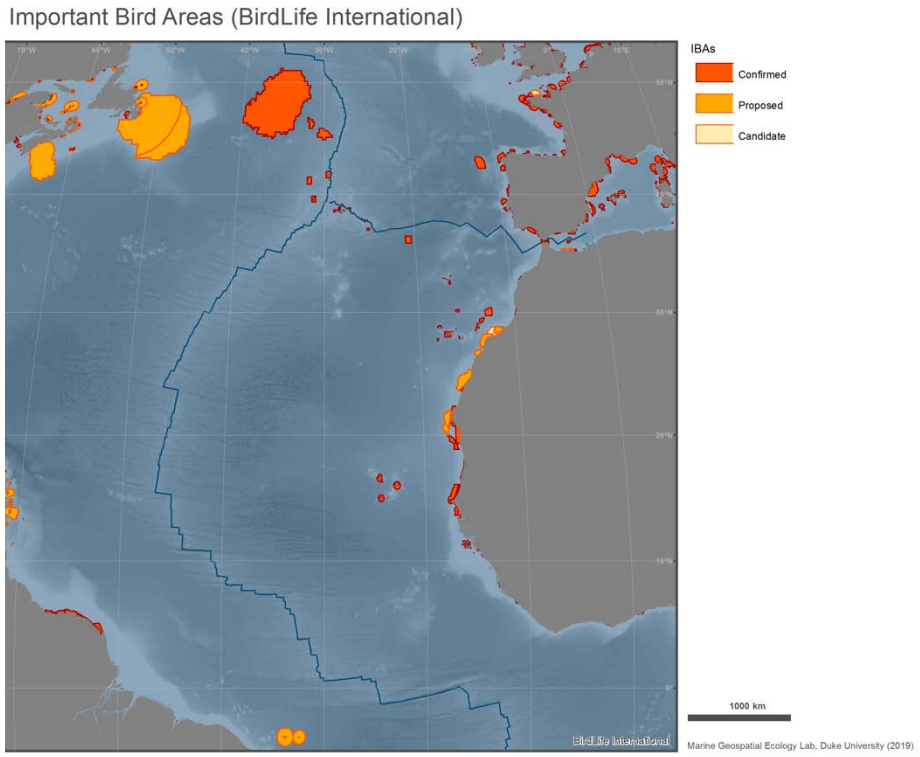


# Biological Data

## Cory’s Shearwater Area Use

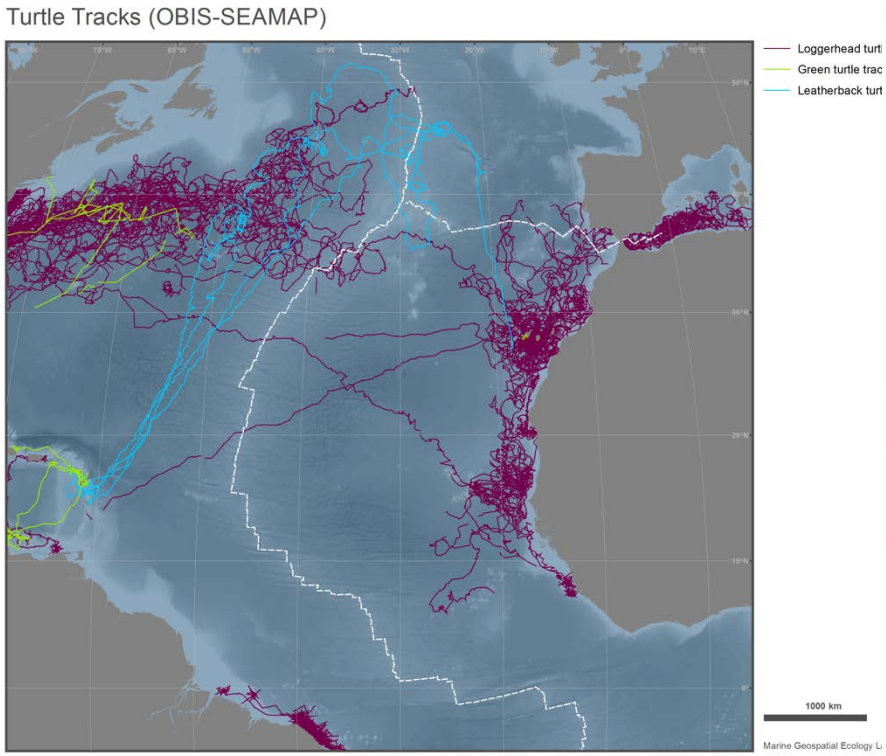



## BirdLife Important Bird Areas (IBAs)

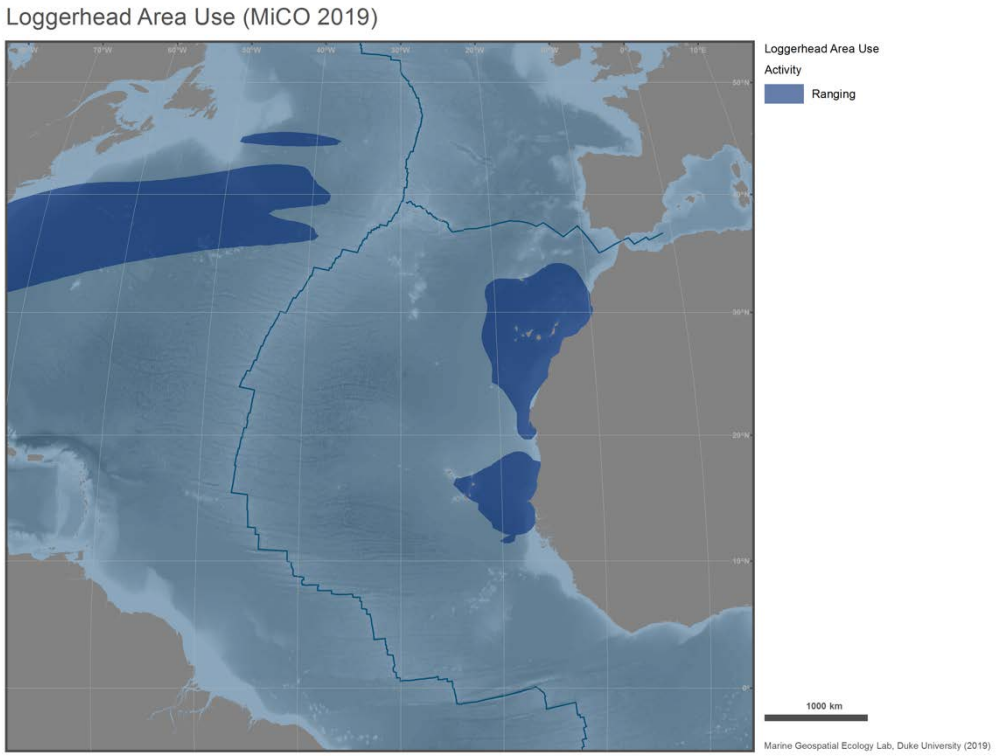


# Biological Data

Turtle telemetry - OBIS-SEAMAP

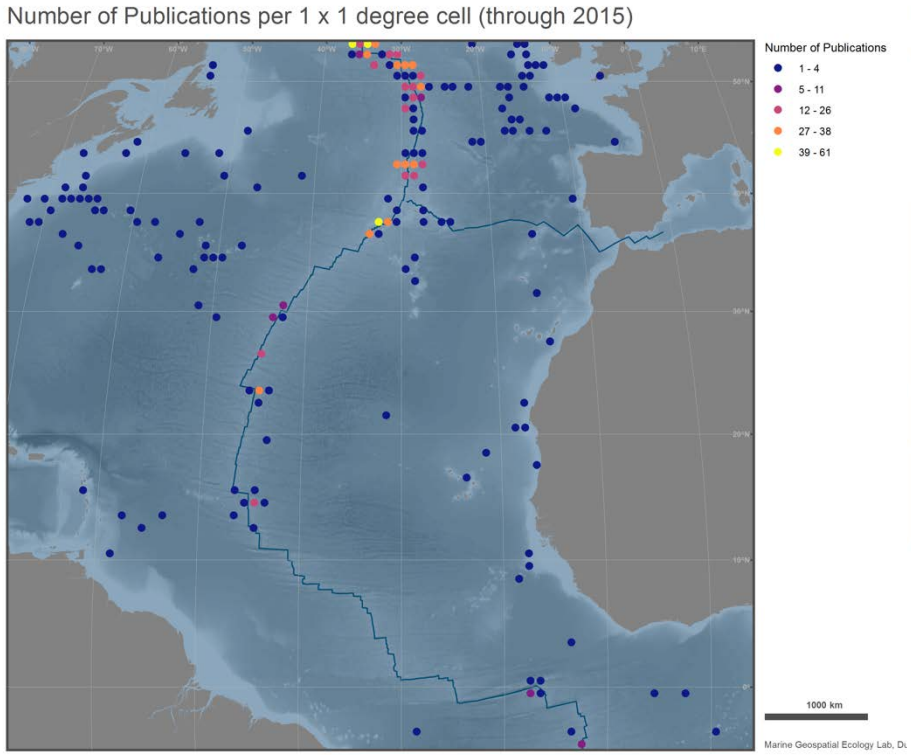


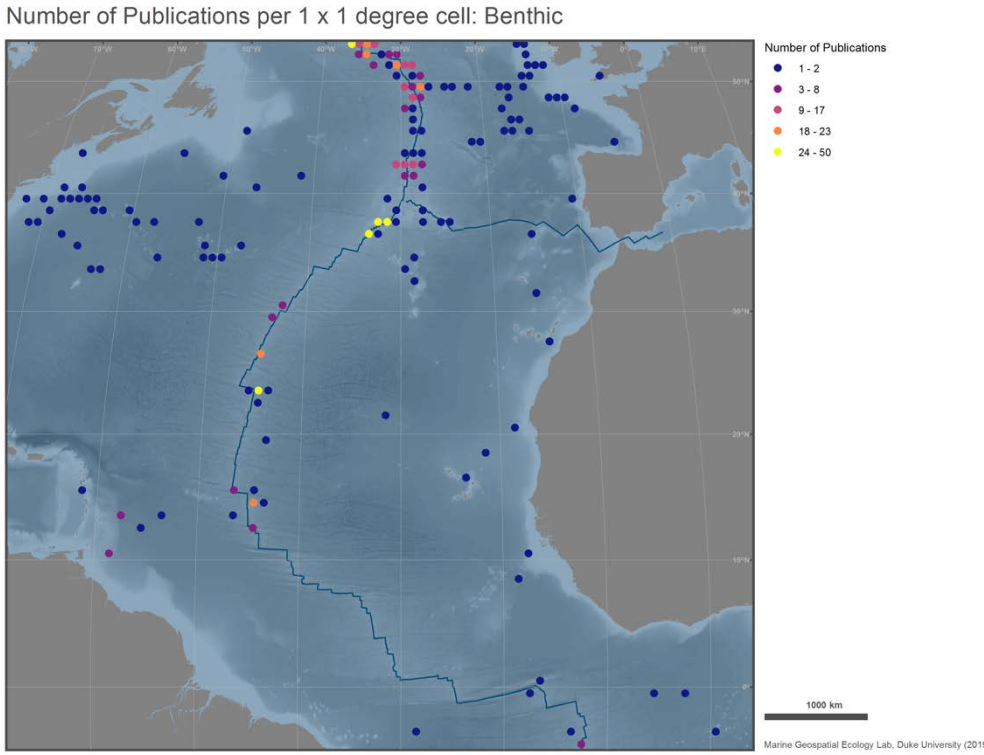

Loggerhead Area Use



# Biological Data

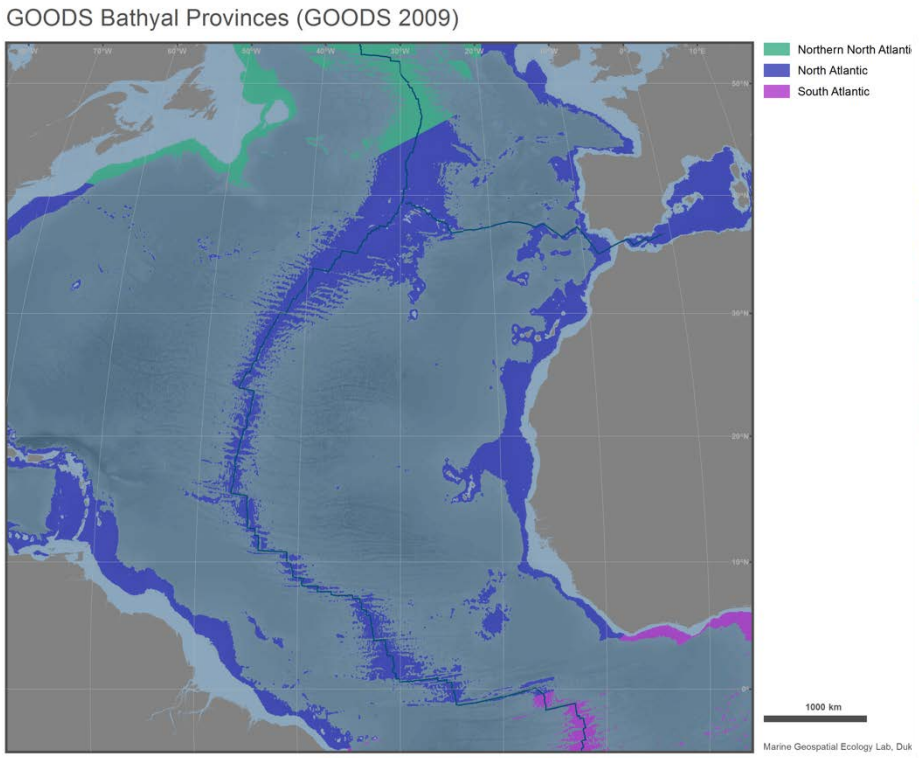
Geo-referenced Publications



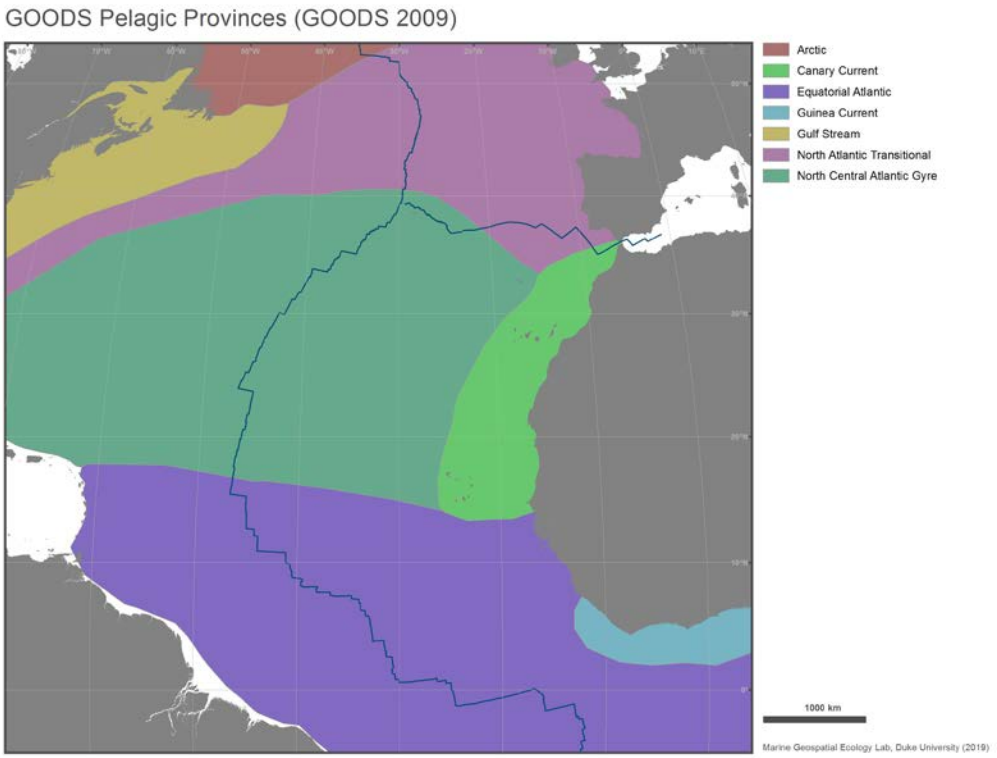



# Biogeographic Classifications

GOODS Bathyal Provinces

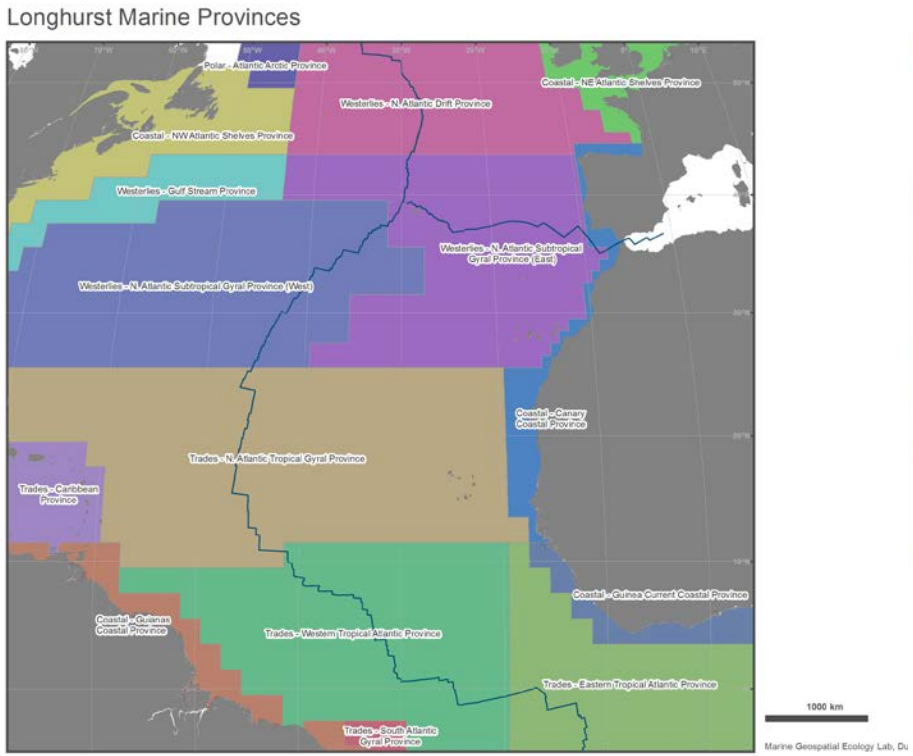



GOODS Pelagic Provinces

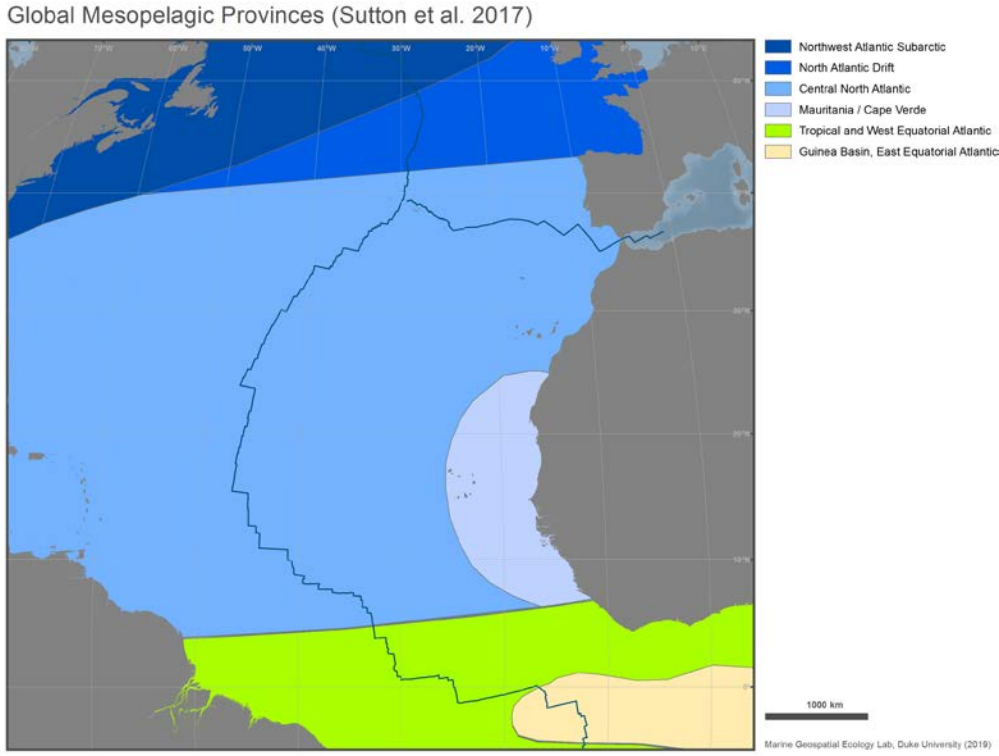


# Biogeographic Classifications

Longhurst Provinces

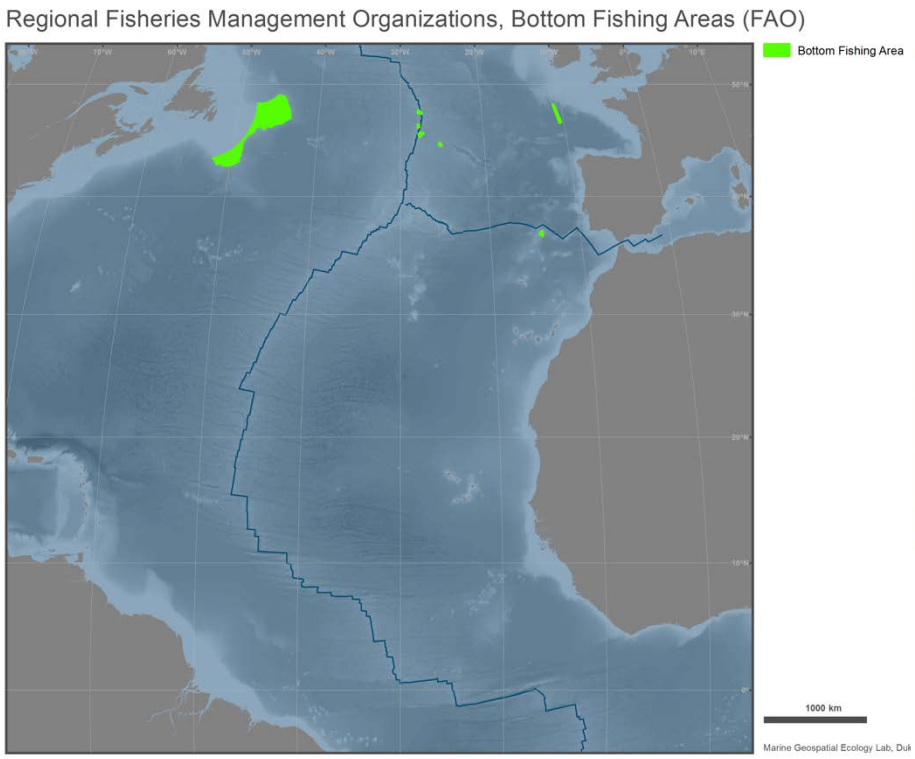



Mesopelagic Provinces

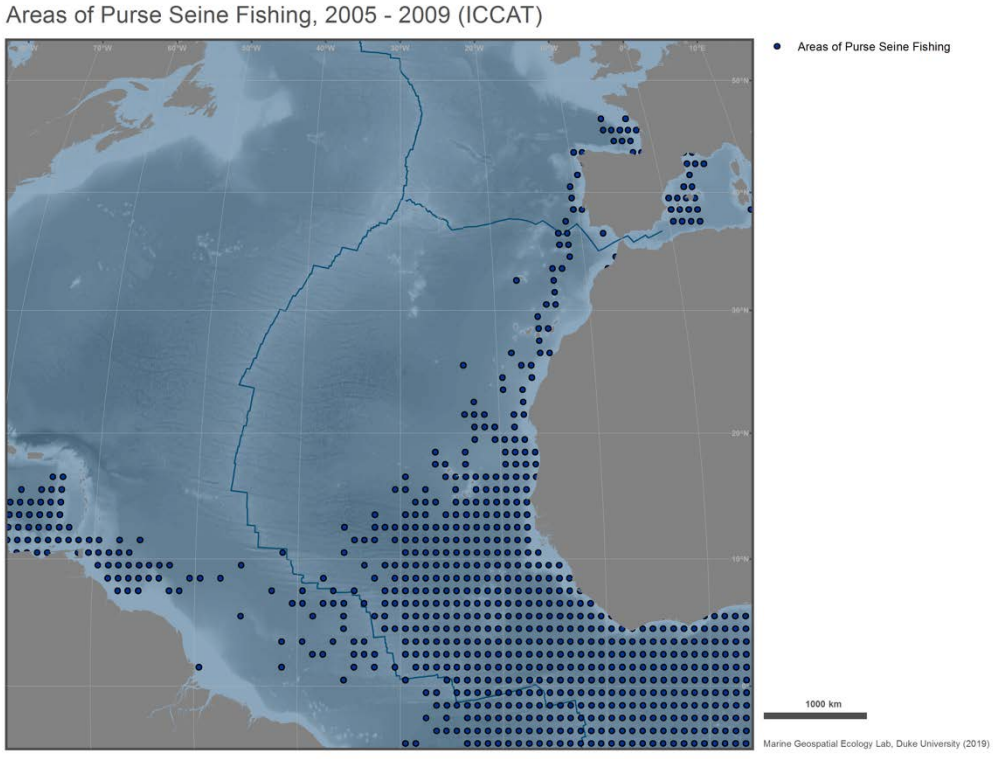


# Human Uses

RFMO Bottom Fishing Areas

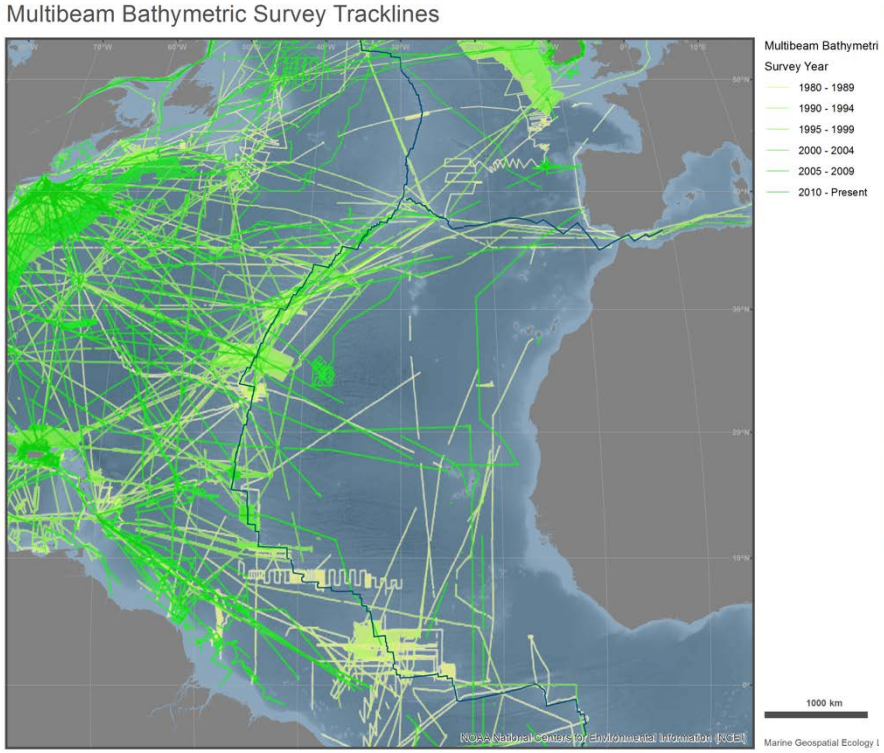



Areas of Purse Seine Fishing

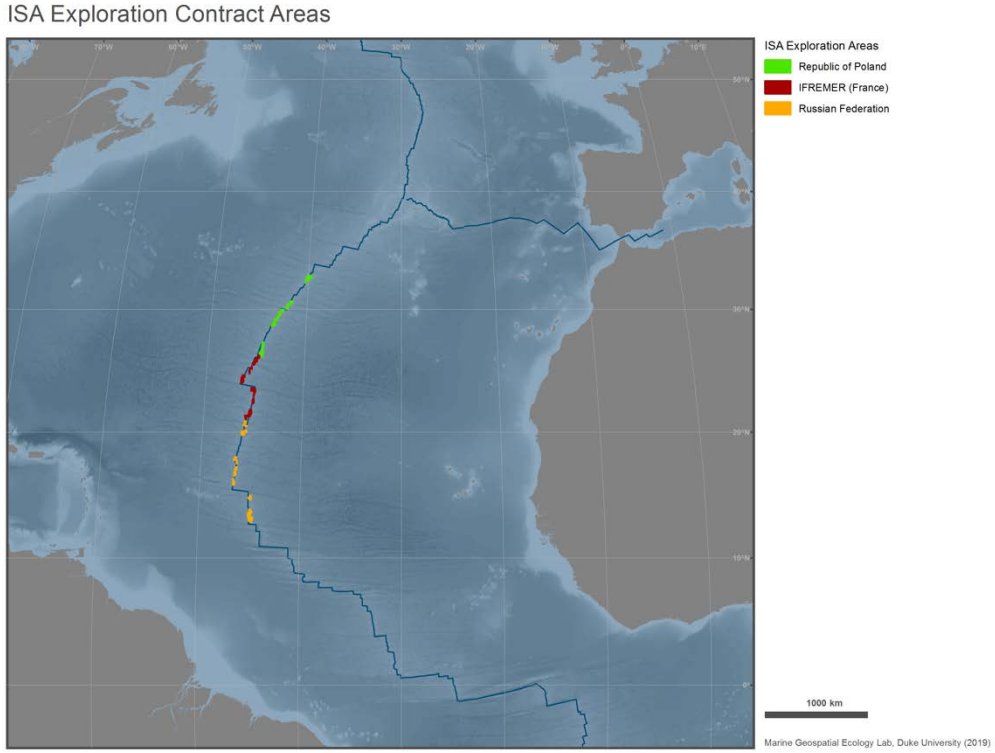


# Human Uses

## Multibeam Survey Tracklines



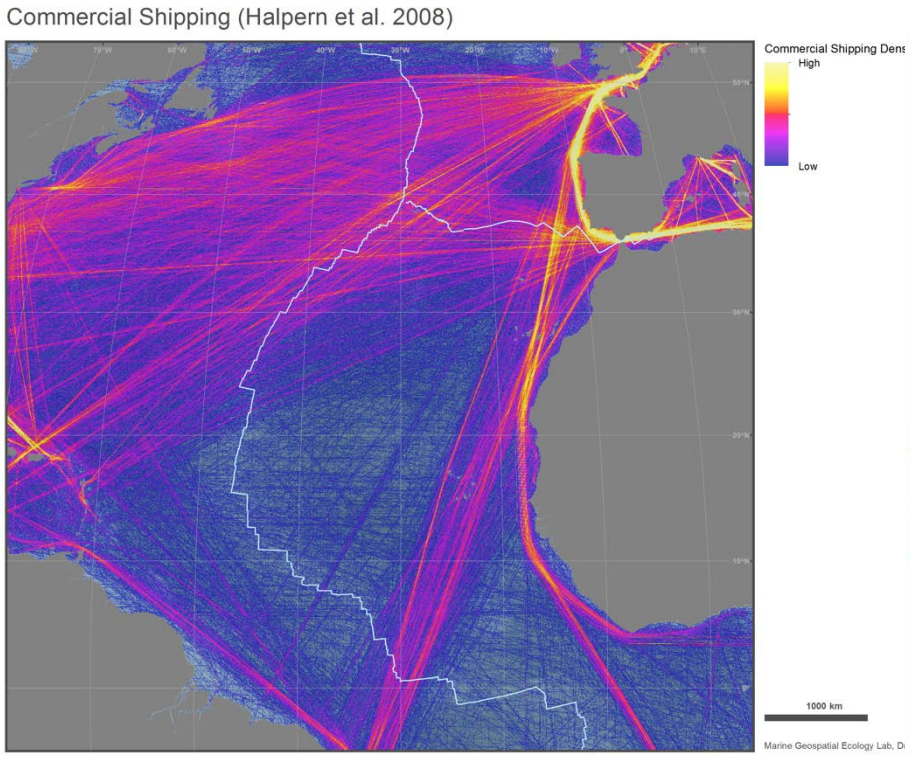

## ISA Exploration Contract Areas

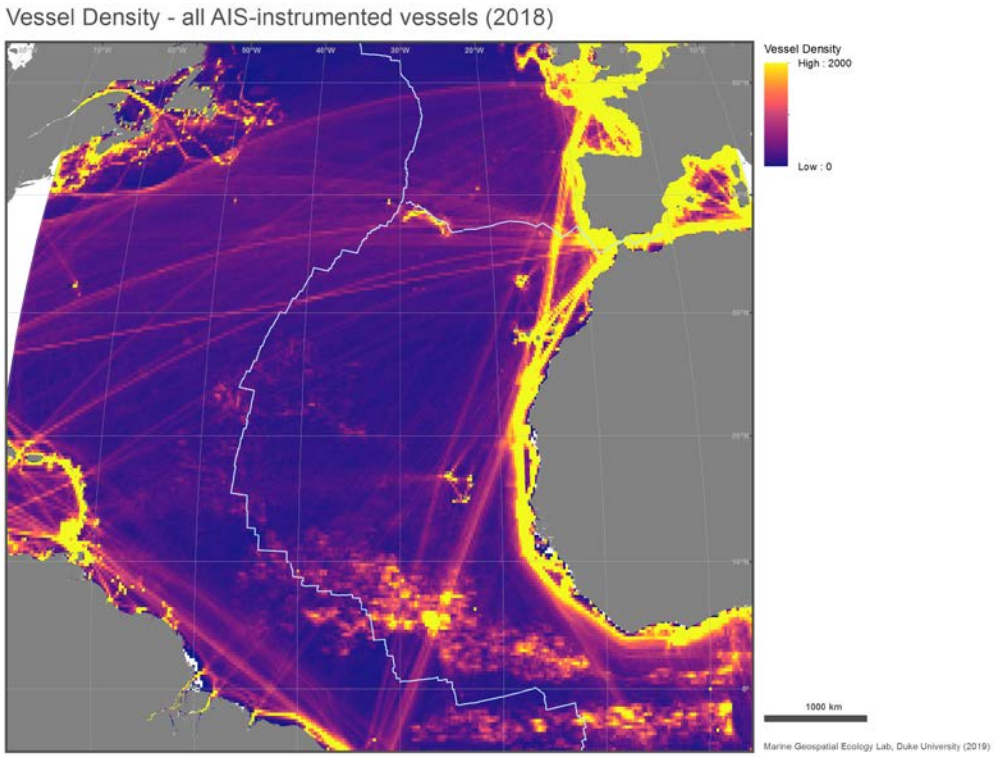


# Human Uses

Commercial Shipping

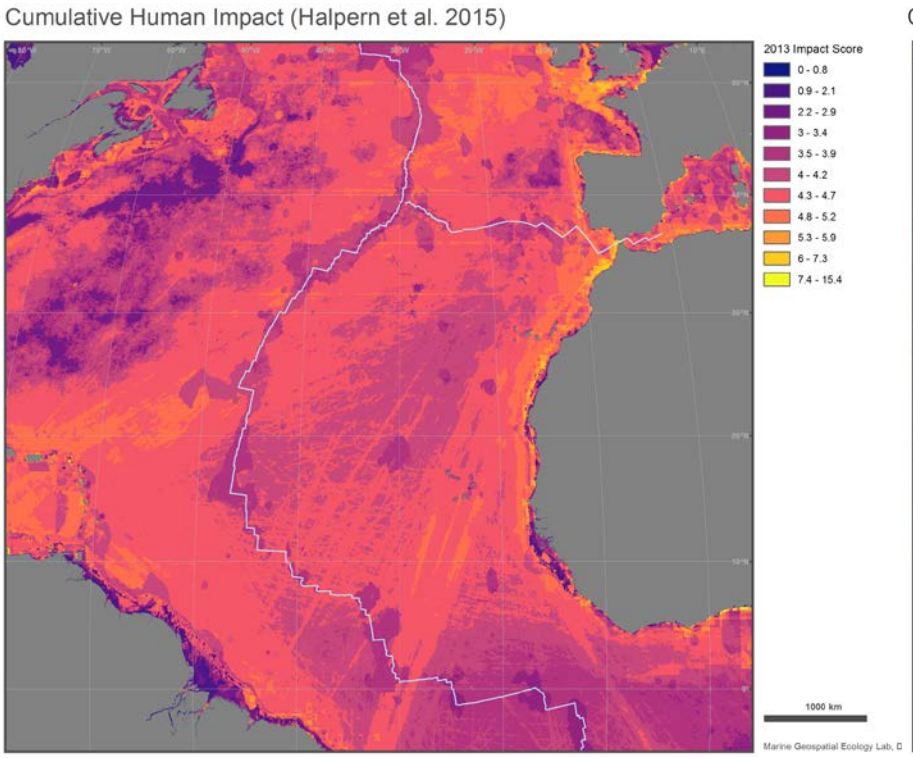
Vessel Density



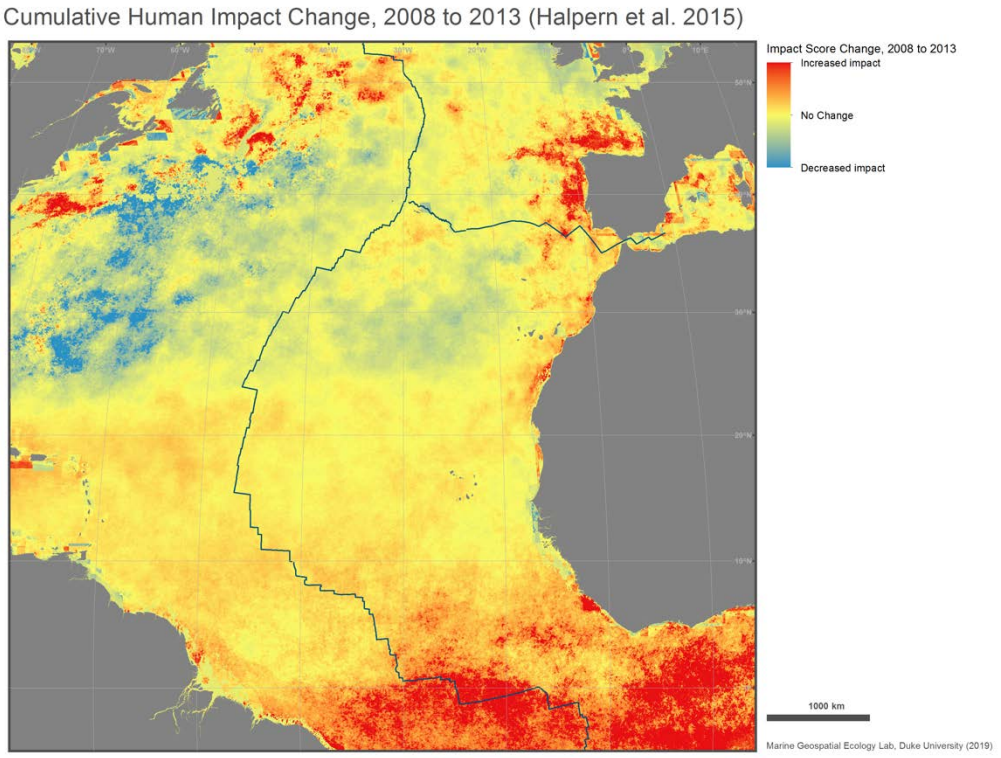



# Human Uses

## Cumulative Human Impact

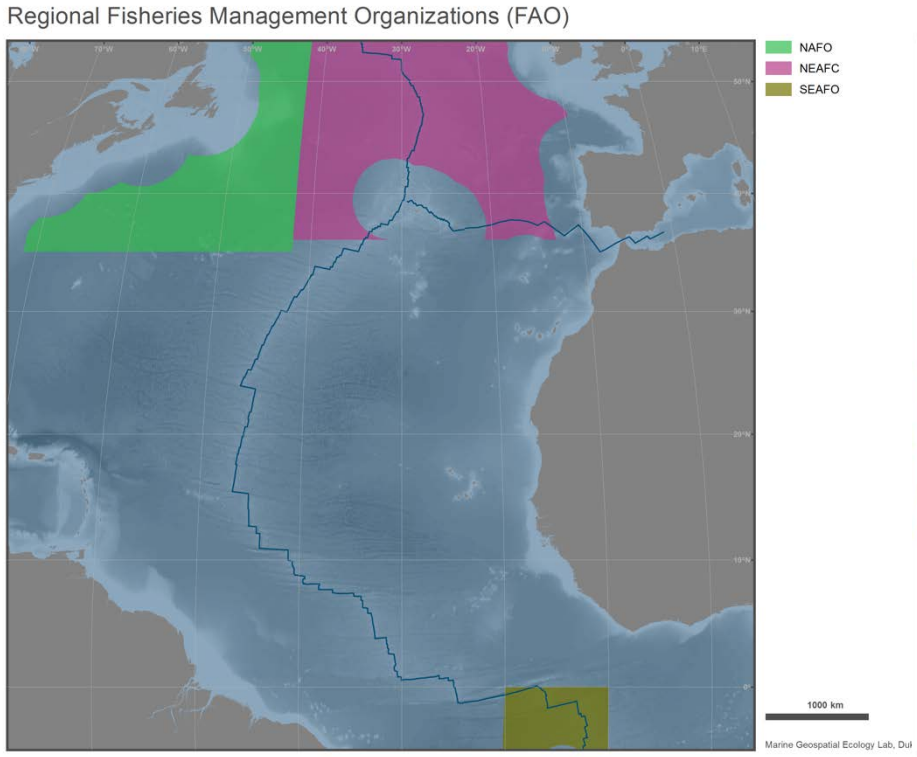



## Cumulative Human Impact Change

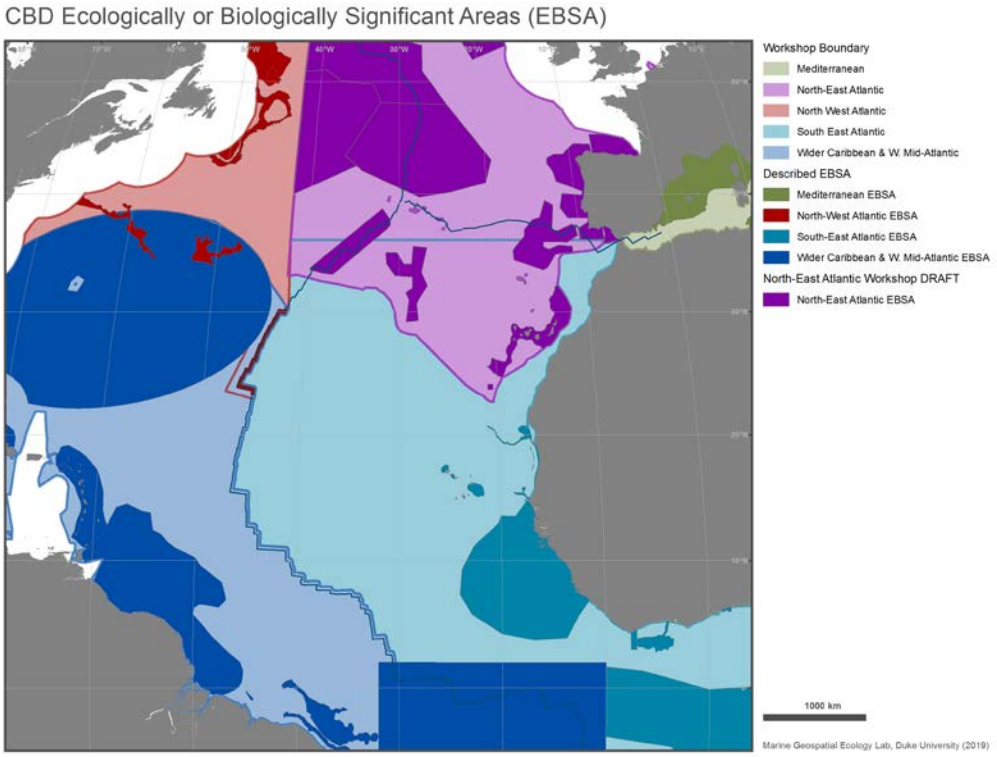


# Areas Defined for Management and/or Conservation Objectives

Regional Fisheries Management Organizations (RFMOs)

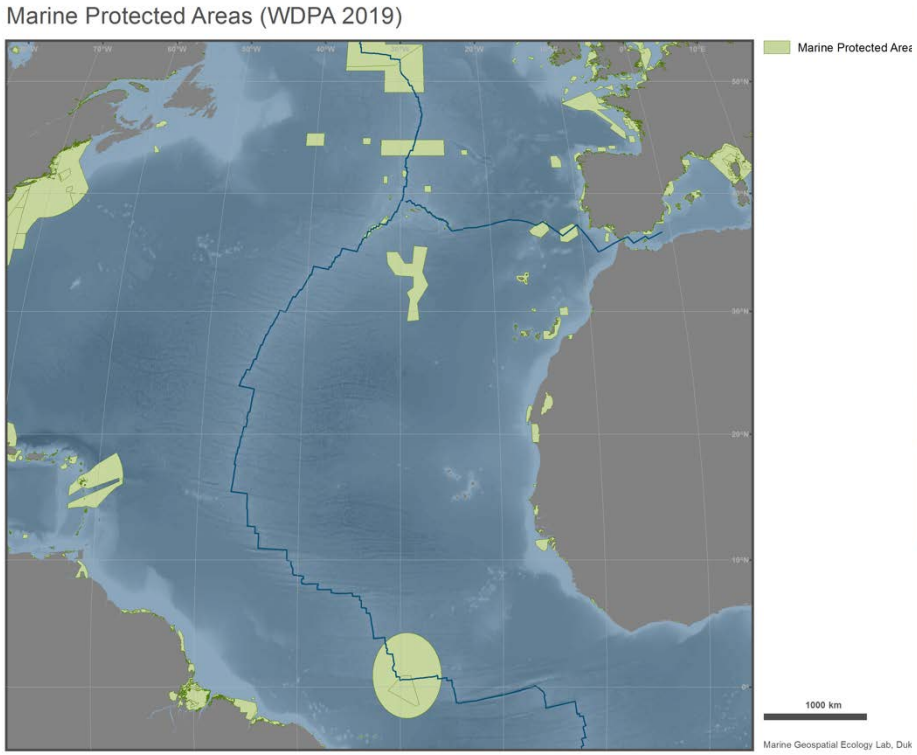



CBD Ecologically or Biologically Significant Areas (EBSAs)

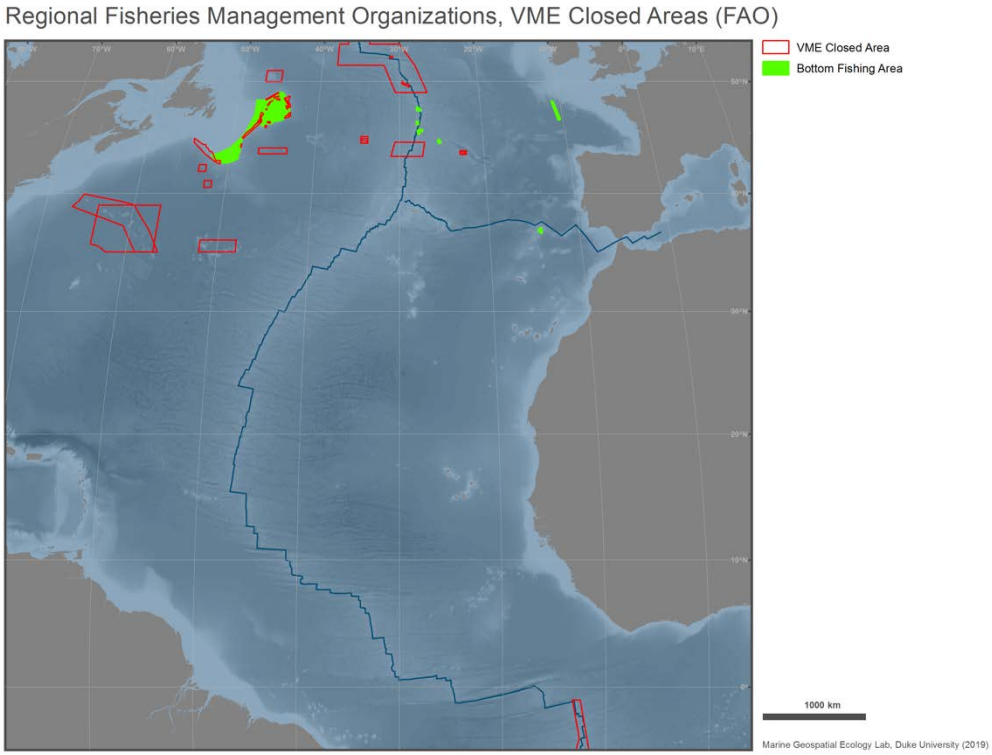


# Areas Defined for Management and/or Conservation Objectives

Marine Protected Areas (MPAs)




Vulnerable Marine Ecosystem (VME) Closed Areas



# Review of regional scientific data/information/maps compiled

Questions and Discussion

DRAFT: This draft will be further refined based on the comments from the workshop participants.

DRAFT Data Report:
Workshop on the Regional Environmental Management Plan for the Area of the Northern Mid-Atlantic Ridge

Evora, Portugal
25-29 November, 2019

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*Supported by*

European Commission

This work was supported by the Atlantic REMP project, funded under Service Contract EASME/EMFF/2017/1.3.1.1 - SI2.775068 to the European Commission.