A Marine Biodiversity Observation Network Pole-to-Pole of the Americas in support of conservation and sustainable use of living resources in the sea

MBON
Marine Biodiversity Observation Network

GOOS
Biology and Ecosystems Panel

Marine Life 2030

IOOS
Integrated Ocean Observing System

OBIS
OCEAN BIODIVERSITY INFORMATION SYSTEM

AmeriGEO
Earth Observations for the Americas

GEO BON

MarineGEO
THE TENNENBAUM MARINE OBSERVATORIES NETWORK

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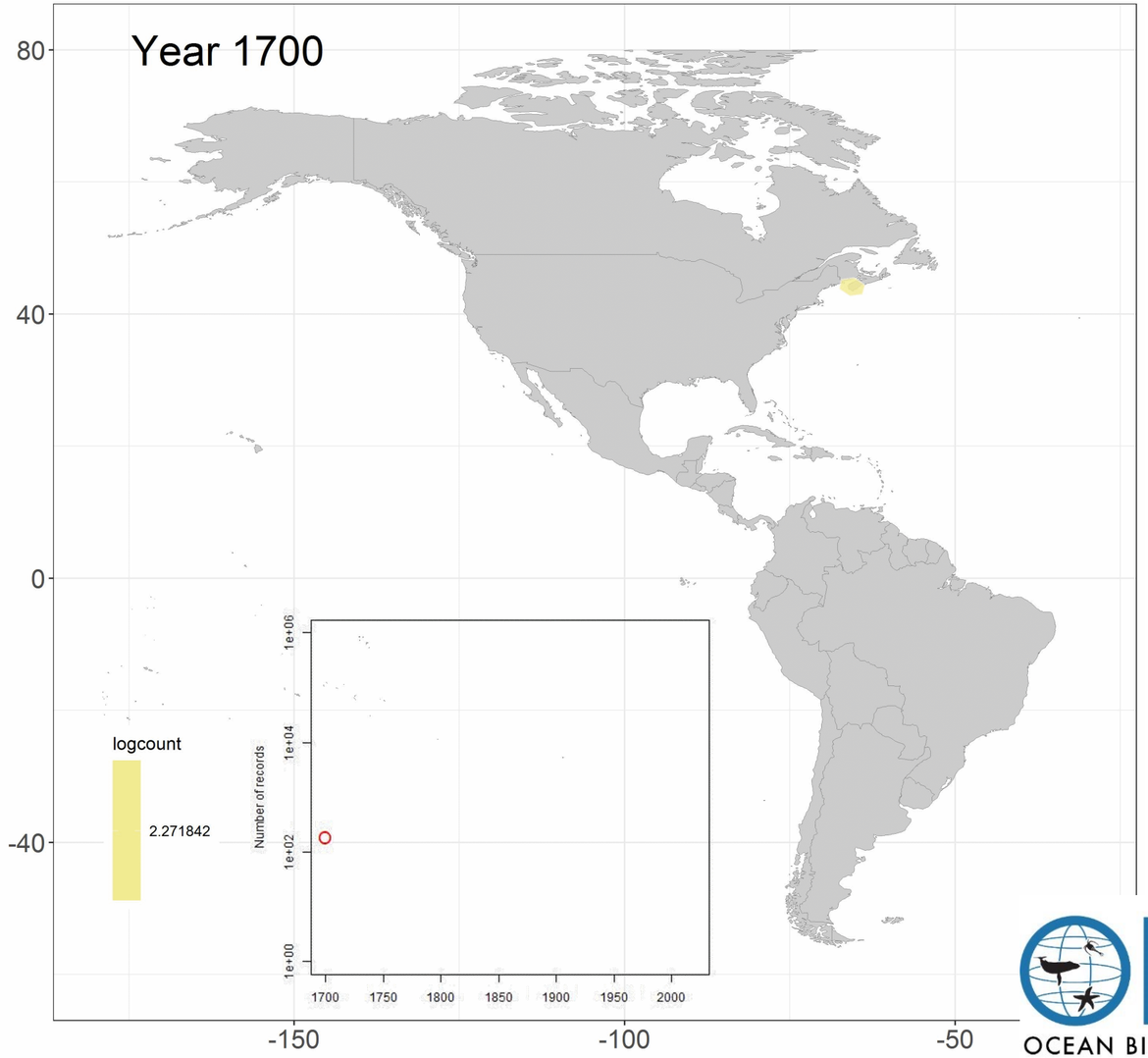
U. Miami Cooperative Inst. for Marine & Atmospheric Studies
NOAA Atlantic Oceanographic and Meteorological Laboratory
https://marinebon.org/p2p/

NASA

The project is supported by the National Aeronautics and Space Administration (NASA) grant 80NSSC18K0318

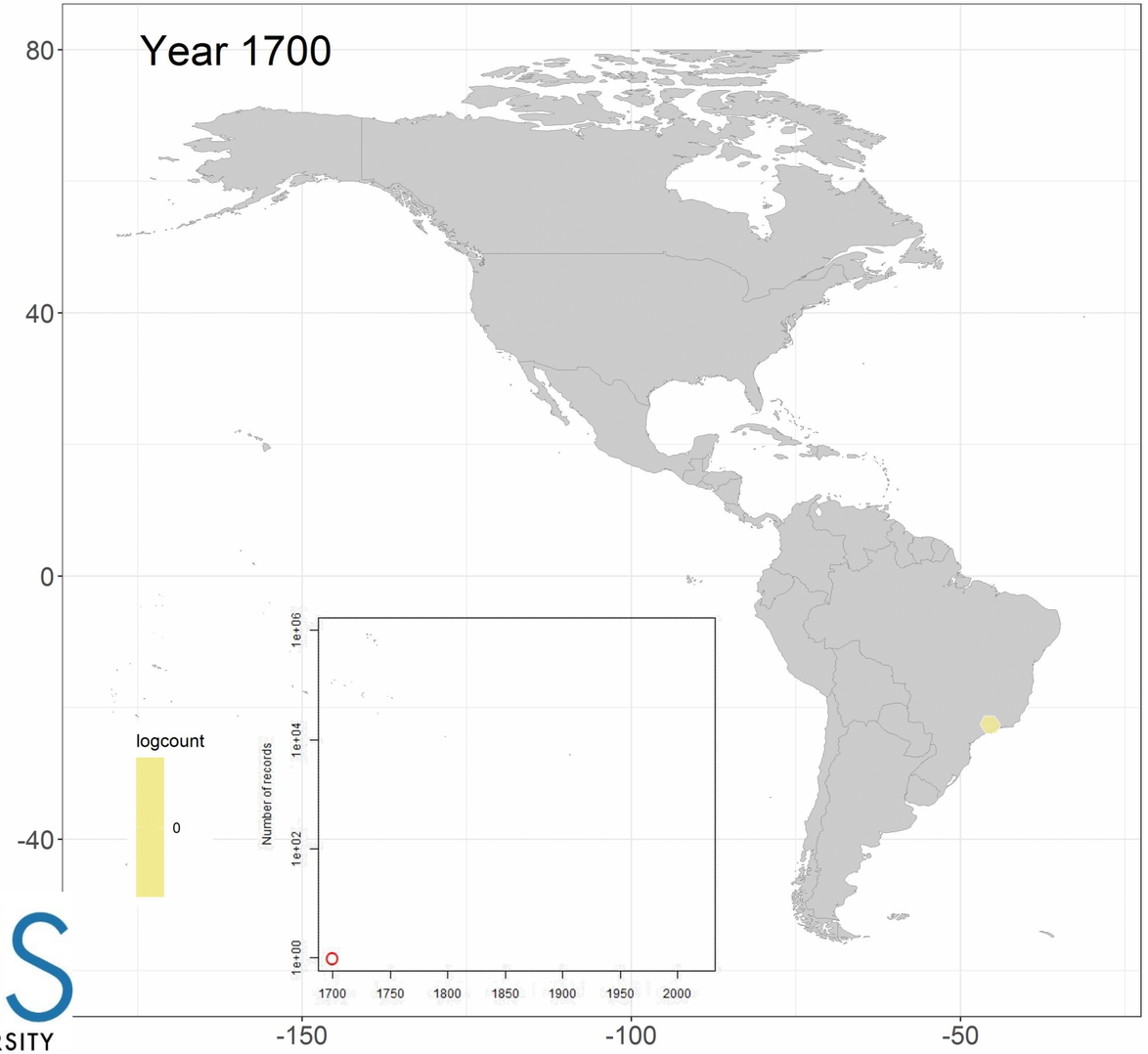
Biodiversity records in the Americas

Mollusca



Plants

Records within the 50m isobath



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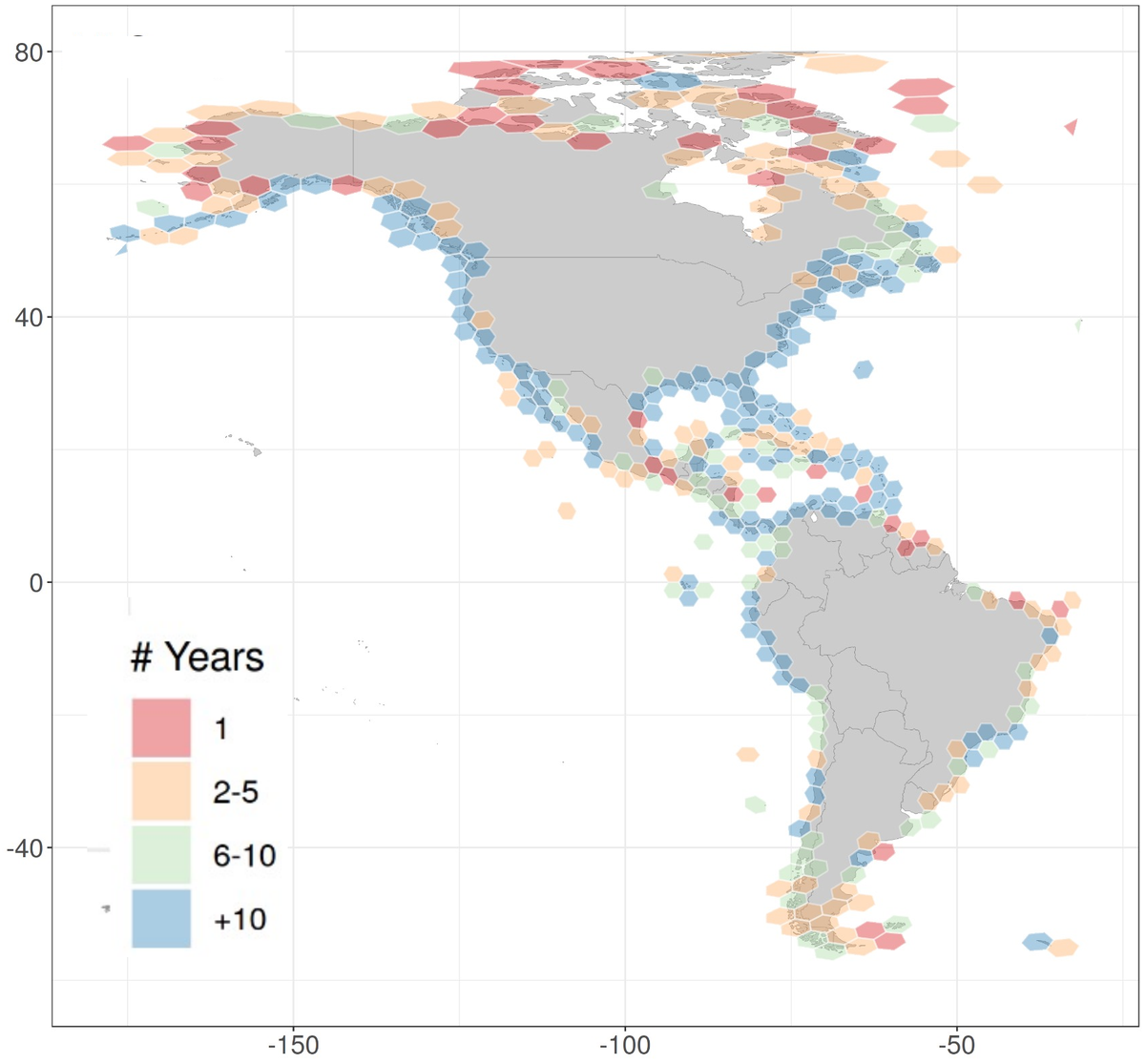
** MBON Pole to Pole records not included

Biodiversity records in the Americas

Annelids + echinoderms + molluscs + plants



1. Uneven biodiversity observations
2. Observations are often not comparable
3. Lack of time series records

OBIS
OCEAN BIODIVERSITY INFORMATION SYSTEM

MBON Pole to Pole of the Americas

People working together to observe marine biodiversity and understand how and why it changes for the benefit of society

- Standardized methodologies and data workflows
- Data and knowledge sharing
- Technology sharing and transfer
- Capacity building

Darwin Core

OBIS
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GOOS
Biology and Ecosystems Panel

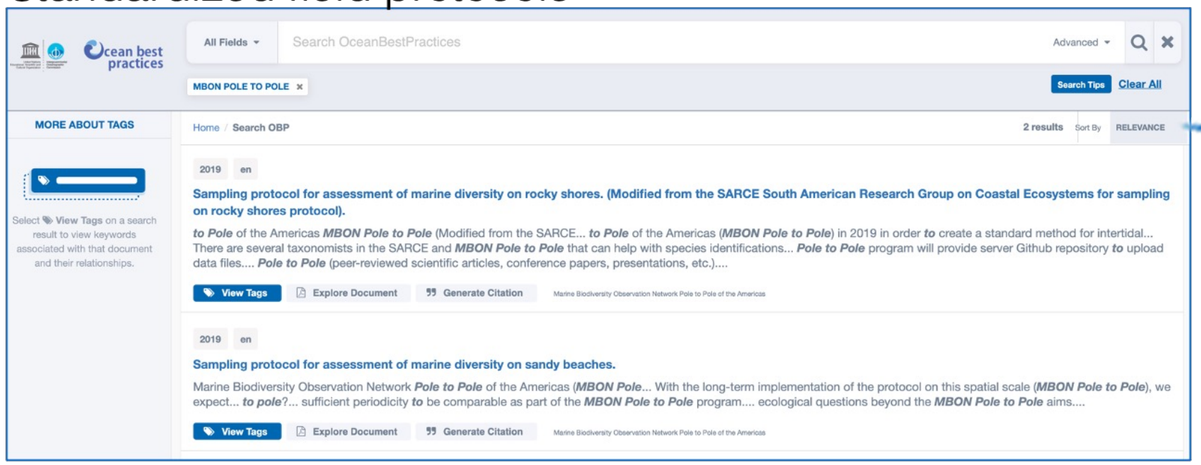
EOV's

Marine Life 2030

Capacity Building – Data Workflows

MBON
Marine Biodiversity Observation Network

Standardized field protocols



Training

United Nations Educational, Scientific and Cultural Organization
Intergovernmental Oceanographic Commission
OceanTeacher GLOBAL ACADEMY

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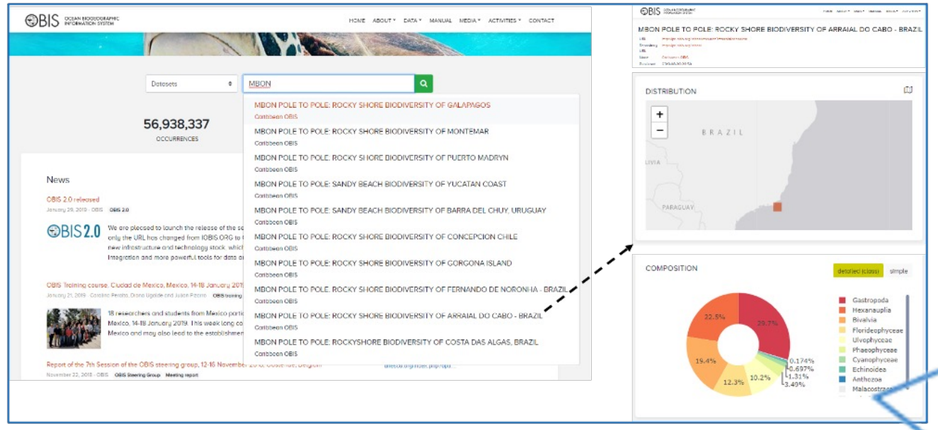
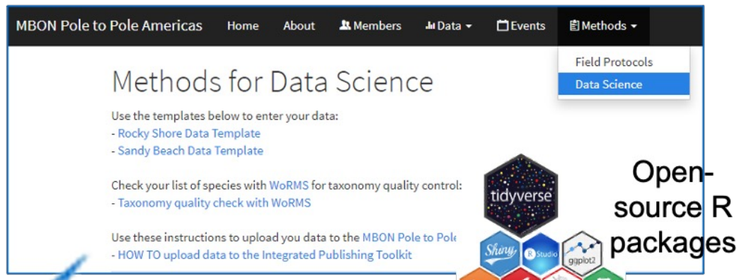


Data sharing

https://marinebon.org/p2p/



Open-source R packages

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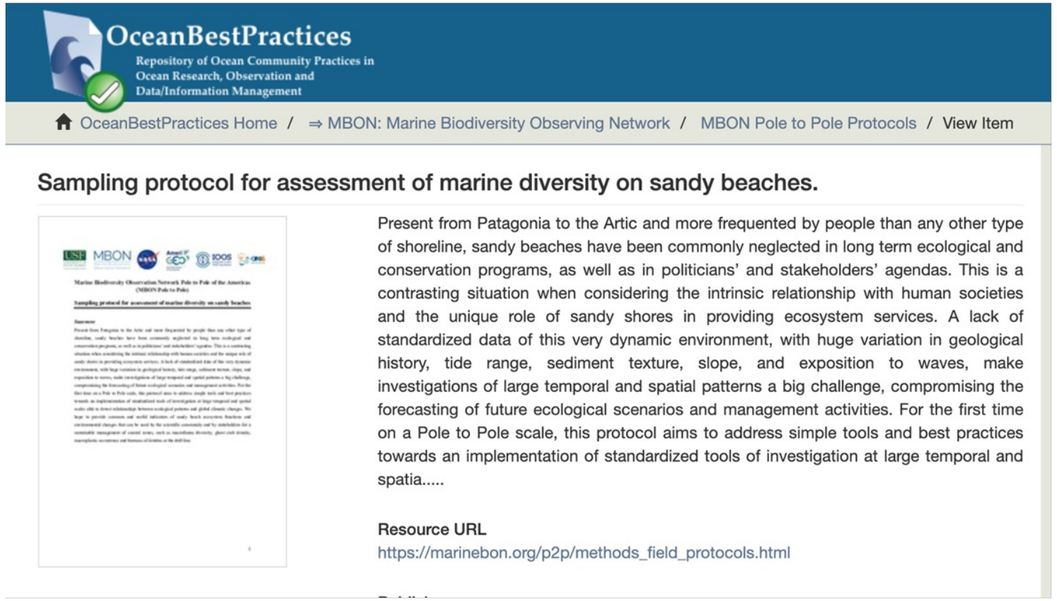
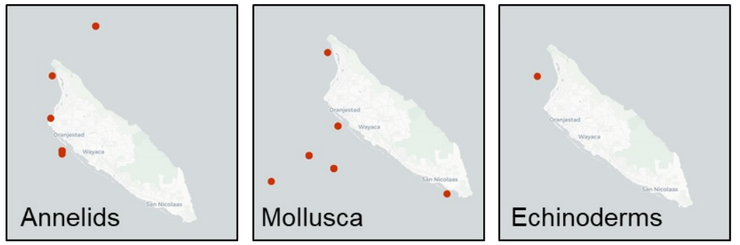
MBON Pole to Pole: Building Capacity in Biodiversity Monitoring





Mapping

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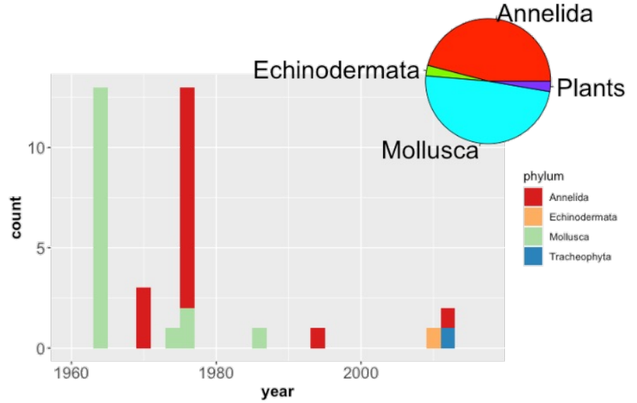
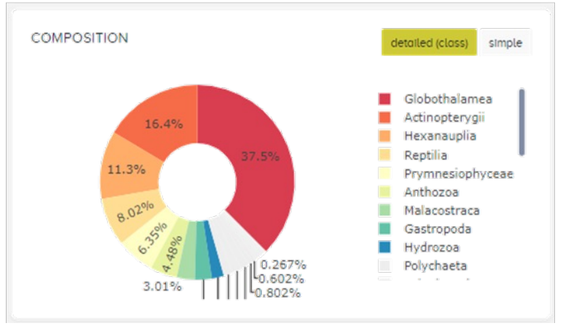
Time series



Archiving



Marine Biodiversity Workshops:

From the Sea to the Cloud

- São Sebastião, Brazil, 6-10 agosto, 2018
- 38 participantes
- 11 países

- Puerto Morelos, México, 2-5 abril, 2019
- 35 participantes
- 12 países

Biology and Ecosystems Panel

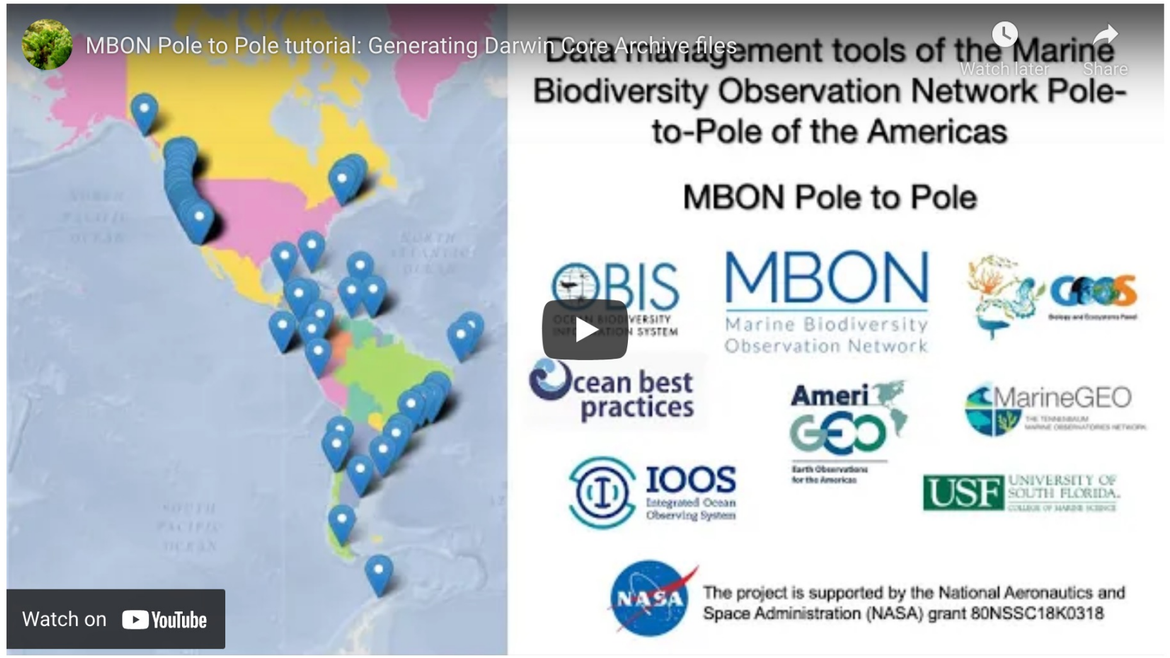
Earth Observations for the Americas

MBON
Marine Biodiversity Observation Network

MBON Pole to Pole: Building Capacity in Biodiversity Monitoring

Transform your survey data tables to Darwin Core Archive files (DwC-A):

- **DwC-A Writer**
- **Download this test dataset to run DwC-A Writer**



RPubs by RStudio

1 Basic Setup
2 Load your data table
3 Read file sheets
4 Generate IDs
5 Assign codes to DATA

DwC-A Writer

Eduardo Klein and Enrique Montes (emontesh@usf.edu)

10/7/2020

This script transforms long-format data tables used in rocky intertidal surveys of the Marine Biodiversity Observation Network Pole to Pole of the Americas (MBON Pole to Pole) into Darwin Core Archive (DwC-A) files for publishing data in the Ocean Biodiversity Information System (OBIS) following instructions from this manual. It also generates an integrated file ready for data analysis.

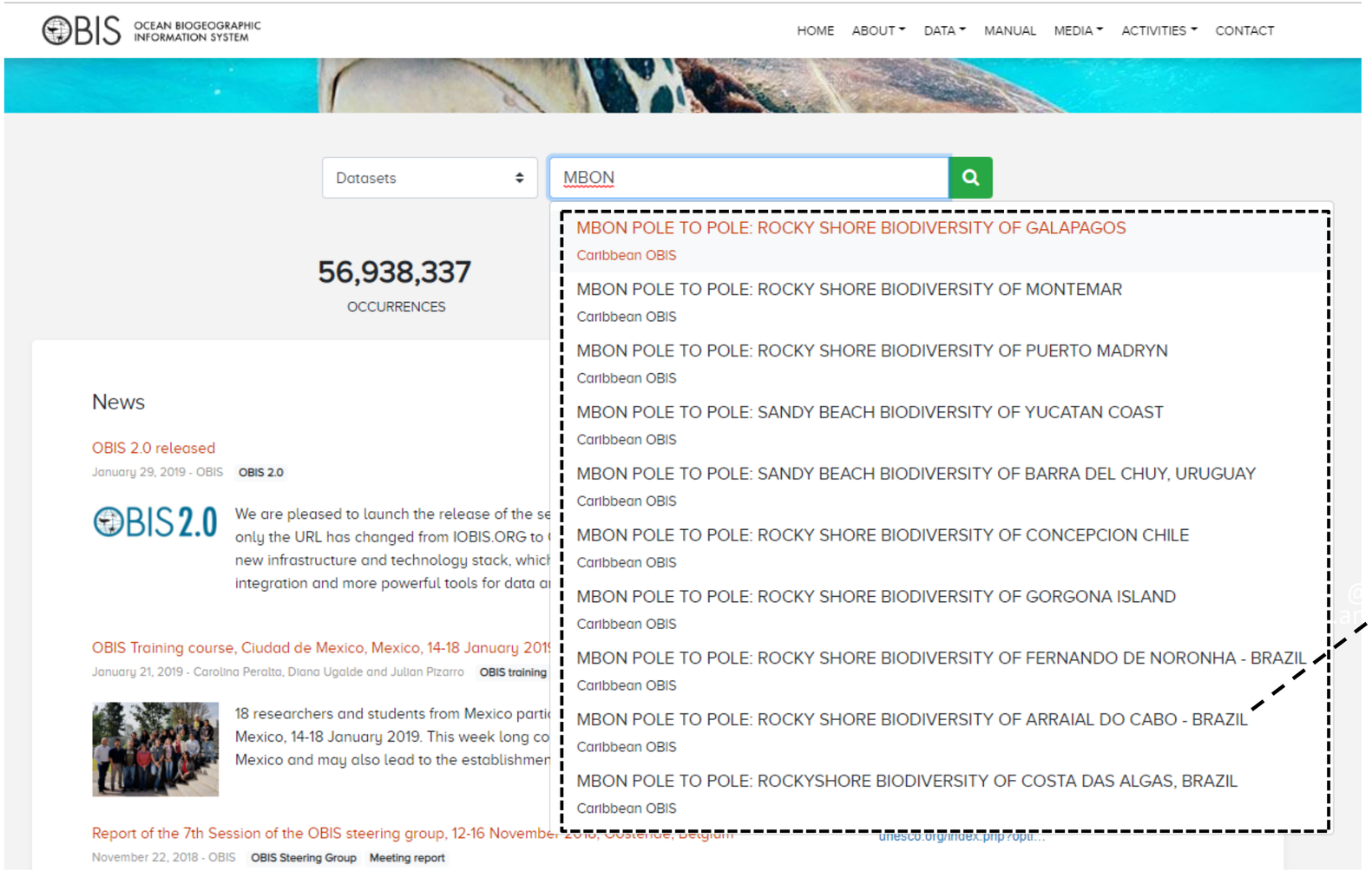
The original R Markdown version of this document is available here.

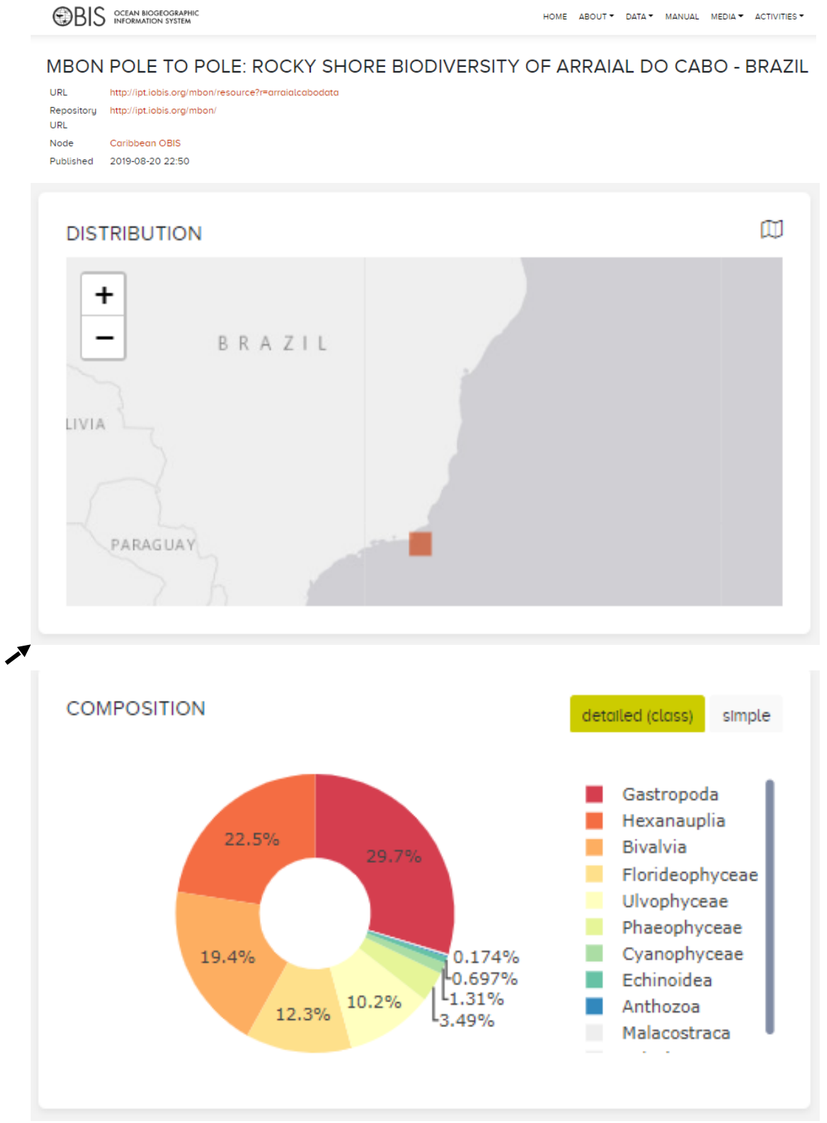
To test this script, you will need to:

- Install R software and RStudio.
- Create three folders in your working directory: Analysis, Data, IPT.
- Set your working directory to the location of these three folders (e.g. setwd("~/your directory").
- Save the The DataSheet_longformat_TEST file in the "Data" folder. This is the data table that you will substitute with your own data.

Now, just copy the code chunks below and paste them into your R console.

MBON Pole to Pole Data available in OBIS

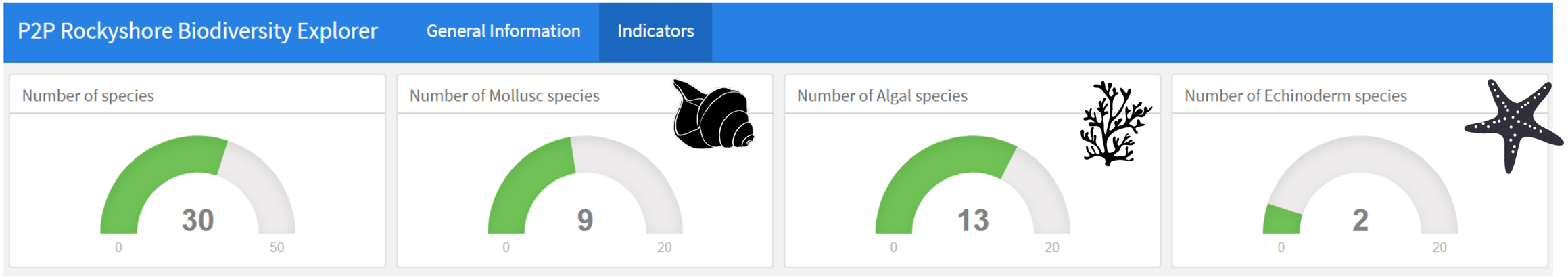


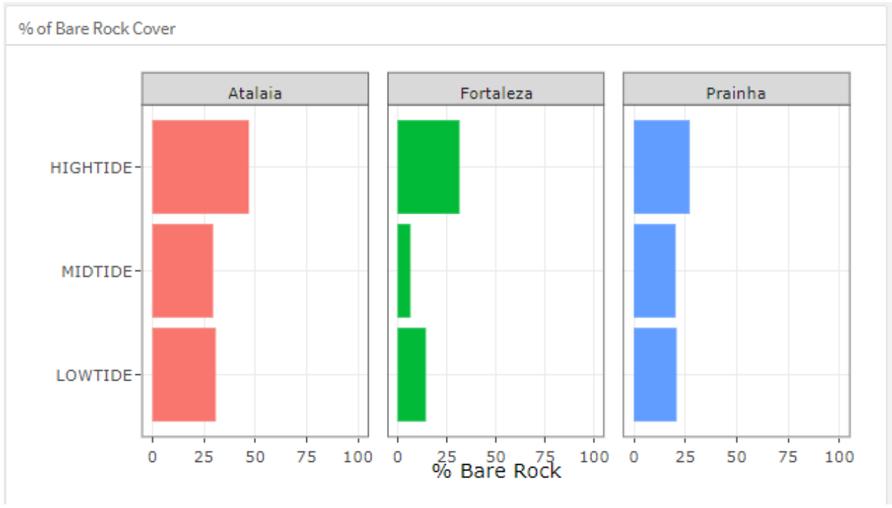


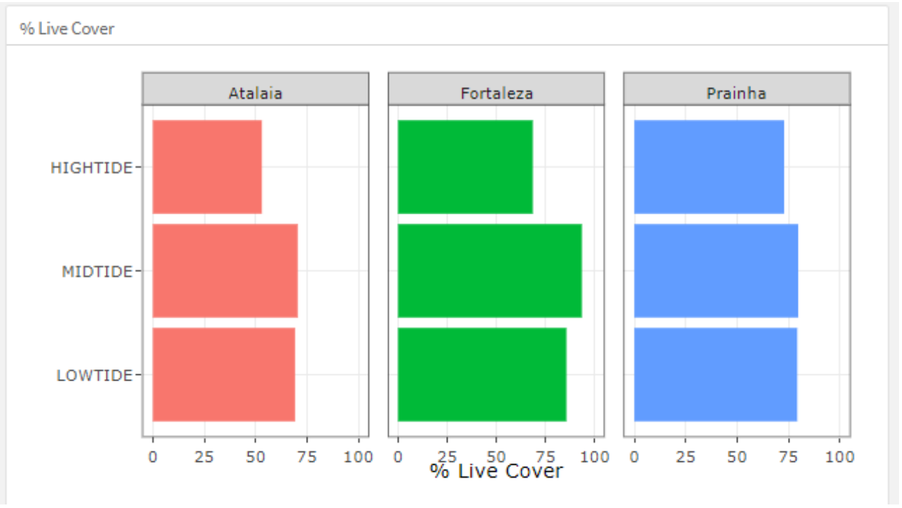
https://www.gbif.org/en/installation/bd4746e4-c1e1-4a68-8546-10a853c64853

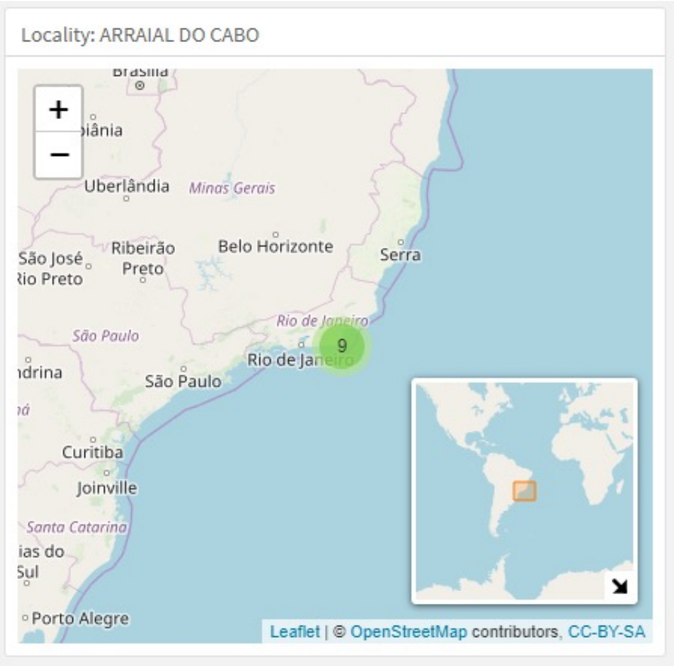
Biodiversity Indicators Dashboards

Example: Rocky shore at Arraial do Cabo – Brazil

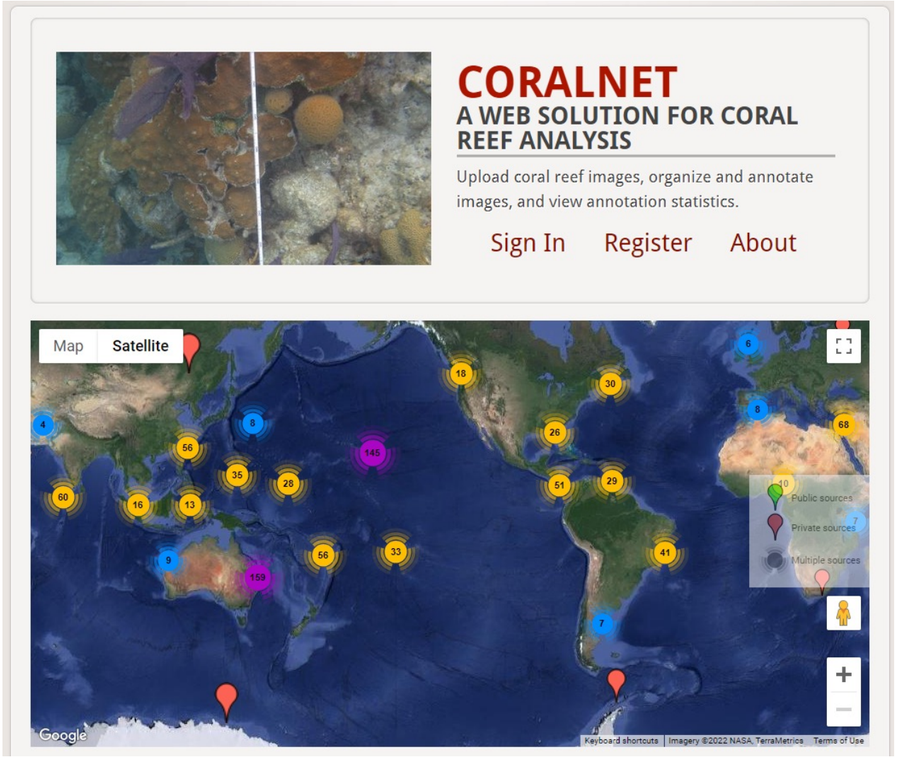


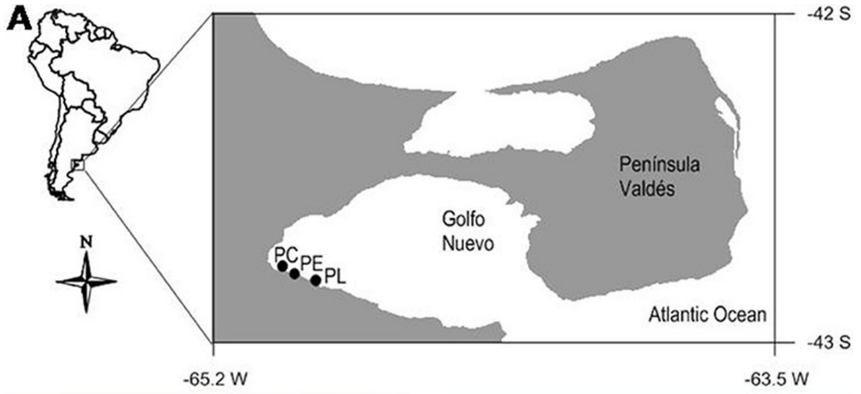


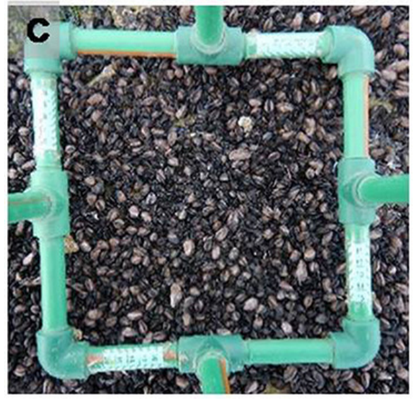




Machine-learning applications for biodiversity monitoring



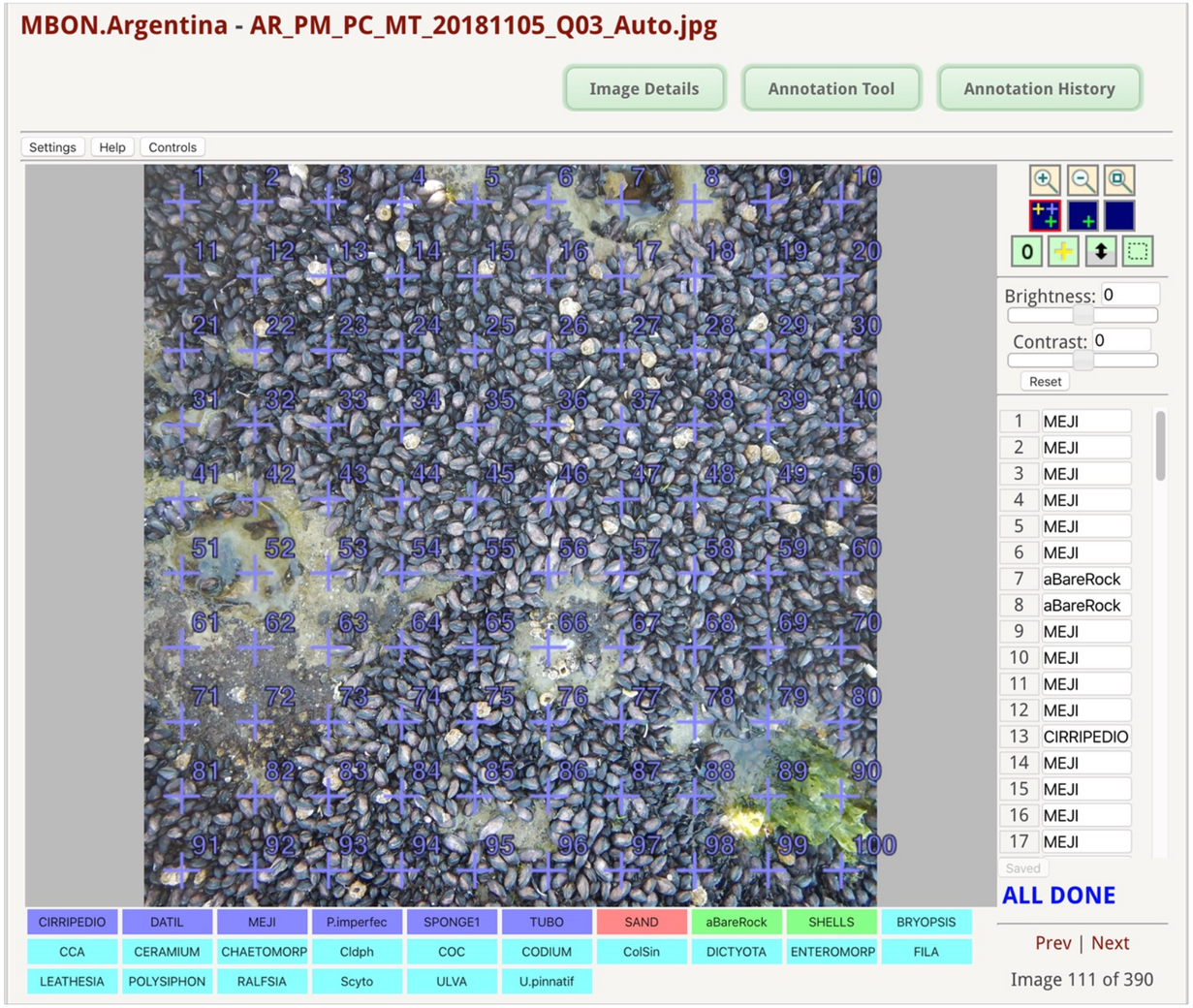


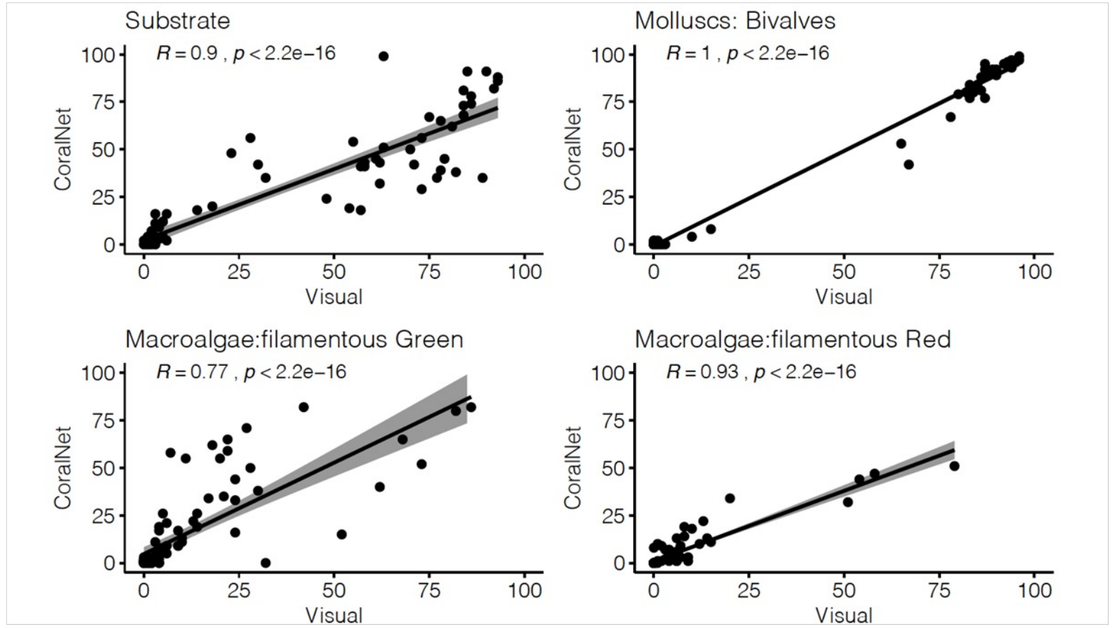


"It took less than a year for mussel cover to drop from 90 to almost 0%"

Mendez et al 2021
Front. Mar. Sci.
https://doi.org/10.3389/fmars.2021.620866

Using machine learning to track biodiversity change in the coastal zone



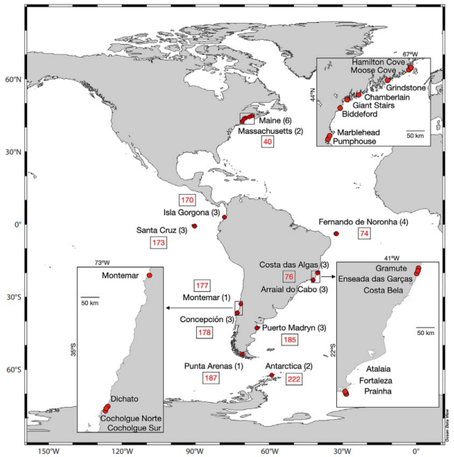


Puerto Madryn, Argentina

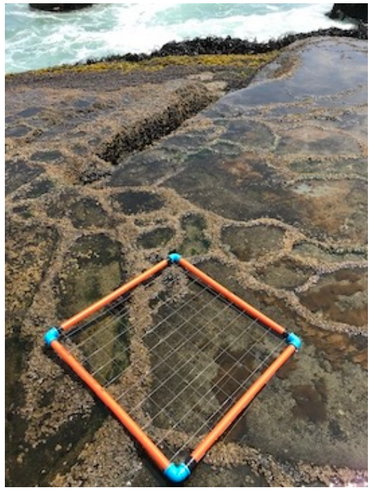
Moose Cove, Maine

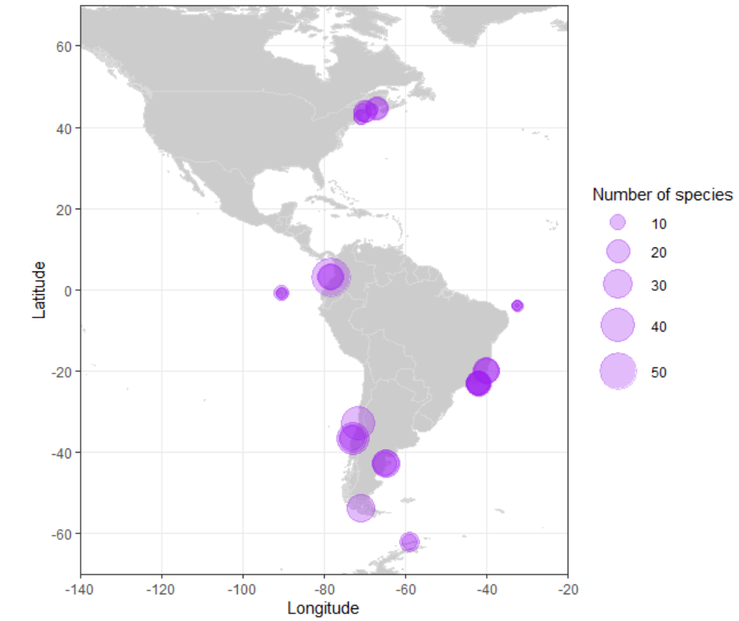
Bravo et al. 2021 FMS

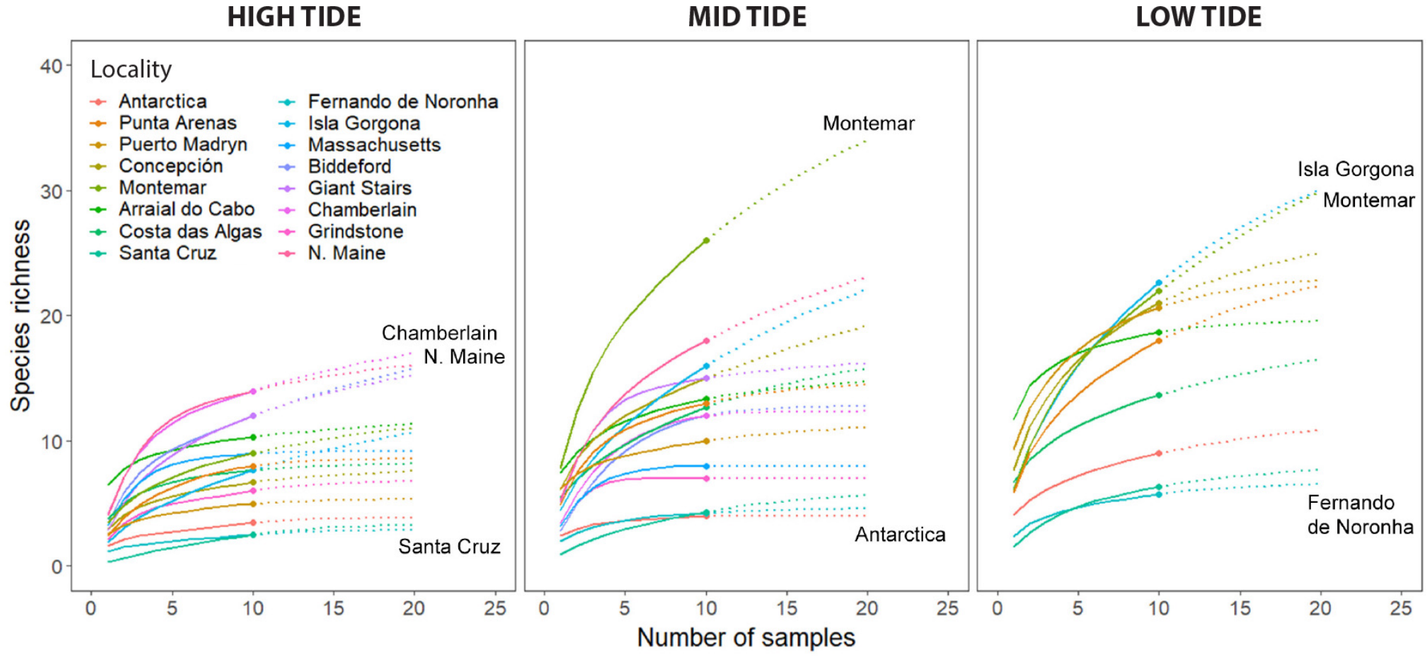
Field sampling effort optimization



Biodiversity survey at the Cocholgue Sur locality in Concepcion, Chile.

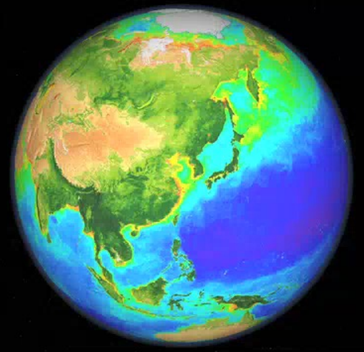




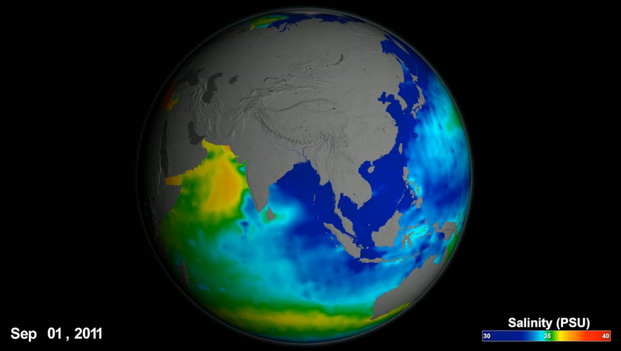


Dynamic biogeographic seascapes

Multiple NASA assets



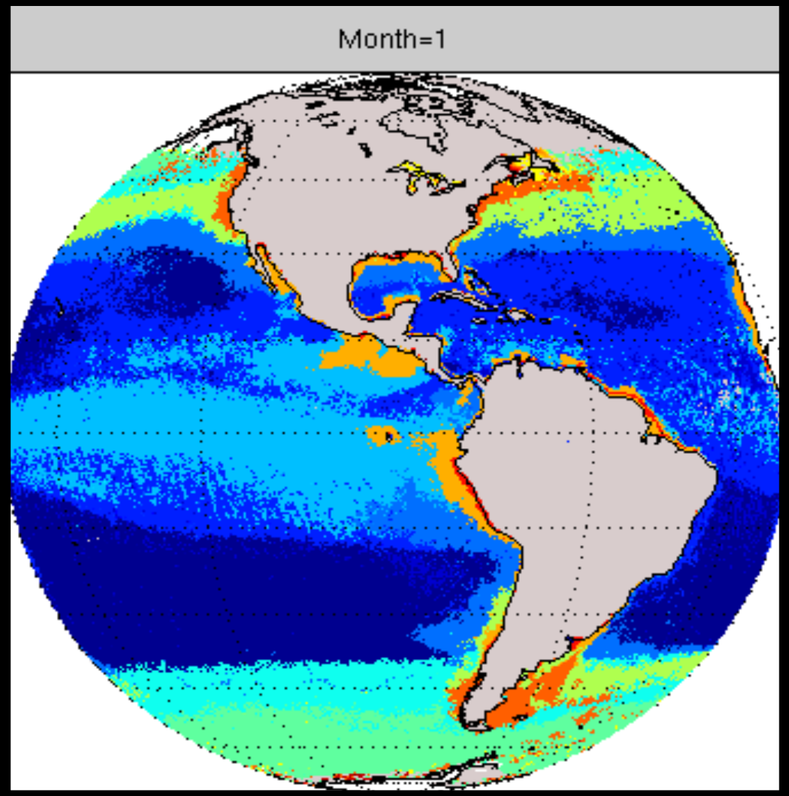
Biology: Ocean Color



Physics: e.g.
SSS, SST, winds, SSHa

Machine learning

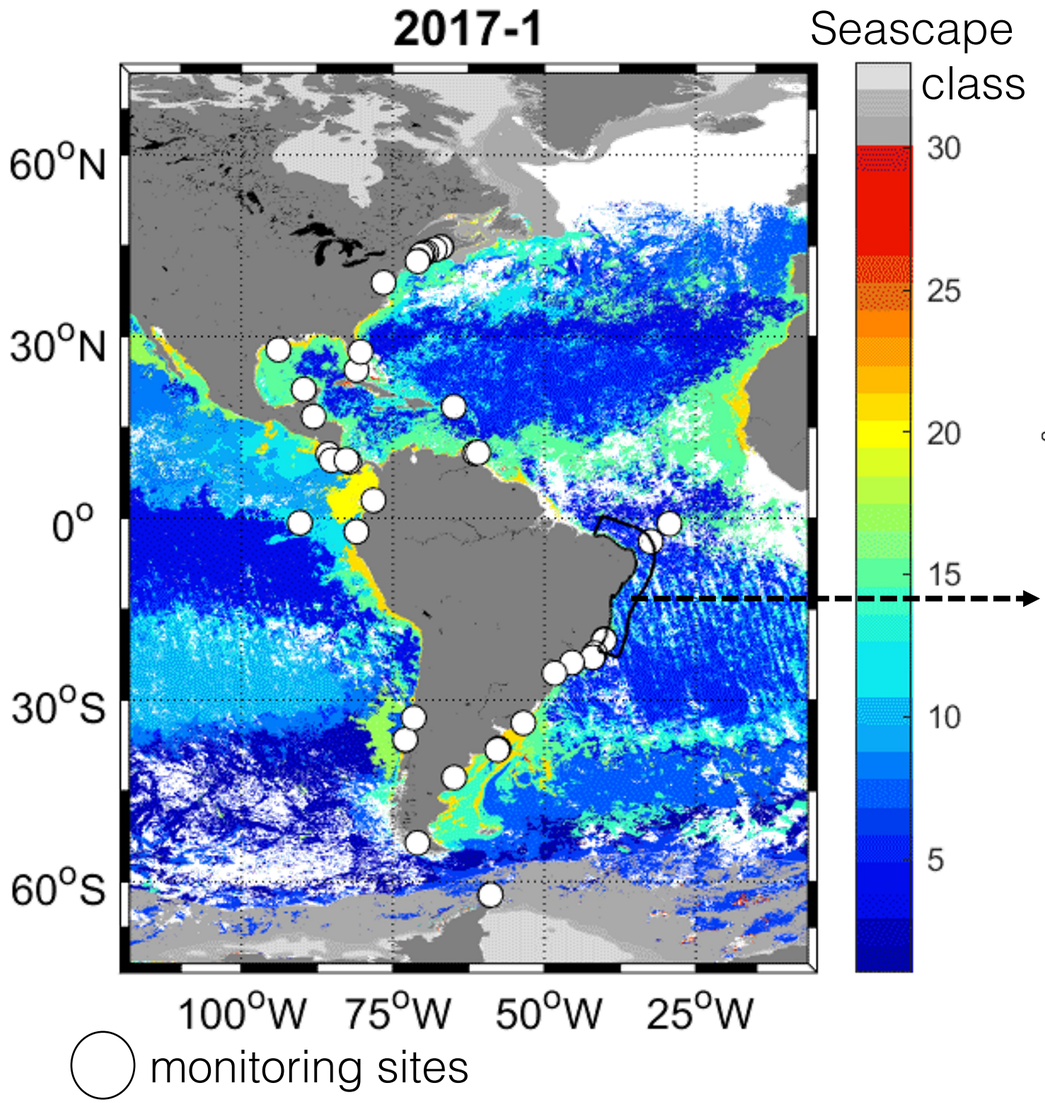
Global dynamic classification

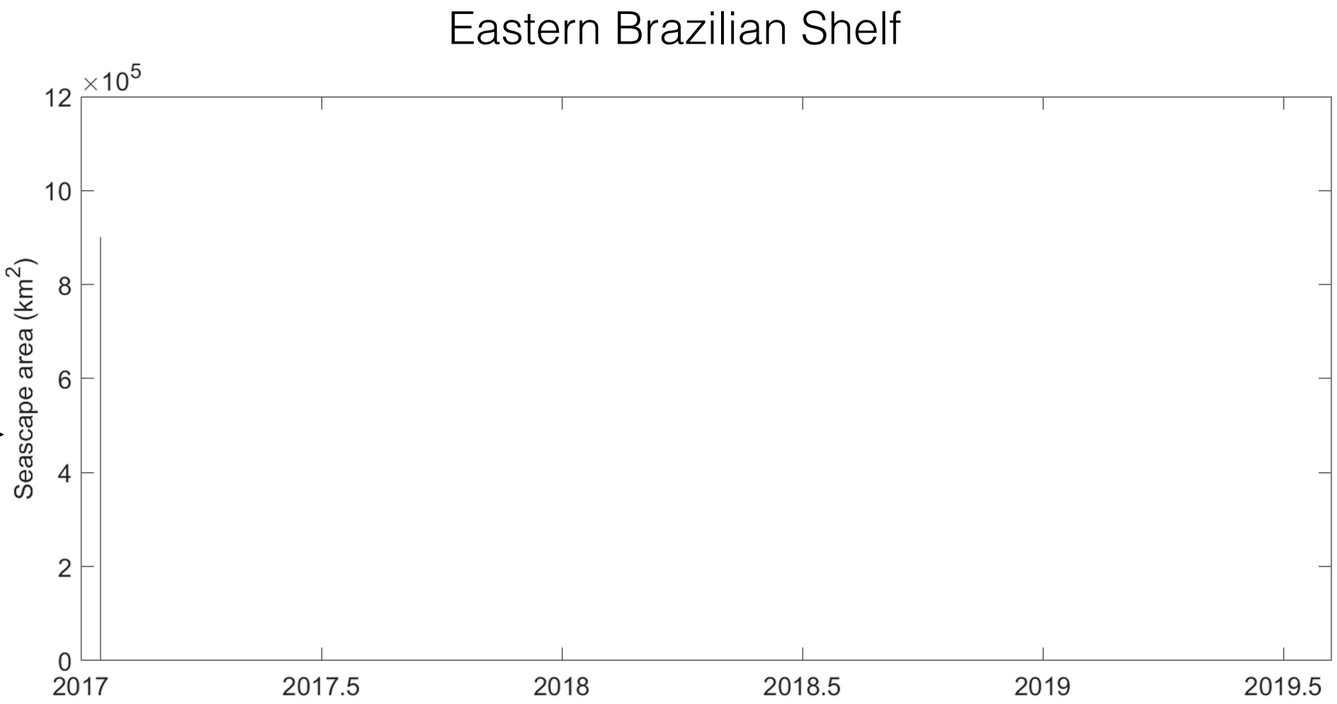


- Globally relevant variables:
  - SST, Chl-a, nFLH, ADT, SSS, CDOM, ice cover
- 8-day and monthly composites
- 5 km pixel resolution
- N= 33 (including sea ice)

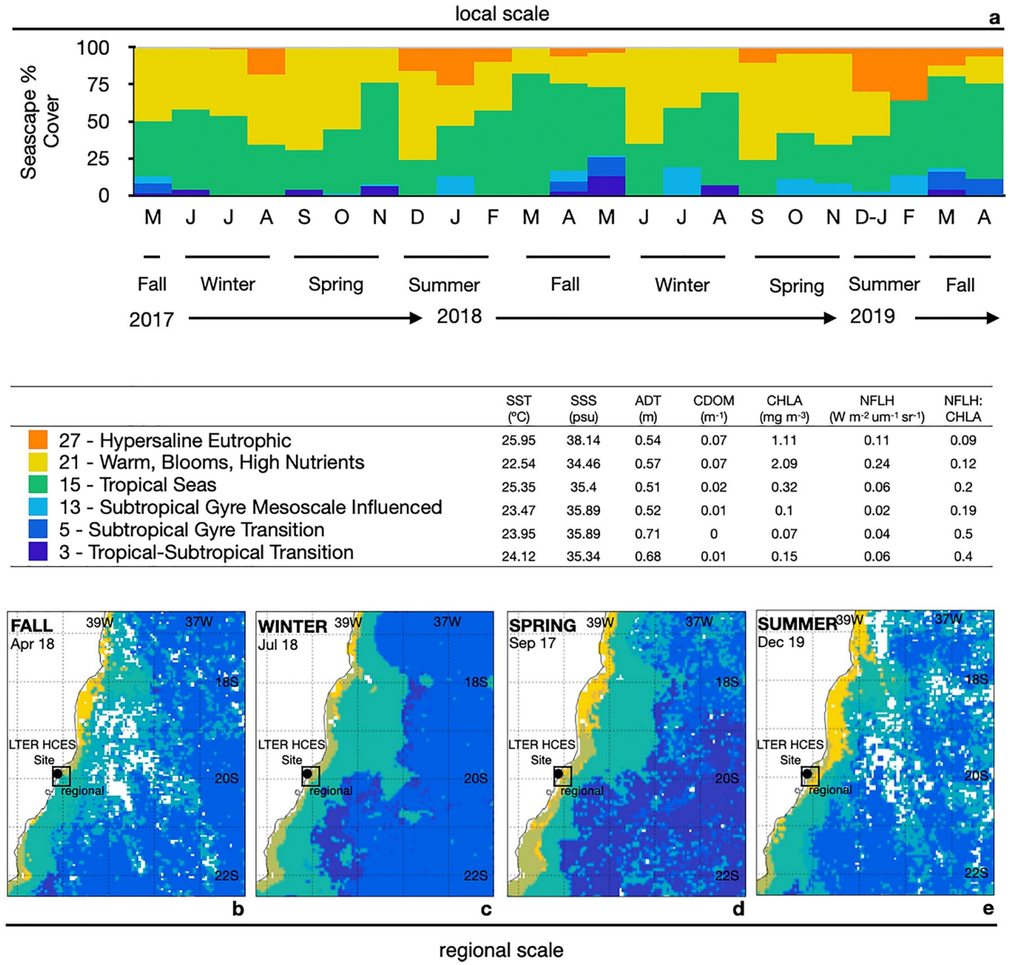
Capacity Building – Use of dynamic seascape maps

Global classification of surface waters at 5 km pixel res.

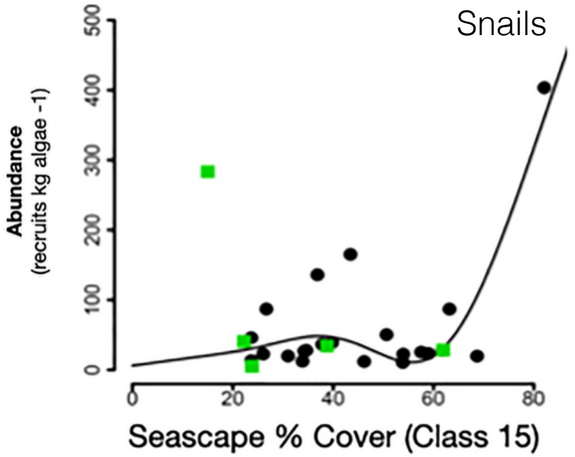


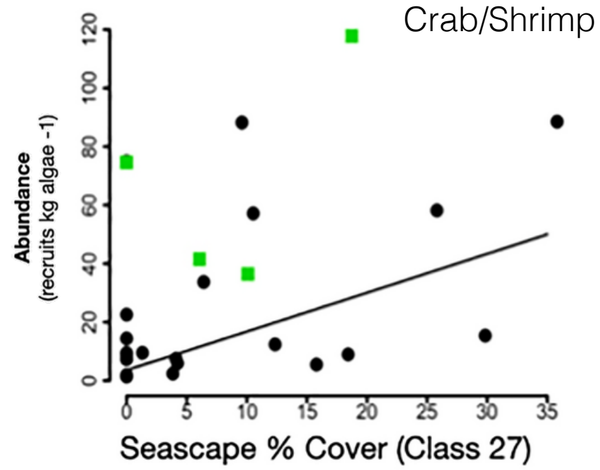


Capacity Building – Use of dynamic seascape maps



	SST (°C)	SSS (psu)	ADT (m)	CDOM (m^{-1})	CHLA (mg m^{-3})	NFLH (W m^{-2} um^{-1} sr^{-1})	NFLH: CHLA
27 - Hypersaline Eutrophic	25.95	38.14	0.54	0.07	1.11	0.11	0.09
21 - Warm, Blooms, High Nutrients	22.54	34.46	0.57	0.07	2.09	0.24	0.12
15 - Tropical Seas	25.35	35.4	0.51	0.02	0.32	0.06	0.2
13 - Subtropical Gyre Mesoscale Influenced	23.47	35.89	0.52	0.01	0.1	0.02	0.19
5 - Subtropical Gyre Transition	23.95	35.89	0.71	0	0.07	0.04	0.5
3 - Tropical-Subtropical Transition	24.12	35.34	0.68	0.01	0.15	0.06	0.4





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Article | Open Access | Published: 11 May 2022

Reef larval recruitment in response to seascape dynamics in the SW Atlantic

Ana Carolina de Azevedo Mazzuco & Angelo Fraga Bernardino

Scientific Reports **12**, Article number: 7750 (2022) | Cite this article

seascapeR

The `seascapeR` package provides functions for fetching, analyzing and visualizing Seascapes, a global and regional dynamic sea water classification product derived from satellite imagery by Maria Kavanaugh (OSU).

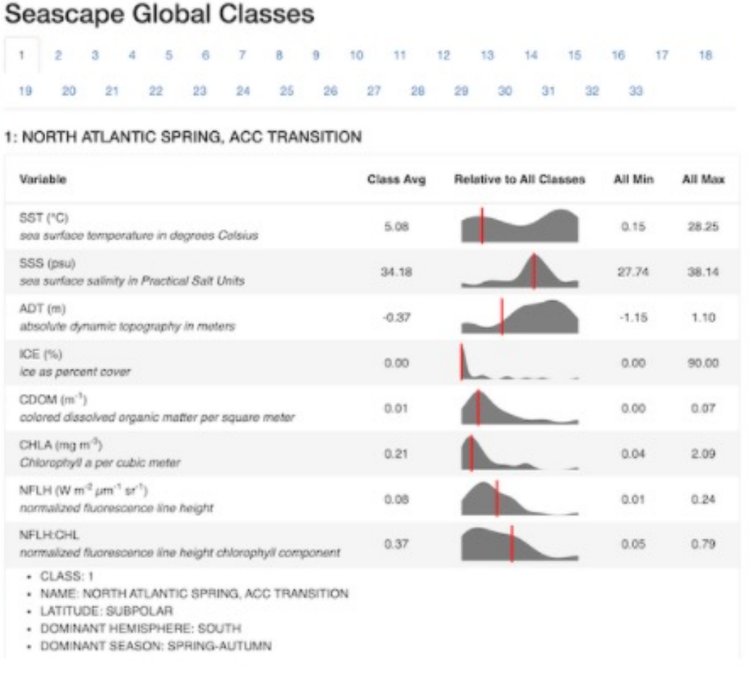
In particular, this package is meant to help nodes in the MarineBON.org network extract Seascape data, especially across NOAA Sanctuaries, for comparison with biological data from eDNA, sound, telemetry and other observational data to evaluate how dynamic water masses relate to ecosystem function.

Shiny app

Besides the documentation below and in Get Started, to see an example of how `seascapeR` functions get used to fetch data across sanctuaries, check out the get_data.R script. The gathered data from this script then feeds the Seascapes for Sanctuaries app built with Shiny. To see how the app generates maps and time series plots, see the app's code at app.R. To see how the Seascape definitions with accompanying relative histograms are rendered in classes.html see the source Rmarkdown file classes.Rmd.

Seascapes for Sanctuaries Shiny app:

Seascape Classes described:



Links

Browse source code at https://github.com/marinebon/seascapeR/

Report a bug at https://github.com/marinebon/seascapeR/issues

License

Full license

MIT + file LICENSE

Developers

Ben Best
Author, maintainer

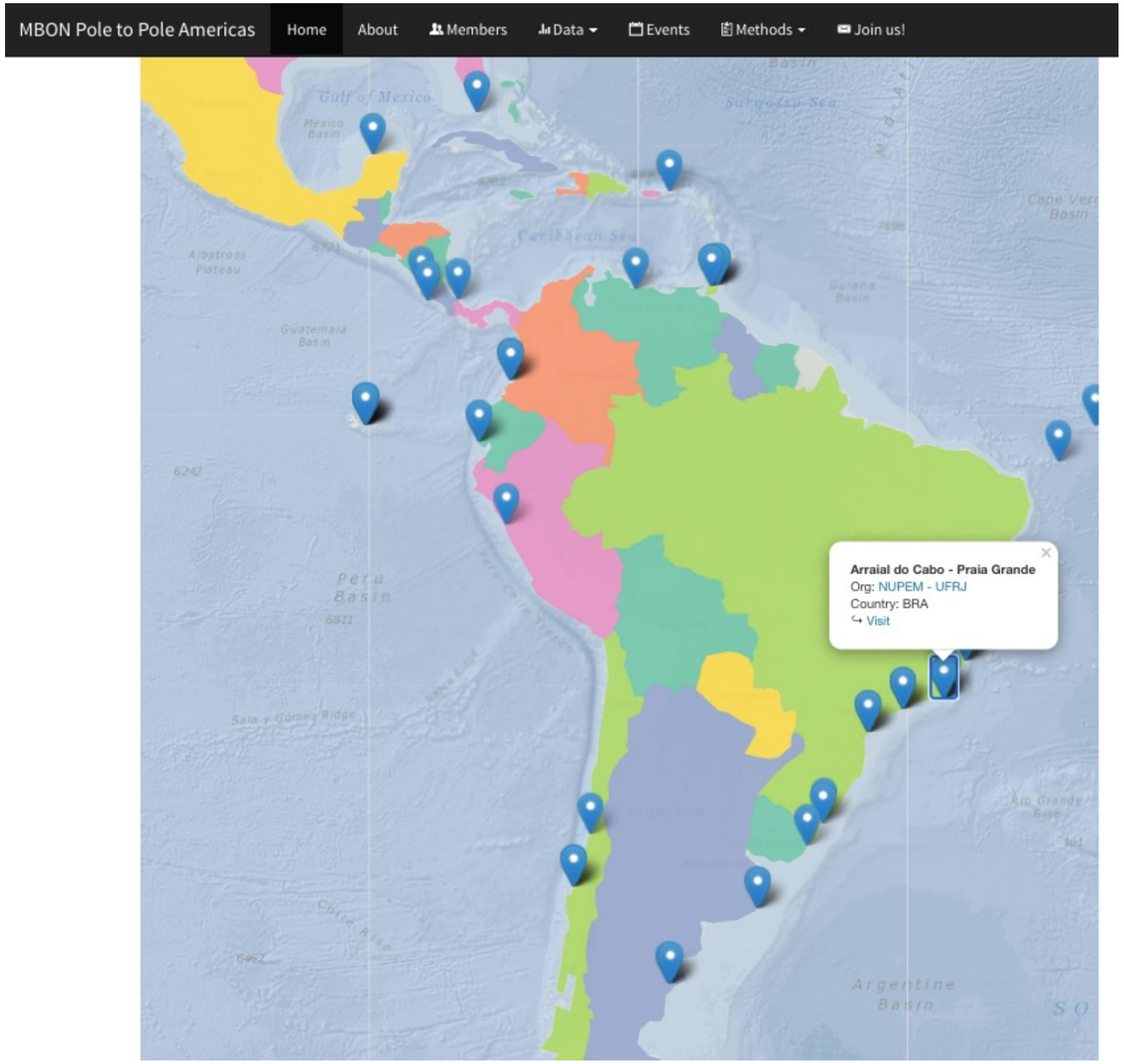
Enrique Montes Herrera
Author

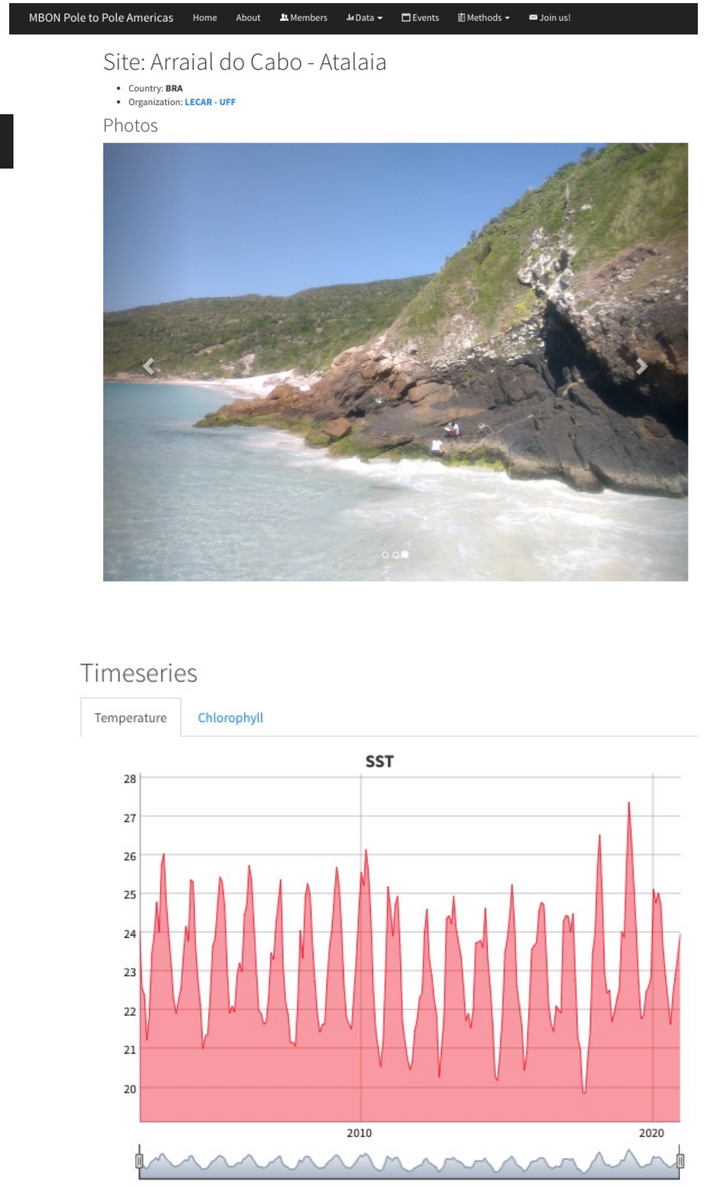
Maria Kavanaugh
Author

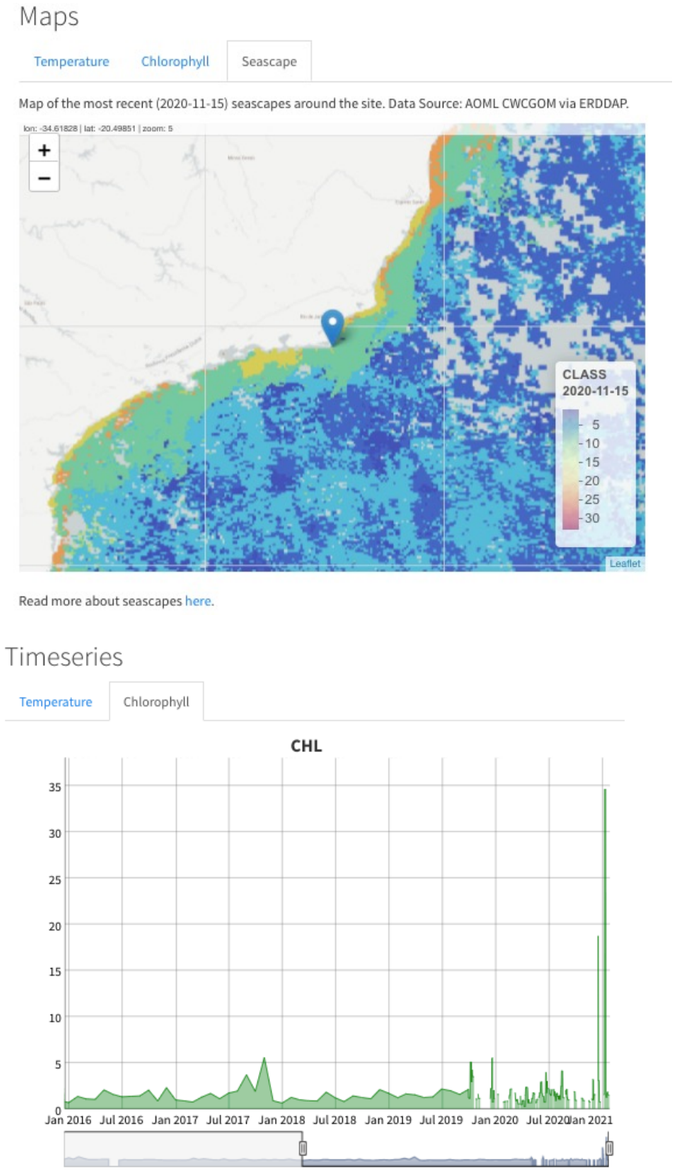
Dev status

pkgdown passing

MBON Pole to Pole site



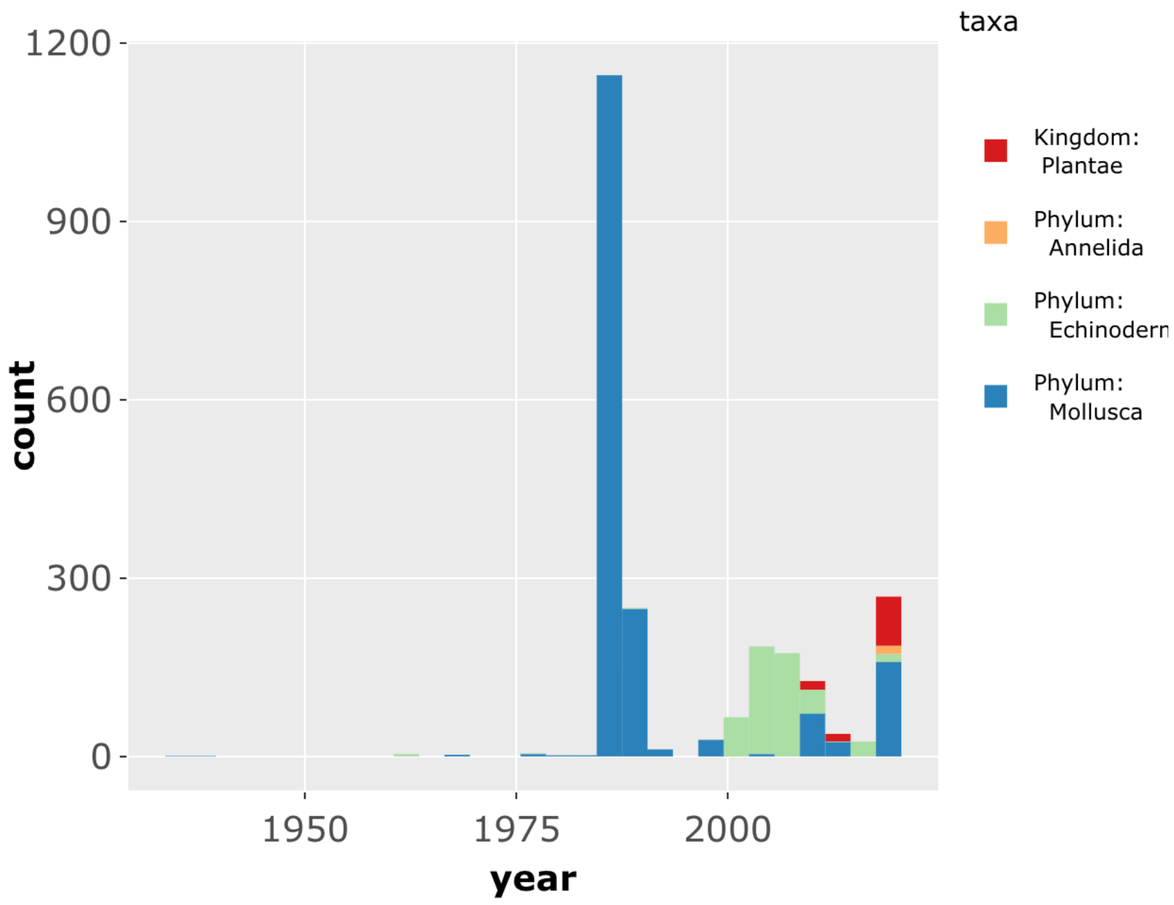




MBON Pole to Pole Website

Taxonomic records in OBIS

Time Series | Maps



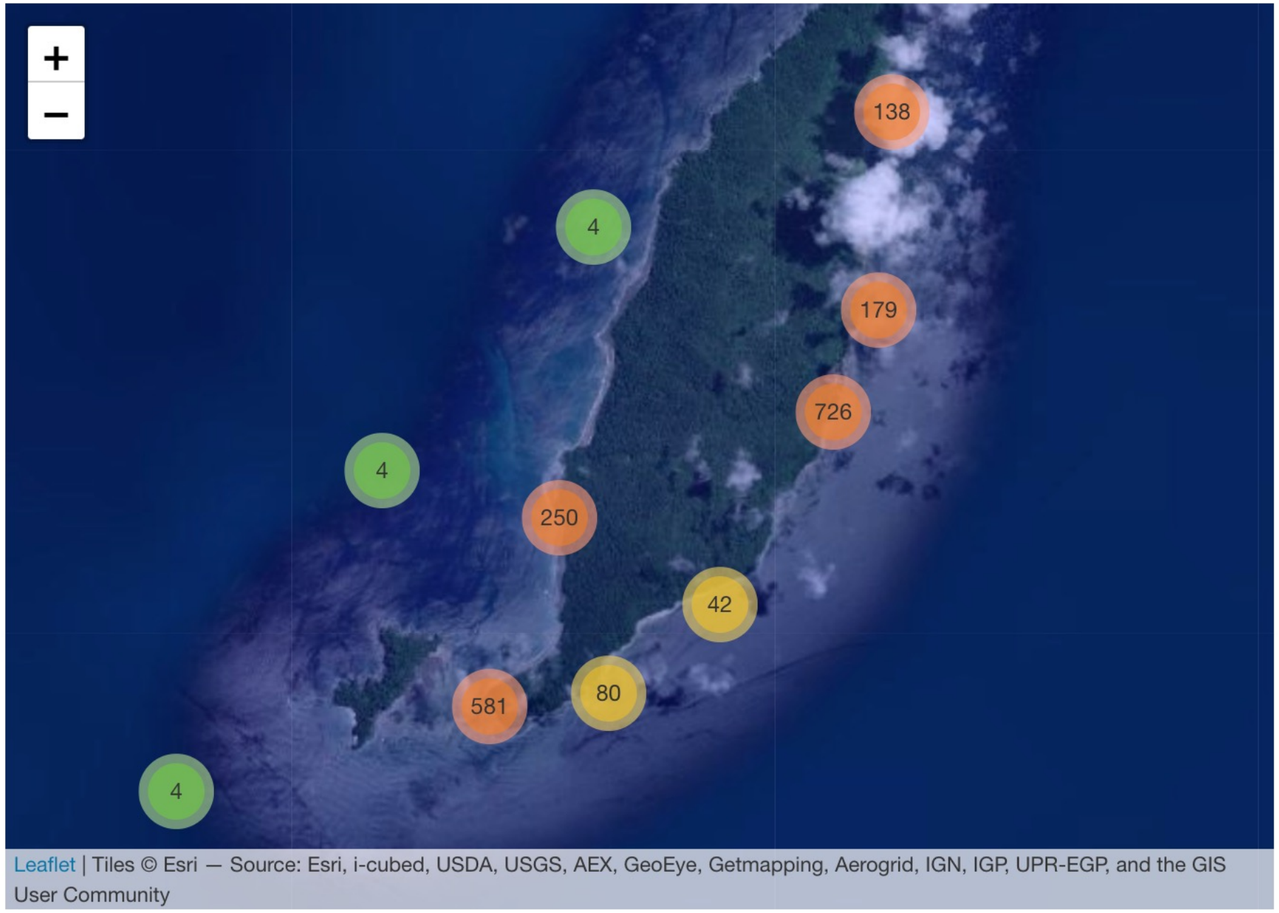
Site: Isla Gorgona - La Ventana

- Country: COL
- Organization: U. del Valle

Photos

Time Series | Maps

Mollusca

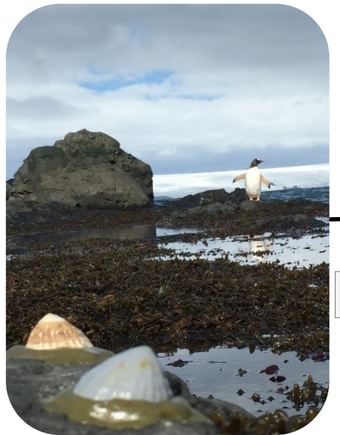


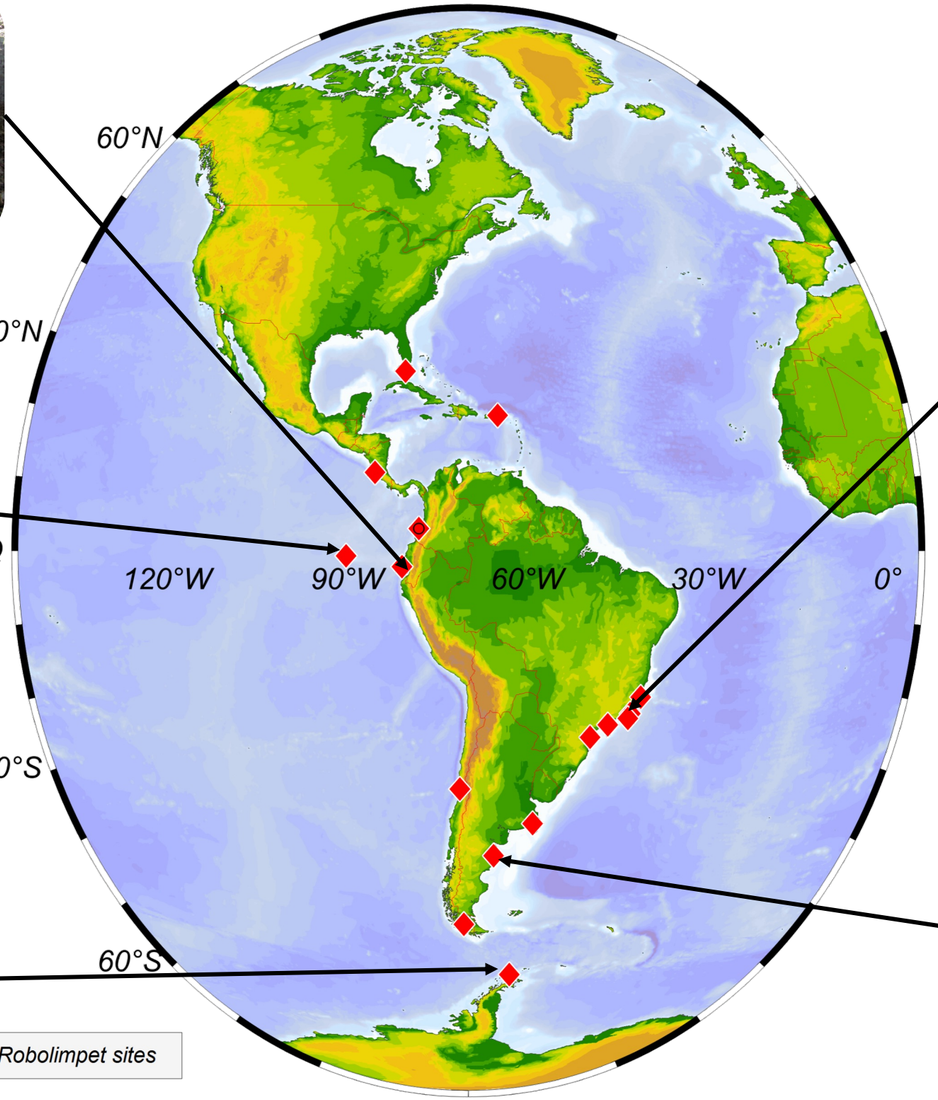
In situ environmental monitoring: temperature records every 30 min

E. Londoño-Cruz (U. Valle)

Nicolás Moity (CDF)

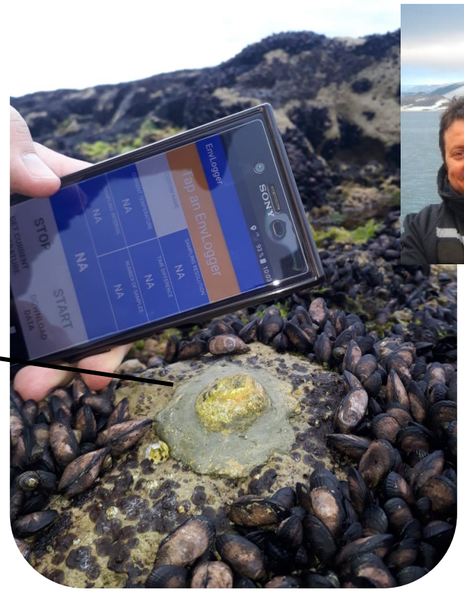
Erasmo Macaya
(U Concepcion)

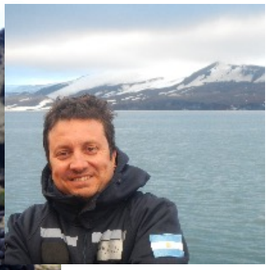




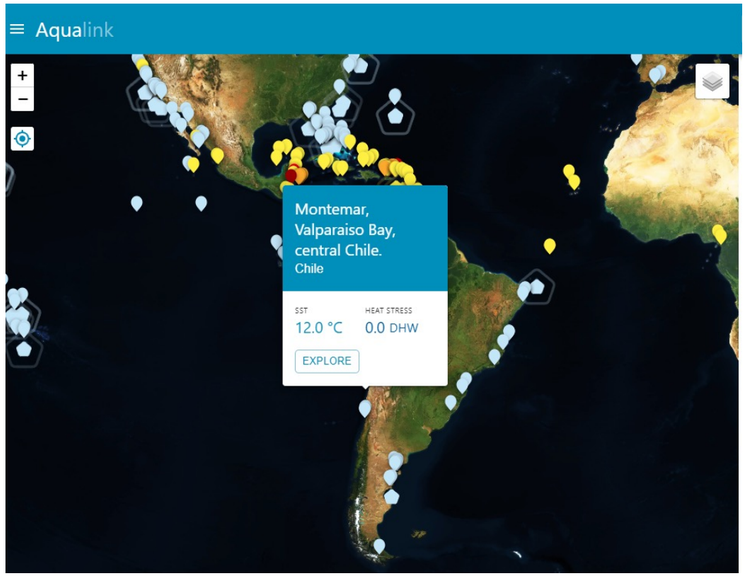
Ana C. Mazzuco
(UFES)

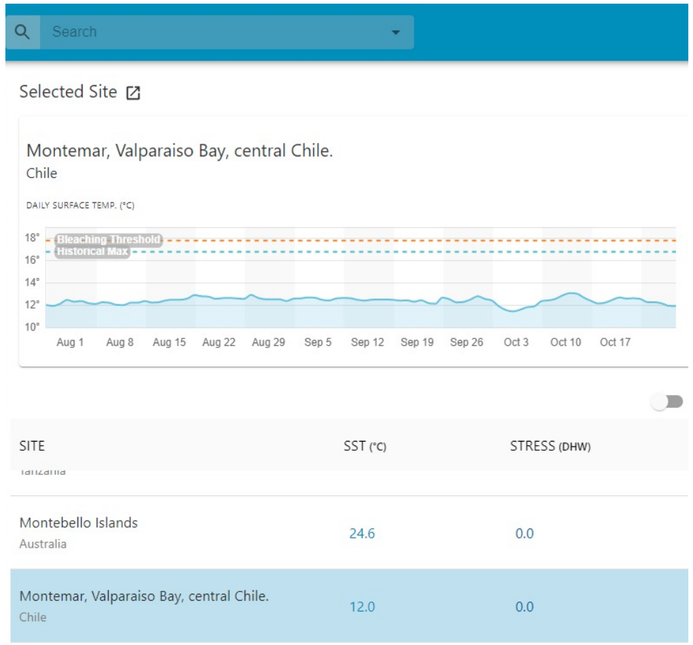
Gregorio Bigatti
(CONYCET)

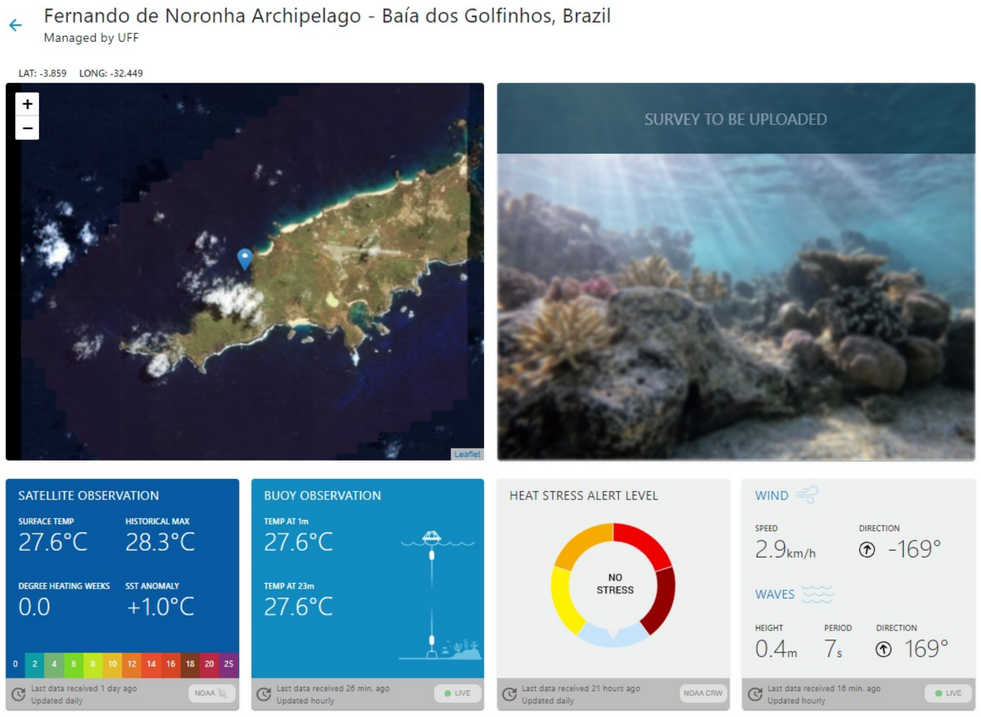




Aqualink Smart Buoys







MBON
Marine Biodiversity Observation Network

GOOS
Biology and Ecosystems Panel

OBIS
OCEAN BIODIVERSITY INFORMATION SYSTEM

Marine Life 2030

CCTBON – Atlantic Ocean Coupled Coastal Temperature and Biodiversity Observation Network

cibio

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- Foster **trans-Atlantic** and **trans-latitudinal** collaboration
- Respond to **management and policy needs**
- Invest in capacity development of the **south Atlantic**
- Ensure national and regional government **financial support for network collaborations**

MBON Pole to Pole Project

Welcome! We are developing a Community of Practice across the Americas to assess marine biodiversity and ecosystem change using field and space observations.

Learn about ongoing biodiversity monitoring efforts contributing to the network by clicking markers on the map

MBON Pole to Pole Americas | Home | About | Members | Data | Events | Methods | Join us!

Join the MBON Pole to Pole program!

We invite marine ecologists and biological oceanographers, resource managers, and conservation groups to contribute to the MBON Pole to Pole network. Groups and individuals conducting repeated sampling in one or more locations in their countries are encouraged and welcome to join the program.

To participate, please fill out the form below.