Marine Biodiversity Workshop: from the Sea to the Cloud

Contents

- Project: Pole-to-Pole MBON & AmeriGEOSS
- Location: Praia do Segredo, São Sebastião, Brasil
- Dates: August 6-10, 2018

0.1 Objectives

This workshop will engage participants in marine biodiversity activities in the field and behind the computer that promote a community of best practices. Specifically, the activities will be to:

1. Collect field data across multiple habitats: rocky intertidal and sandy beaches habitats;
2. Manipulate tabular and spatial data for standardized data formats, such as Darwin Core, while controlling for quality;
3. Publish datasets to OBIS, using tools for sharing data;
4. Train on data science tools (R, Rmarkdown, Github) to mine data, conduct discovery and analysis, and produce reproducible research documents with interactive visualizations onto the web.

0.2 Logistics

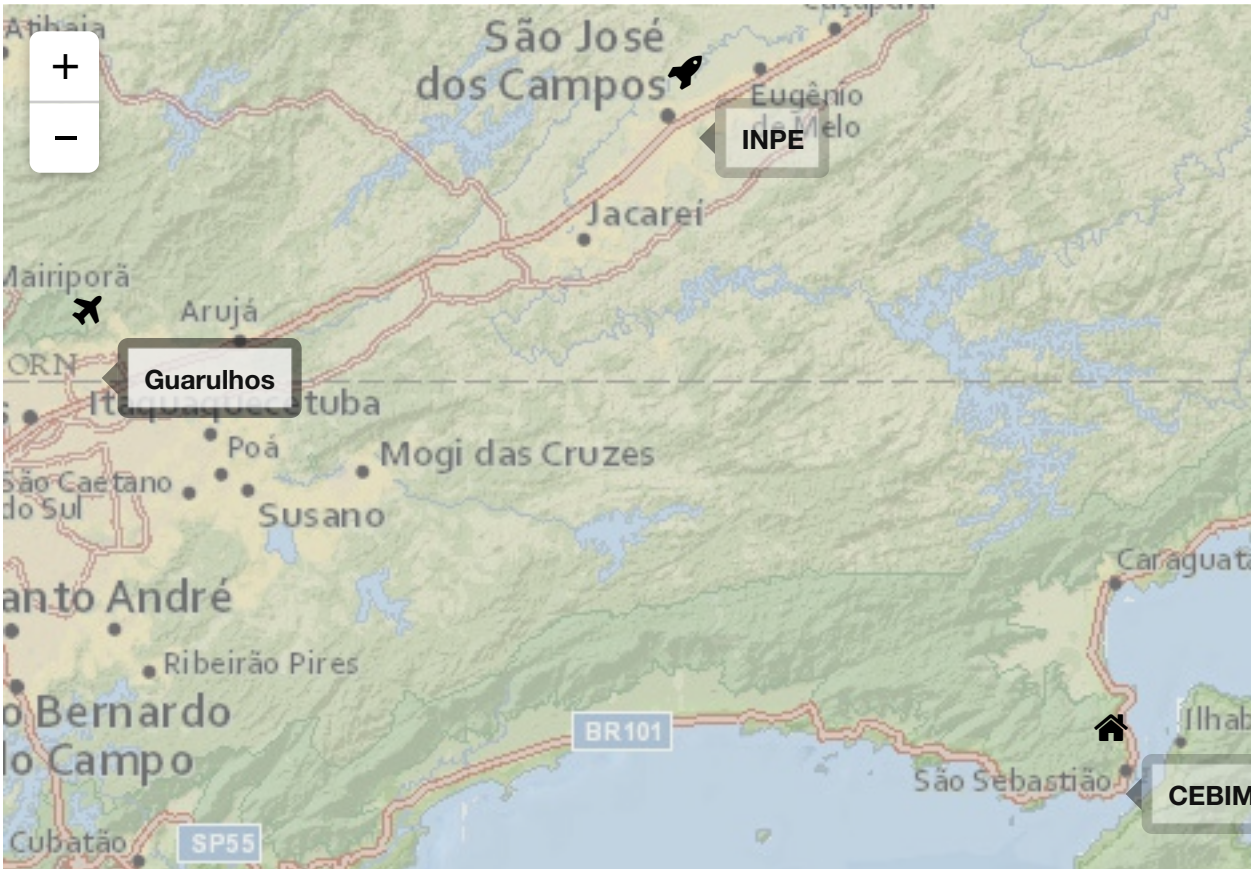
August 6-10, 2018 (+2 day for travel)

0.2.1 Venue, August 6: INPE

Opening of AmeriGEOSS Week Instituto Nacional de Pesquisas Espaciais (INPE) São José dos Campos, São Paulo, Brasil

0.2.2 Venue, August 7-10: CEBIMar

Centro de Biologia Marinha (CEBIMar) - Universidade de São Paulo Praia do Segredo - São Sebastião São Paulo, Brasil



0.3 Organizers

- Pole-to-Pole Marine Biodiversity Observation Network (MBON) of the Americas - P2P MBON
- Institute for Marine Remote Sensing (ImaRS), College of Marine Science, University of South Florida, St. Petersburg, Florida, USA
- Centro de Biologia Marinha (CEBIMar) & Instituto de Biociências (IB) - Universidade de São Paulo, Brazil
- AmeriGEOSS - Group on Earth Observations
- Ocean Biogeographic Information System (OBIS)

0.4 Workshop rationale

This workshop is a first step for the implementation of the P2P network. It addresses capacity building and science development for conservation and management of living resources, to sustain critical ecosystem services for communities in the region. The workshop participants will develop standard protocols for field data collection, data formatting and publishing, following international standards (e.g. Darwin Core - DwC). Efforts will also focus on data discovery and analysis using tools provided by the Ocean Biogeographic Information System (OBIS) and the GEO BON MBON. P2P incorporates the biodiversity priorities of various GEO initiatives, including Blue Planet and AmeriGEOSS, and coordinates with IOC/UNESCO (GOOS and OBIS), and other national and international groups to serve the broadest possible community. This network will help nations and regions to improve conservation planning and environmental impact mitigation, serve the scientific community, and satisfy commitments to the Intergovernmental Science-Policy

Platform on Biodiversity and Ecosystem Services (IPBES), Aichi Targets of the Convention of Biological Diversity (CBD), and the UN 2030 Agenda for Sustainable Development Goals (SDG's).

The P2P workshop:

- enhances coordination of data collection among nations;
- improves the collection of harmonized data, developing data standards and methodologies for data management and dissemination without compromising national concerns;
- integrates biodiversity information with physical and chemical data over time (status and trends); and
- generates products needed for informed management of the ocean.

The workshop targets investigators and resource managers dedicated to studying and conserving biodiversity of invertebrates in two important coastal habitats: rocky shore intertidal zone and sandy beaches. This activity targets participants from all nations in the Americas, from pole to pole.

0.5 Instructors

- Eduardo Klein (OBIS) - Darwin Core (DwC) and OBIS tools
- Ben Best (Ecoquants) - Data visualization and analysis tools using R software
- Patricia Miloslavich (GOOS) - Protocols of the South American Research Group on Coastal Ecosystems (SARCE) and Essential Ocean/Biodiversity Variables (EOV/EBV) framework
- Emmett Duffy (MarineGEO) - Predation and fouling community development, exotic invasions and biodiversity - an experimental approach.
- Frank Muller-Karger (USF) - Satellite remote sensing
- Maria Kavanaugh (OSU) - Satellite biogeography (seascape maps)
- Maikon di Domenico (Universidade Federal do Paraná) - sandy beaches*
- Pete Raimondi (UCSC – PISCO / MARINe) *(*waiting for confirmation)

0.6 Required workshop materials

- Participants must bring a laptop computer with the following programes installed (with latest version, as of 2018-03-20):
  - R (3.4.4)
  - RStudio (1.1.442)
  - Git (2.16.2)

  These are available for Windows, Mac or Linux operating systems.
- Install additional packages by running the following line of code in your R terminal:

```
source("https://github.com/marinebon/p2p-brazil-workshop/master/scripts/install-R-packages.R")
```

- Github.com/io, for code / R-generated examples / landing page:
  - ioos.github.io/BioData-Training-Workshop: IOOS template
  - ohi-science.org/data-science-training: bookdown OHI
  - marinebon.github.io/p2p-brazil-workshop: bookdown min example. Bookdown renders Rmarkdown into easy to navigate book format.
- SARCE sampling protocols. The past experience could be replicated (and it will be desirable if we want to make comparison in time) see the SARCE site and it protocols. The SARCE data will be in OBIS after the next harvest.
- Full snorkeling gear

0.7 Preliminary Agenda

Agenda (draft)

Time

Description

Aug 6, day 1, Mon: AmeriGEOSS Week (INPE; São José dos Campos)

9 am - noon

Opening of AmeriGEOSS Week at the Instituto Nacional de Pesquisas Espaciais (INPE; São José dos Campos) [Gutierrez, Montes]

2 pm

Departure to the Centro de Biologia Marinha (CEBIMar) in São Sebastião

4 pm

Arrival at CEBIMar (lodging TBD)

7 pm

Group dinner (TBD)

Aug 7, day 2, Tue: Field sampling of intertidal rocky shore invertebrates

7:30 - 8:30 am

Breakfast (it'd be good have it at CEBIMar)

8:30 - 9 am

Welcome and workshop briefing [Montes]

9 - 9:45 am

Rocky Intertidal sampling protocol & taxonomy of invertebrates [Miloslavich]

9:45 - 10 am

Cross-referencing Essential Ocean Variables and Essential Biodiversity Variables frameworks

10 - noon

Field sampling activity (TBD) [Marques]

12:30 - 2 pm

Lunch

Aug 7 afternoon: back at CEBIMar

2 - 2:30 pm

How to register data collected in the field. [Klein, Montes]

2:30 - 3:15 pm

Intro to Reproducible Research Tools: R, Rmarkdown, Github [Best]

3:15 - 5 pm

Open computer lab work

7 pm

Group dinner (TBD)

Aug 8, day 3, Wed: Field sampling of sandy beaches invertebrates

7:30 - 8:30 am

Breakfast

8:45 - 9 am

Workshop briefing: Day 3 [Montes]

9 am - 10 am

Sandy beaches sampling protocol & taxonomy for invertebrates [TBD]

10 am - noon

Field sampling activity (TBD) [Marques]

12:30 - 2 pm

Lunch

Aug 7 afternoon: back at CEBIMar

2 pm - 2:30 pm

How to register data collected in the field. [Klein]

2:30 - 3:15 pm

From data to plots to websites [Best]

3:15 - 5 pm

Open computer lab work

5 - 6 pm

MarineGEO, Predation and fouling community development, exotic invasions and biodiversity - an experimental approach [Duffy]

7 pm

Group dinner (TBD)

Aug 9, day 4, Thu: OBIS

7:30 - 8:30 am

Breakfast

8:45 - 9 am

Workshop briefing: Day 4 [Montes]

9:00 - 9:30 am

Ocean Biogeographic Information System (OBIS) for data sharing, analysis and discovery. [Klein]

9:30 - 10:30 am

International data standards: Darwin Core (DwC), QA/QC, publishing to OBIS w/ IPT [Klein]

10:30 - 10:45 am

Break

10:45 - 11:30 am

Use of taxonomy databases (e.g. WoRMS) [Klein], Practical exercises [Best]

11:30 - noon

SARCE Case Study [Klein, Miloslavich]

12:00 - 1:30 pm

Lunch

1:30 - 2:00 pm

The MBON Ocean Explorer: an integrated visualization of OBIS records and satellite data [Muller-Karger, Best]

2:00 - 5:00 pm

Data cataloging using WoRMS, data formatting using DwC [Participants]

7 pm

Group dinner

Aug 10, day 5, Fri: Data analysis & viz

7:30 - 8:30 am

Breakfast

8:45 - 9 am

Workshop briefing: Day 5 [Montes]

9 - 9:30 am

Data visualization and analysis tools using R software [Best]

9:30 - 10 am

Satellite biogeography and dynamic seascape maps as tools for scaling in situ biodiversity observations [Montes]

10 - 10:15 am

Break

10:15 - noon

Pushing data into OBIS [Participants]

noon - 1:30 pm

Lunch

1:30 - 3 pm

Pushing data into OBIS [Participants]

3 pm

Adjourn

0.8 Survey

Loading...

0.9 Resources

- Ocean Biogeographic Information System (OBIS) - Manual
- R for Data Science
- Spatial Data Analysis and Modeling with R
- (**?**)