

# **Caribbean ESR Lab Report**

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2024-02-06

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# ESR Lab Reports

ESR lab reports are quarto books that compile the R scripts for each indicator as well as any other descriptions of how the ESR will be put together.

## Caribbean ESR

This lab report is for the Caribbean ESR that was compiled from 2023-2024. This is the first ESR for the Caribbean region. Here we can add more text about why this ESR is being compiled.

## Some notes

This lab report was created the following way:

1. clone the Caribbean ESR repo into my R studio
2. create a new folder in the repo called “Lab report”
3. create 2 files, one called “index.qmd” and another called “\_\_quarto.txt” within the Lab report folder
4. rename the “\_\_quarto.txt” file to “\_\_quarto.yml” in file explorer to change it into the book YAML
5. populate the YAML document
6. Now in order to be able to render the book as both an html and pdf (or whatever other format you want) you need to make sure all the appropriate files are in the Lab report folder. I needed to move the Caribbean-ESR.Rproj file, the .git folder, and the .gitignore files into the Lab report folder from the main Caribbean-ESR folder.

# **Part 1: Intro**

## **Part 2: Indicators**

# Ocean acidification indicator

Sent by F. Gomez on 02/19/2023

Notes from Fabian:

derived surface omega series from the MOM-Topaz hindcast 0.10deg resolution model \*.txt files have this structure: column1: year, column2=month, and column3=carbon system variable. The mean magnitude of the simulated omega trends, around  $9 \times 10^{-3}$  year<sup>-1</sup>, is consistent with observed trends in the Subtropical North Atlantic.

Question: What is causing the acceleration after 2008?

Answer: made a Taylor decomposition to figure out what was driving that acceleration in the simulated  $\Delta pCO_2$  anomaly. Interannual  $\Delta pCO_2$  changes were mostly driven by the balance between DIC and alkalinity. There was a positive trend from the 1980s until mid 2000s, which contributed to moderate the  $\Delta pCO_2$  decline. But that trend vanished in the last 15 years or so, which probably has to do with this accelerated decline in  $\Delta pCO_2$  in the last decade.

```
library(plotTimeSeries)
library(spam)

rm(list = ls())

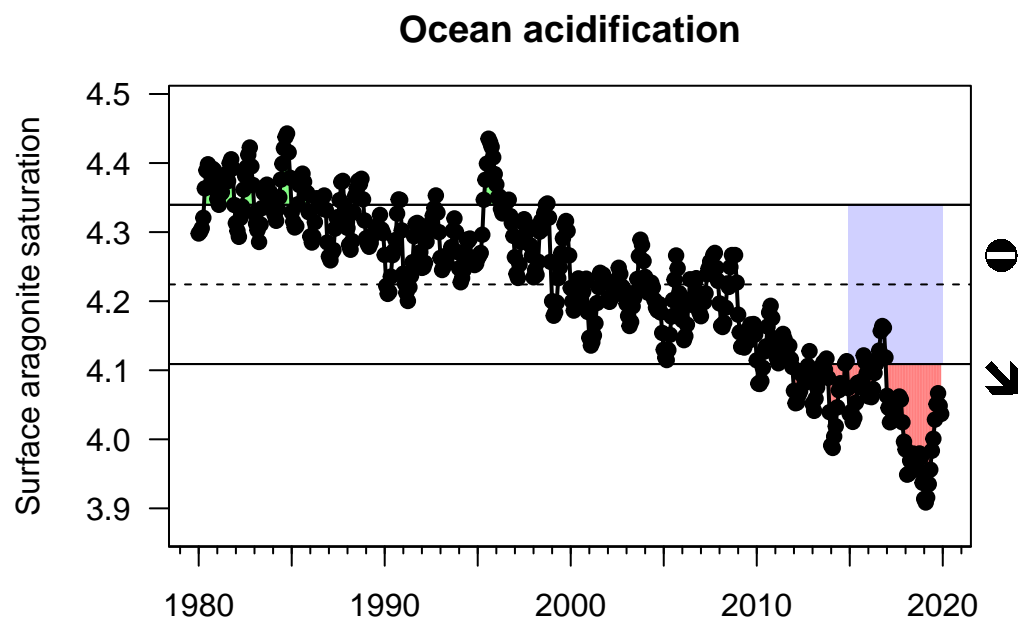
dat <- read.table("indicator_data/surface_omega_series.txt", skip = 0, header = F)
head(dat)
tail(dat)
dat$dates <- paste0(month.abb[dat$V2], dat$V1)
```

Format indicator object

```
datdata <- dat$dates
inddata <- data.frame(dat$V3)
labs <- c("Ocean acidification", "Surface aragonite saturation", "")
indnames <- data.frame(matrix(labs, nrow = 3, byrow = F))
s <- list(labels = indnames, indicators = inddata, datelist = datdata)
class(s) <- "indicatordata"
```

Save and plot

```
plotIndicatorTimeSeries(s)
```



```
inddata <- s  
save(inddata, file = "OA_test.RData")
```