Tangalin_homework Week 6

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Introduction

Today we are learning to work with figures using chemical data from *Manualua Bay* on Oahu's south shore

R Packages We Need

```
library(tidyverse)  #ggplot2, dplyr
library(readr)      # to read csv files
library(ggplot2)    # to make plots
library(kableExtra) # to style tables
library(tinytex)    #to render pdfs with Latex tinytex::install_tinytex()# This installs the full
```

This is a water chemistry dataset from Dr.Silbiger's Lab with:

Chemical Measurements

- **Temp_in**: Temperature in situ *(°C)*
- **Salinity**: Salinity *(PSU)*
- **Phosphate**: Phosphate concentration *(µmol/L)*
- **Silicate**: Silicate concentration *(µmol/L)*
- **pH**: Acidity level

Environmental Measurements:

Season

Season of the year

- SPRING
- FALL

Tide_time

Tide and time of day

- Low_Day

Zone

Submarine groundwater zone

- Ambient
- Diffuse
- Transition
- Near Spring
- Offshore
- Channel

Site

Site name

- W
- BP

Summary Table

Season	Zone	Mean_Temp	Mean_Salinity	Mean_Phosphate	Mean_Silicate	Mean_pH
FALL	Ambient	26.81	34.49	0.11	4.86	8.07
FALL	Diffuse	26.53	34.00	0.17	16.62	8.05
FALL	Transition	26.16	32.82	0.24	43.50	8.06
SPRING	Ambient	24.51	34.61	0.11	2.04	8.04
SPRING	Diffuse	24.10	33.33	0.20	31.49	8.02
SPRING	Offshore	24.43	34.60	0.16	1.80	7.95
SPRING	Transition	23.89	30.10	0.54	107.68	8.02

Plot

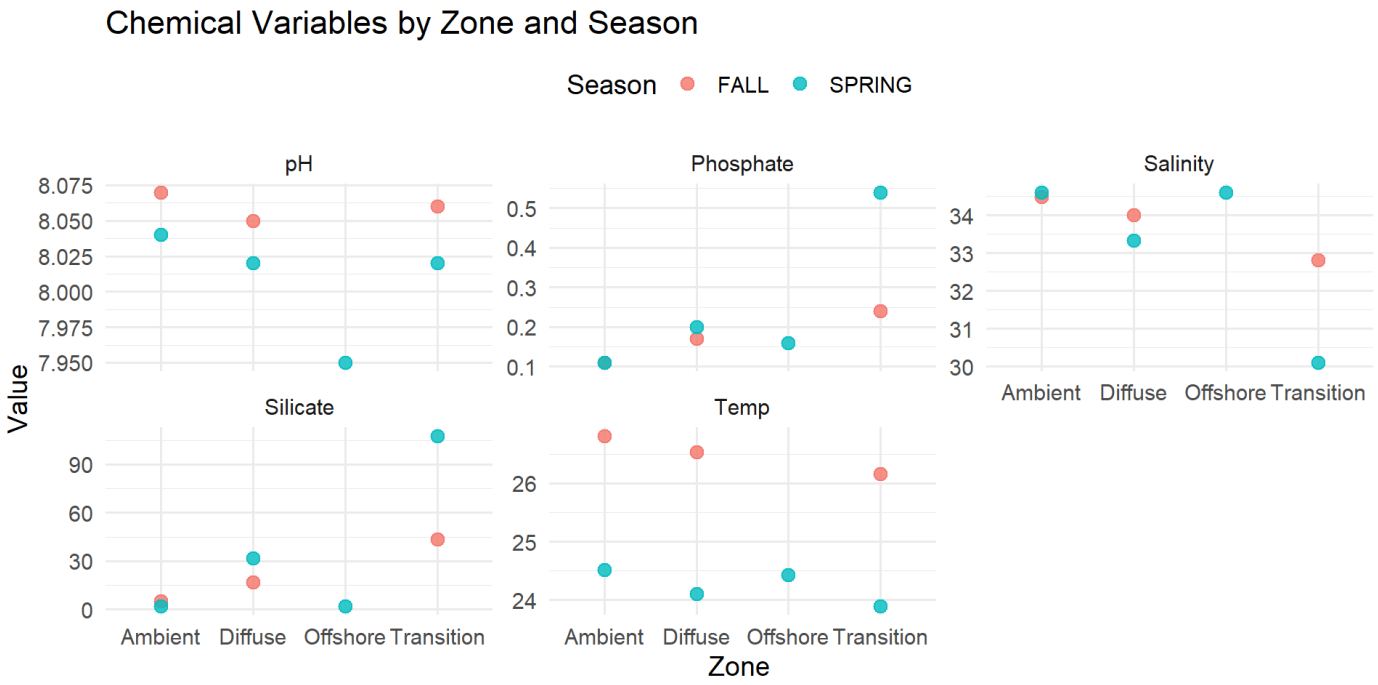

Figure 1: Mean Chemical Variables by Season and Zone

Summary of Seasonal Chemical Patterns in Maunalua Bay

- **SPRING** samples show **lower temperatures** compared to FALL, especially in the **Transition** and **Diffuse** zones.
- **Silicate** concentrations are **higher in SPRING**, with the most pronounced increase in the **Transition zone**.
- **Phosphate** levels are **slightly elevated** in **SPRING**, particularly in the **Transition zone**, suggesting *seasonal nutrient shifts*.
- **pH and salinity remain relatively stable** across seasons and zones, showing minimal seasonal variation.

The Site

Maunalua Bay