

An Analysis of Oceanic Measurements & Marine Life

Group 11

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Motivation and Objective

- Can our oceans tell us anything about global warming and climate change?
- If yes, where and how is it present?
- Does it affect biological footprint and marine lives?
- Finally:
Does California experience similar repercussions or trends?

Dataset

- **NOAA** (National Centers for Environmental Information)
 - **WOD (World Ocean Database)** – OSD (Ocean Station Data)
 - 3.2 million Casts
 - 250 Thousand Biological Casts
 - Data for ocean variables including temperature, salinity, pH, oxygen, etc.
 - **ERDDAP (Environmental Research Divisions Data Access Program)**
 - API based data query -
 - Coast watch
 - **BCO-DMO** (Biological & Chemistry Oceanography Data Management Office)
 - Data for jellyfish and zooplanktons

Methodology

Californian Trends

Cast Report Scrapping

Data Cleaning

Exploratory Analysis

Global Trends Analysis

Correlation Analysis

Biological Data Analysis

Measurements Locations of 1950 to 1959



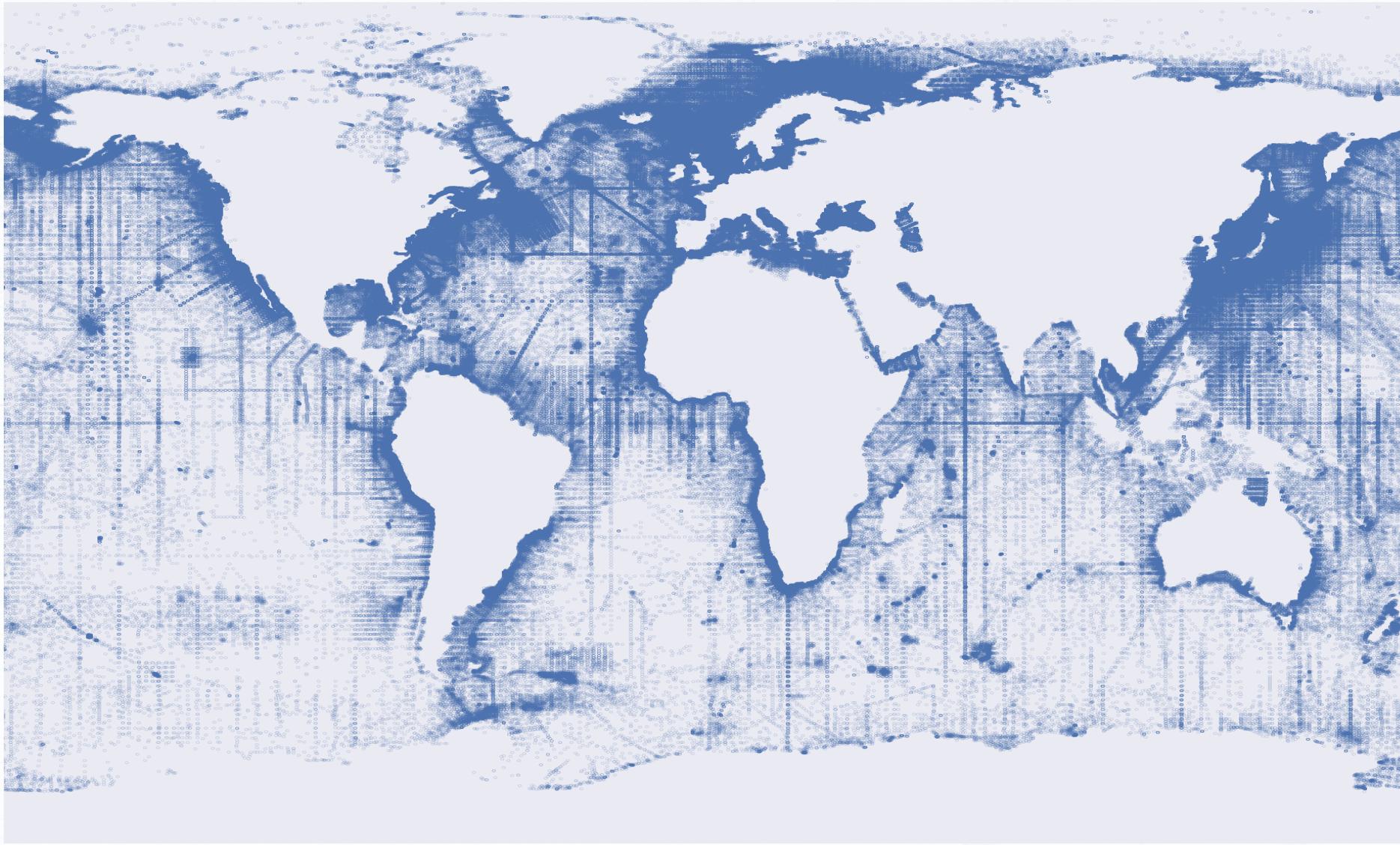
Measurements Locations of 1950 to 1969



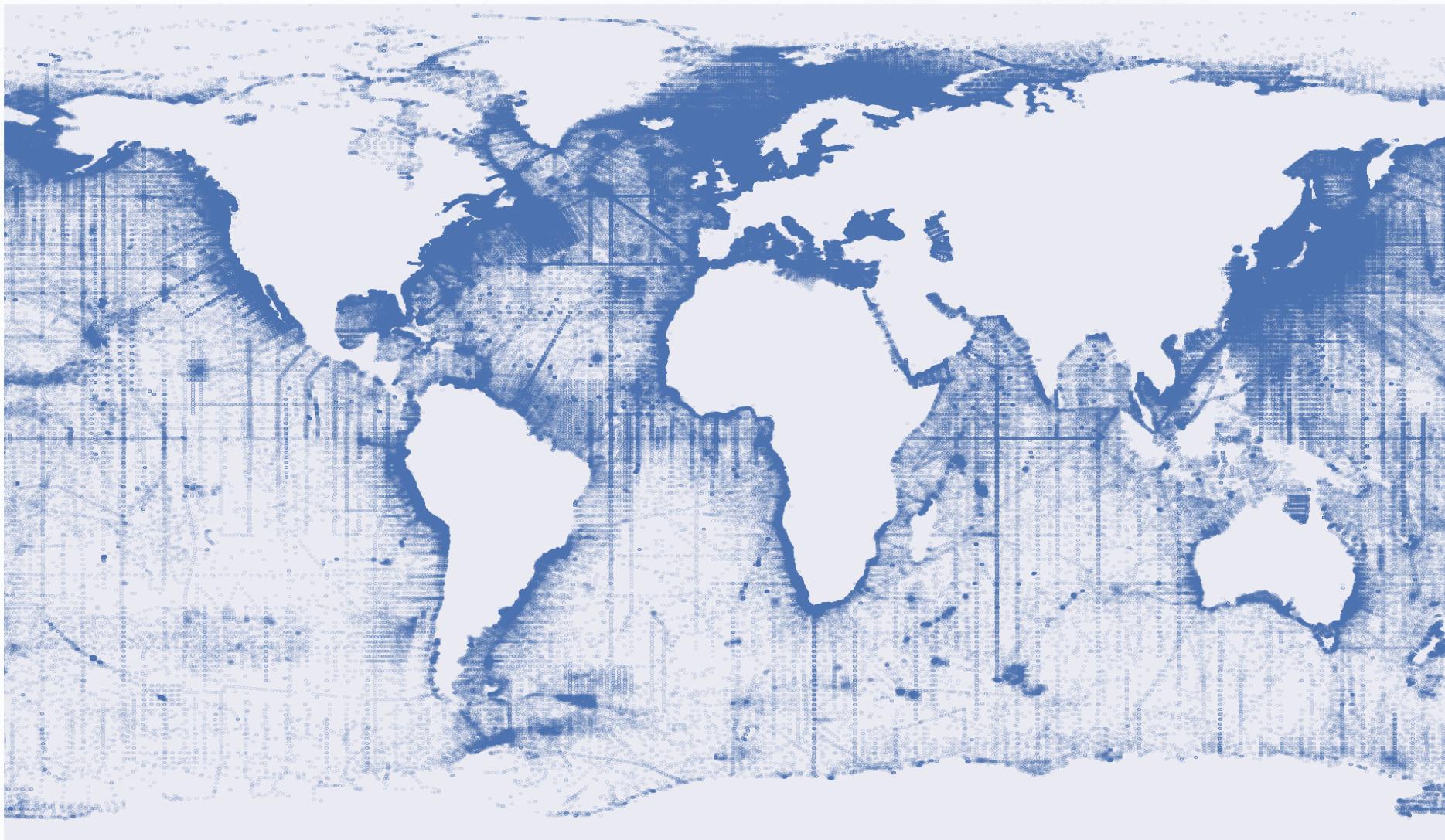
Measurements Locations of 1950 to 1979



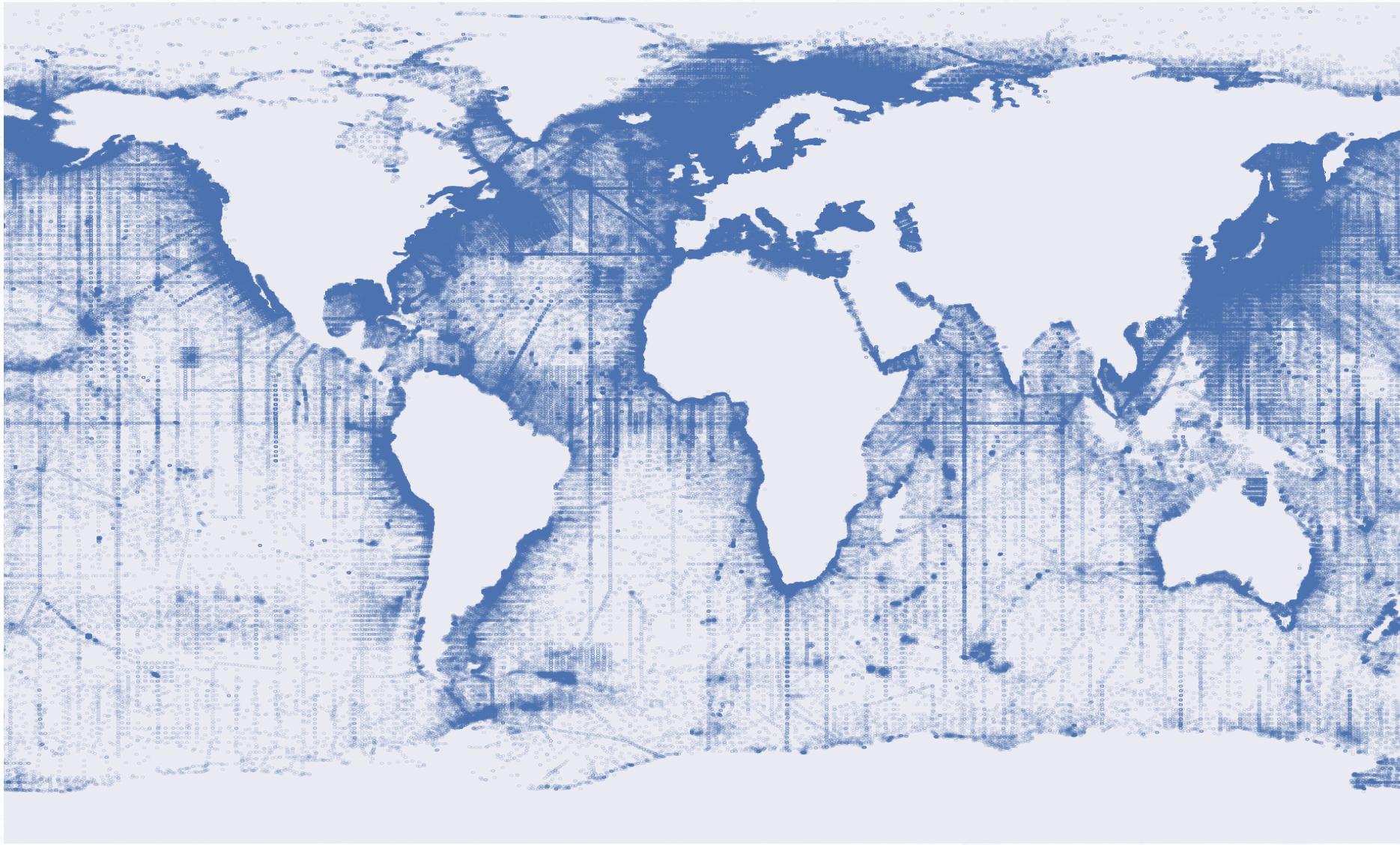
Measurements Locations of 1950 to 1989



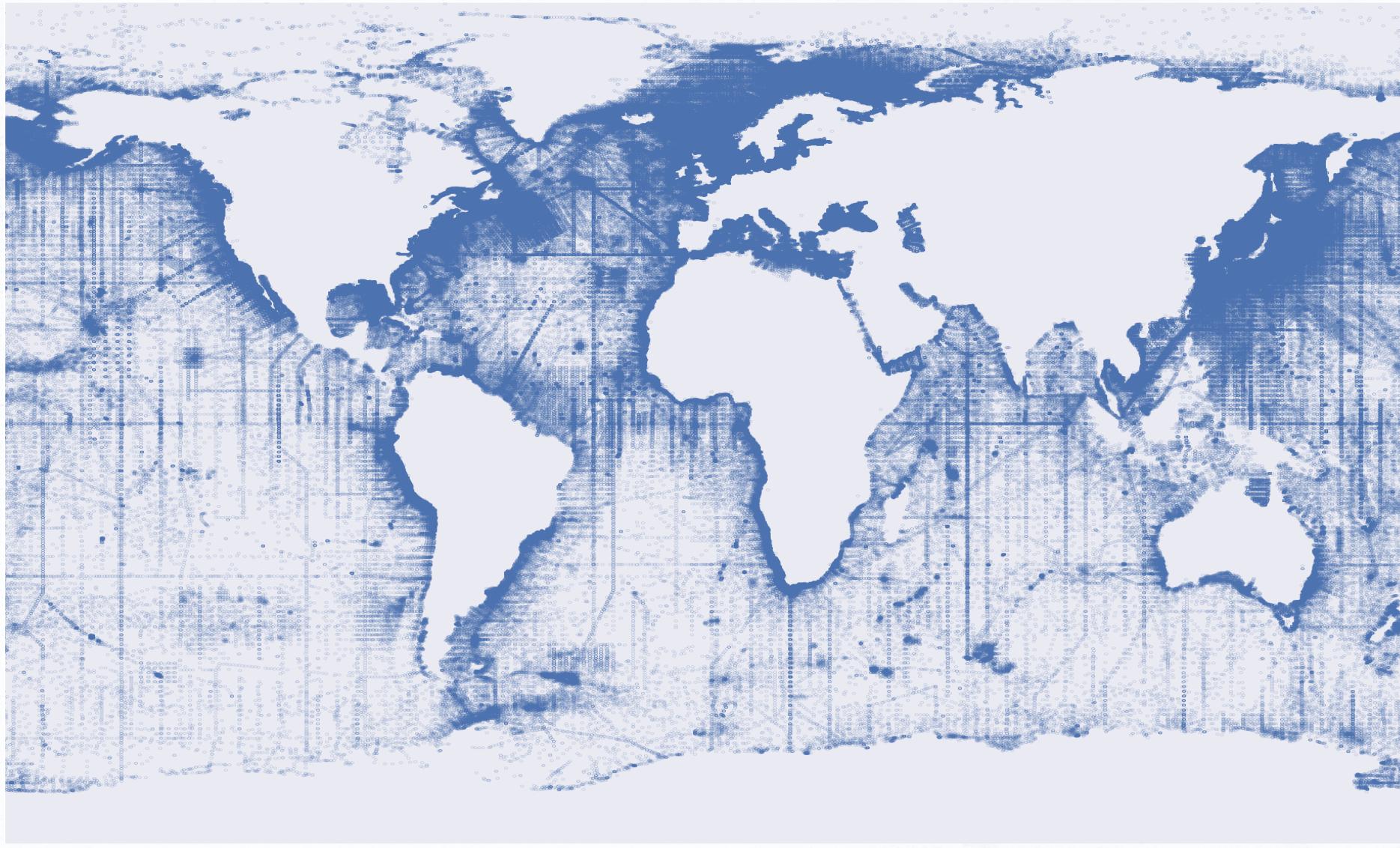
Measurements Locations of 1950 to 1999



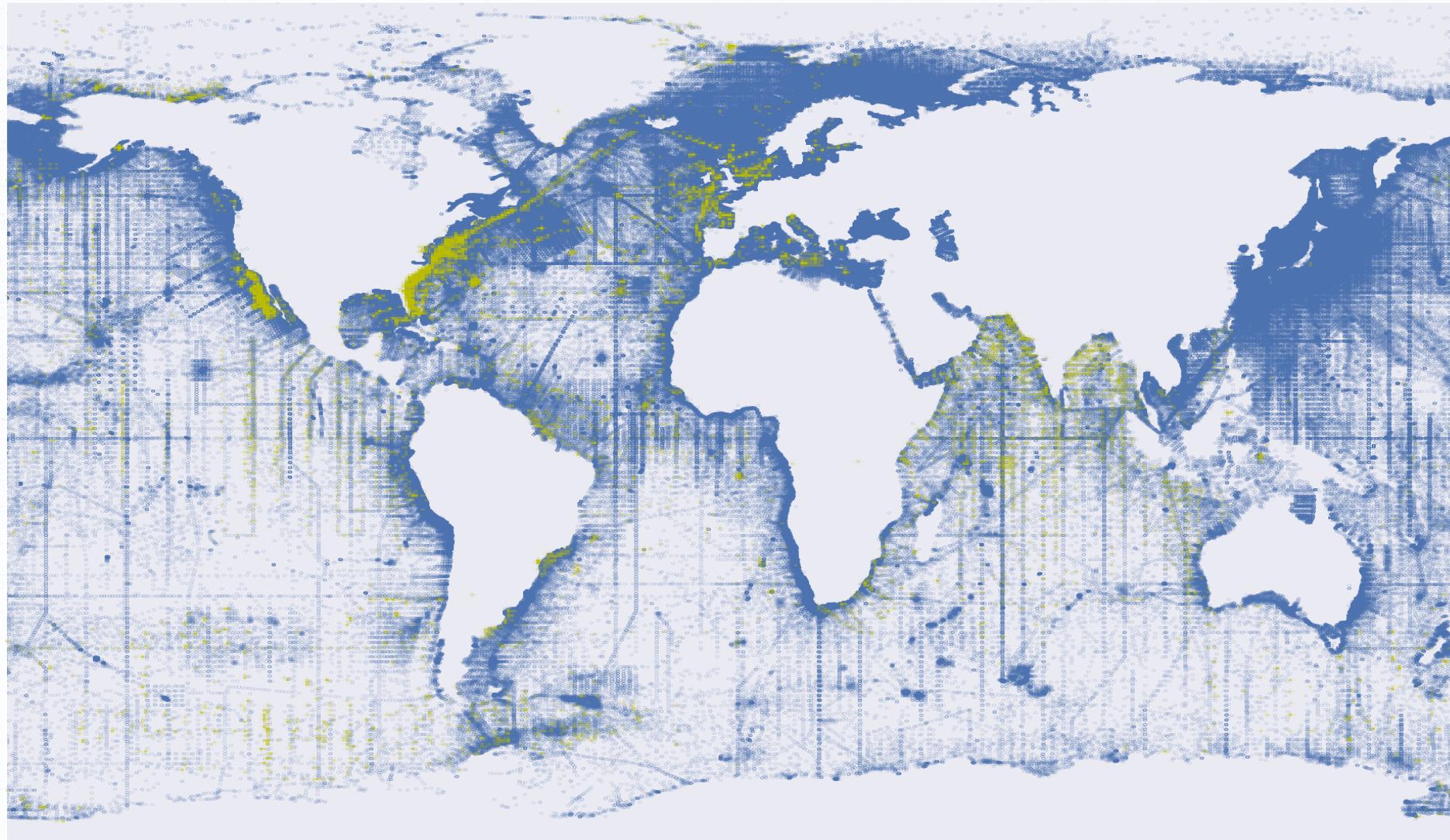
Measurements Locations of 1950 to 2009



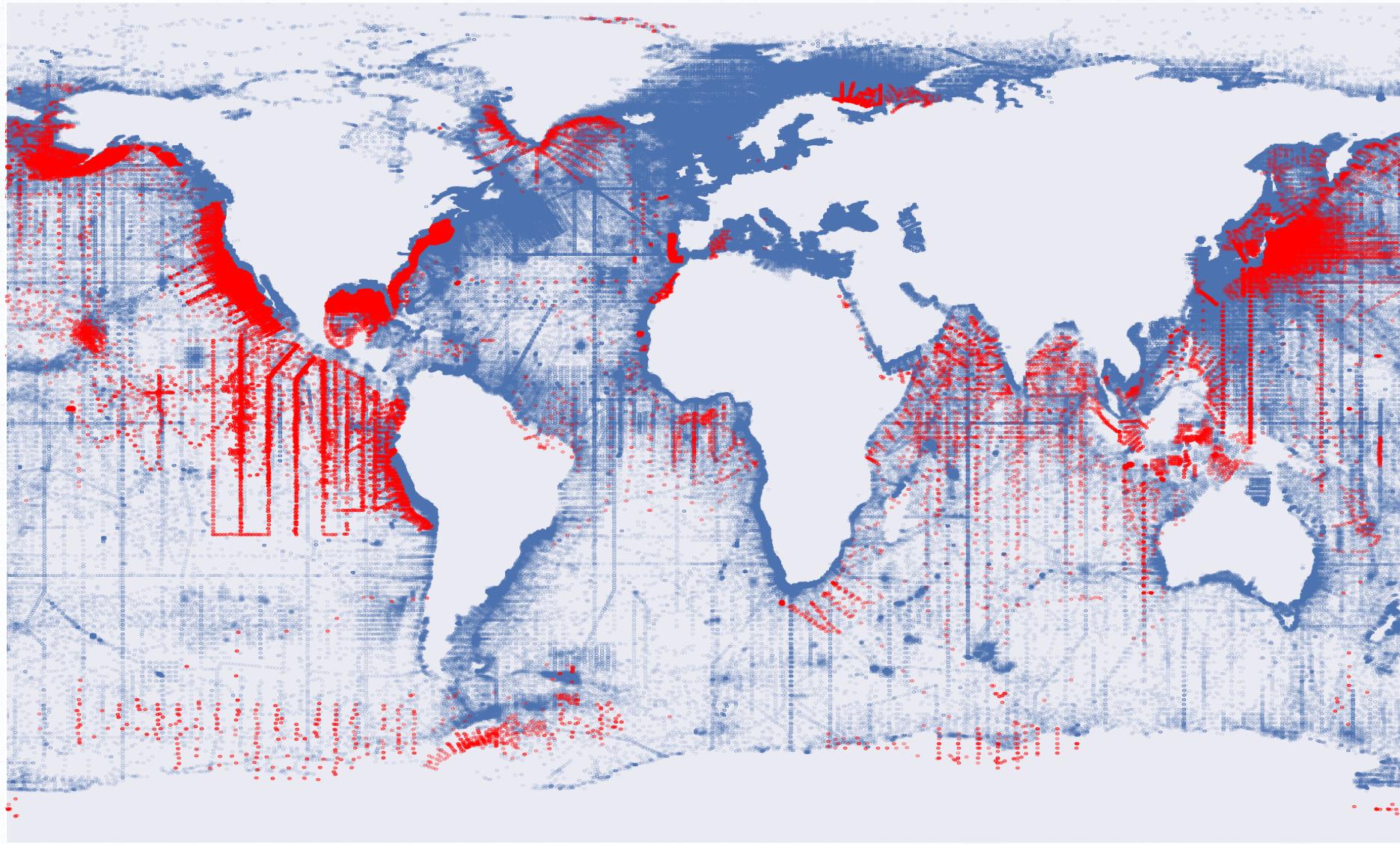
Measurements Locations of 1950 to 2018



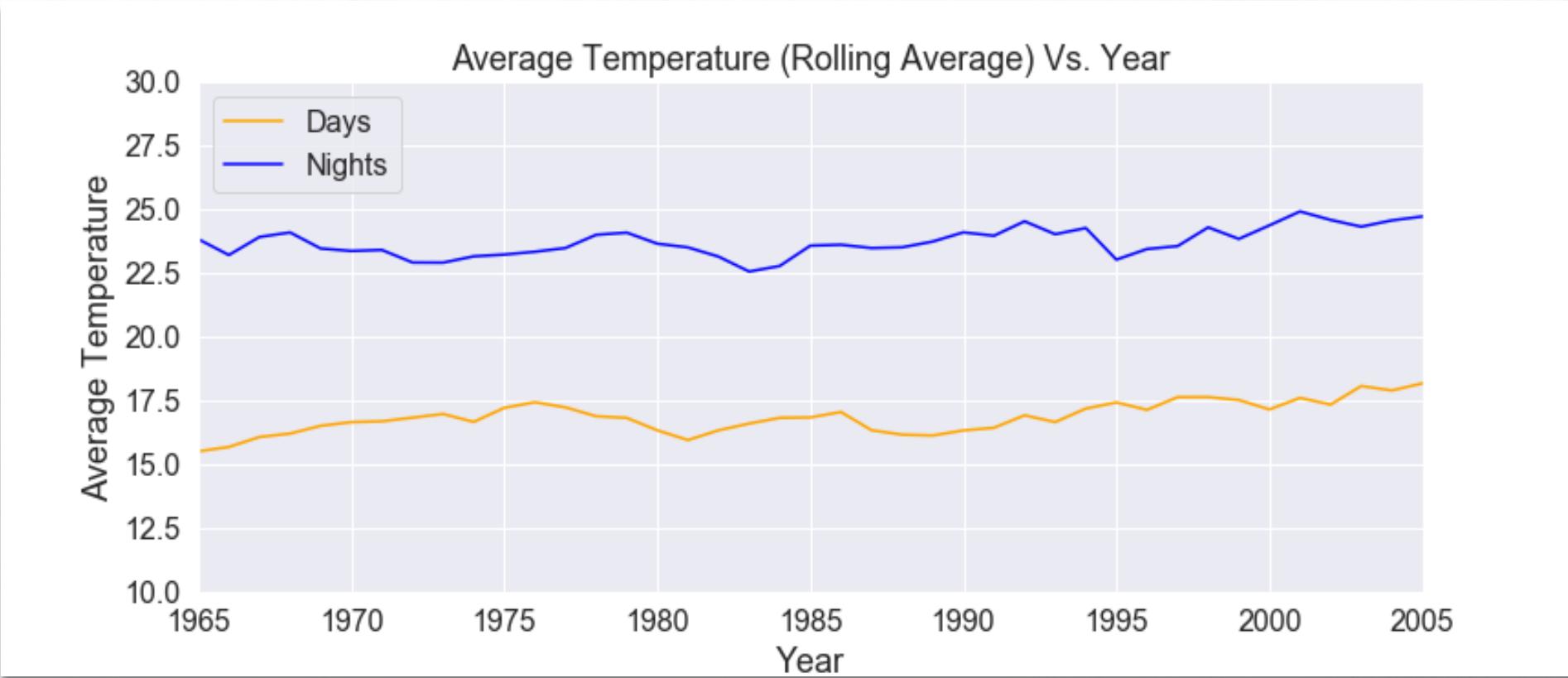
Measurements Locations with Jellyfish

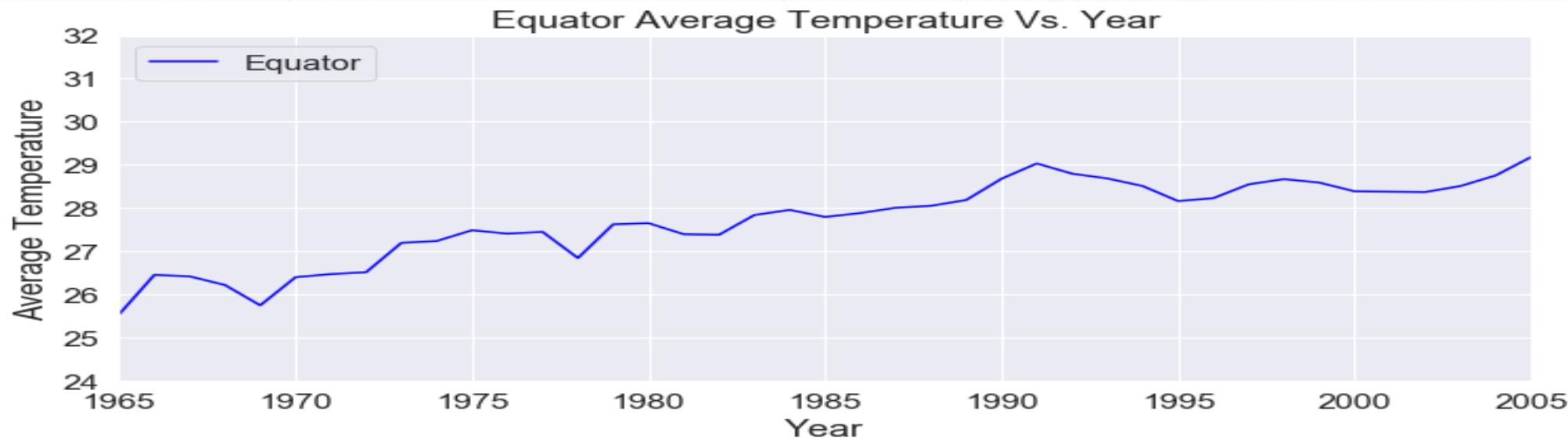


Measurements Locations with Plankton

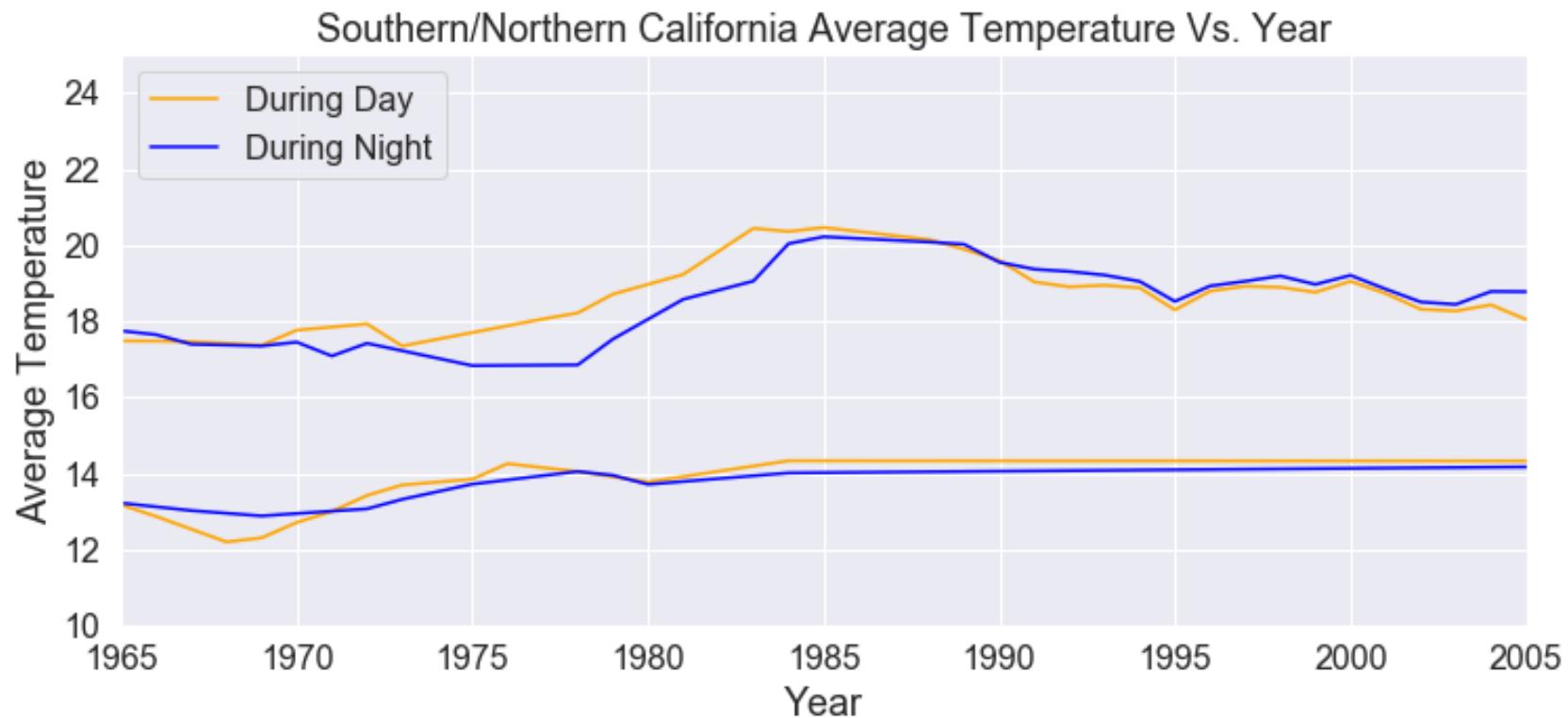


Global Temperature Trends





California Temperature Trends



Attributes

Temperature

Non-Biological Attributes

Oxygen

pH

Salinity

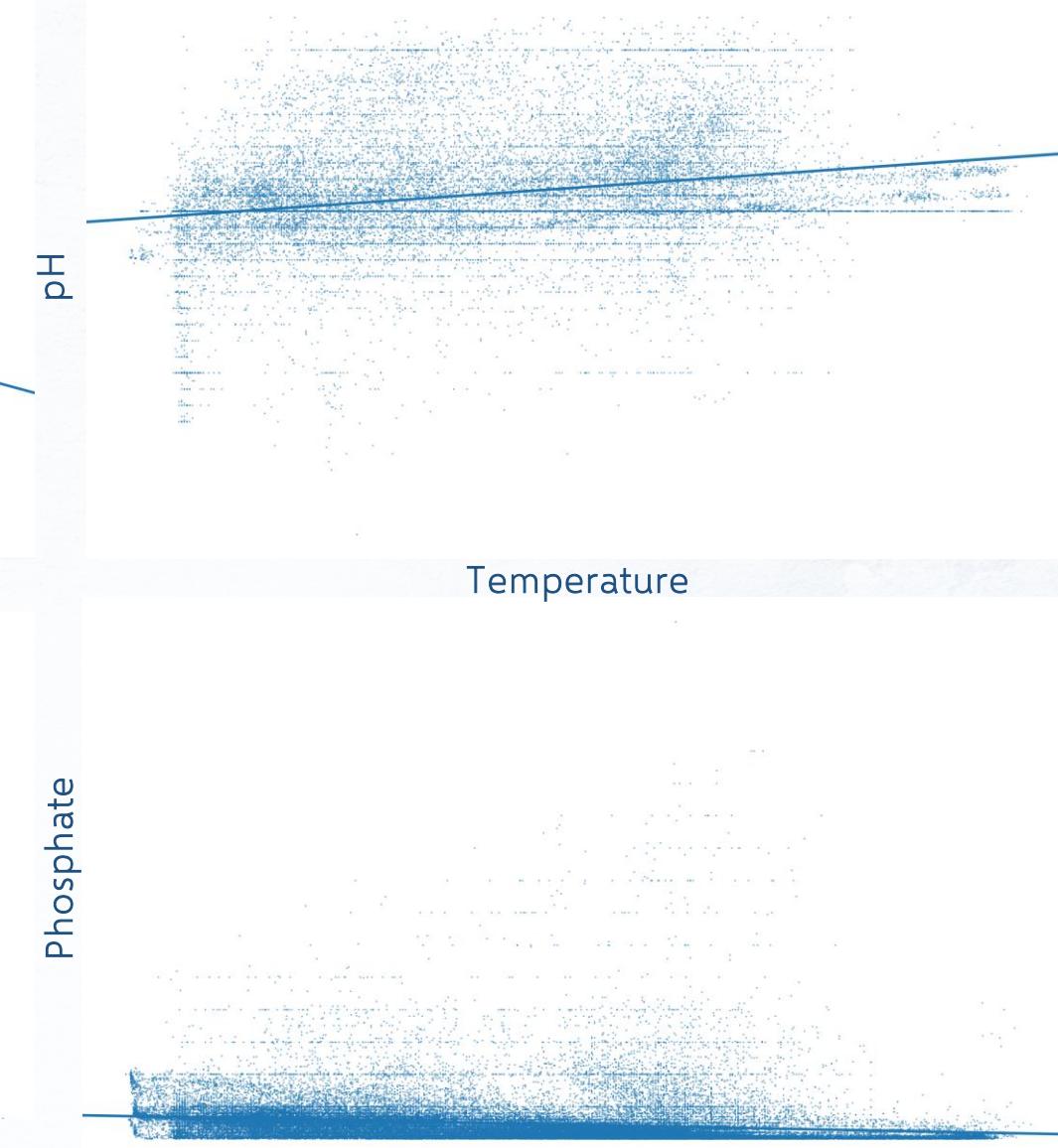
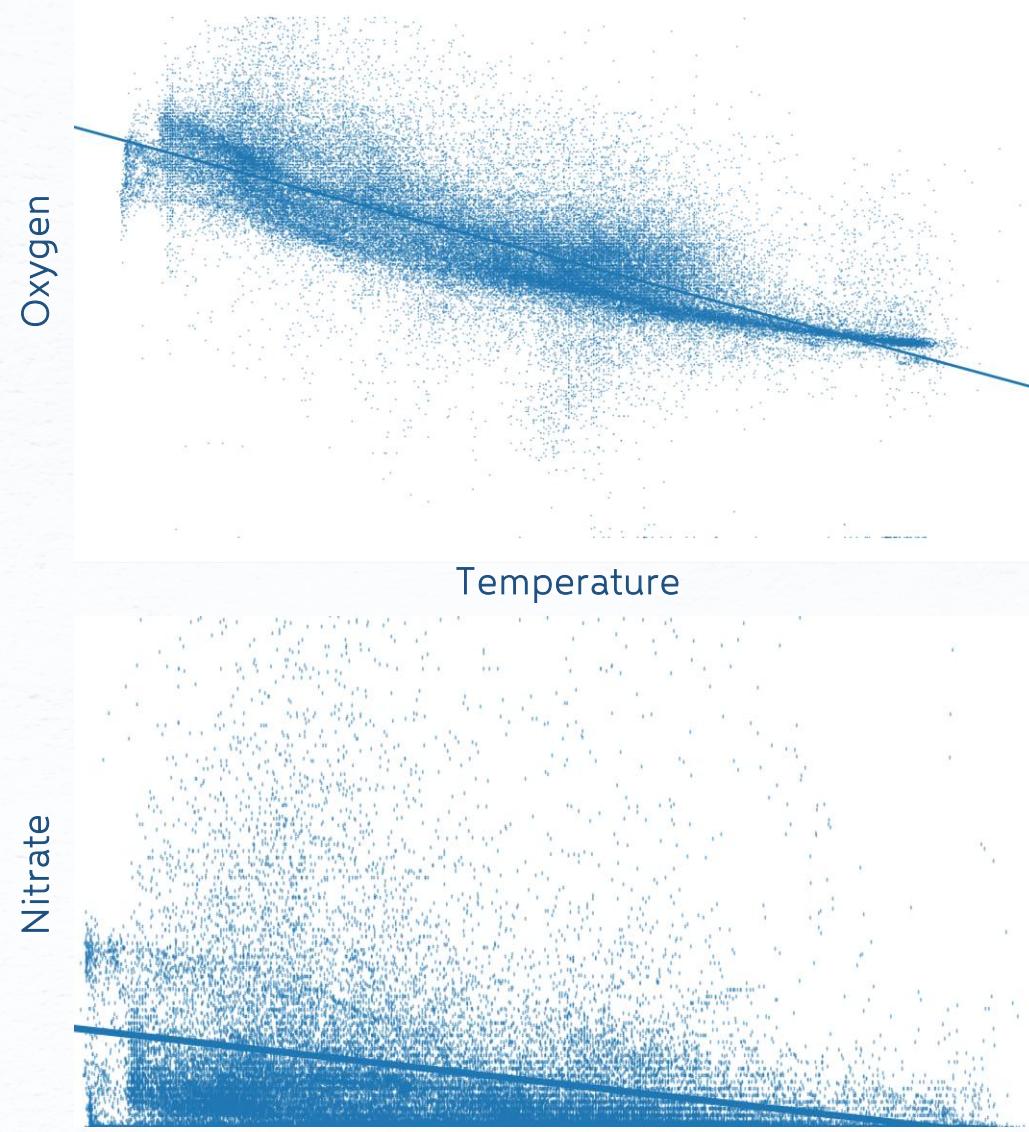
Nitrate

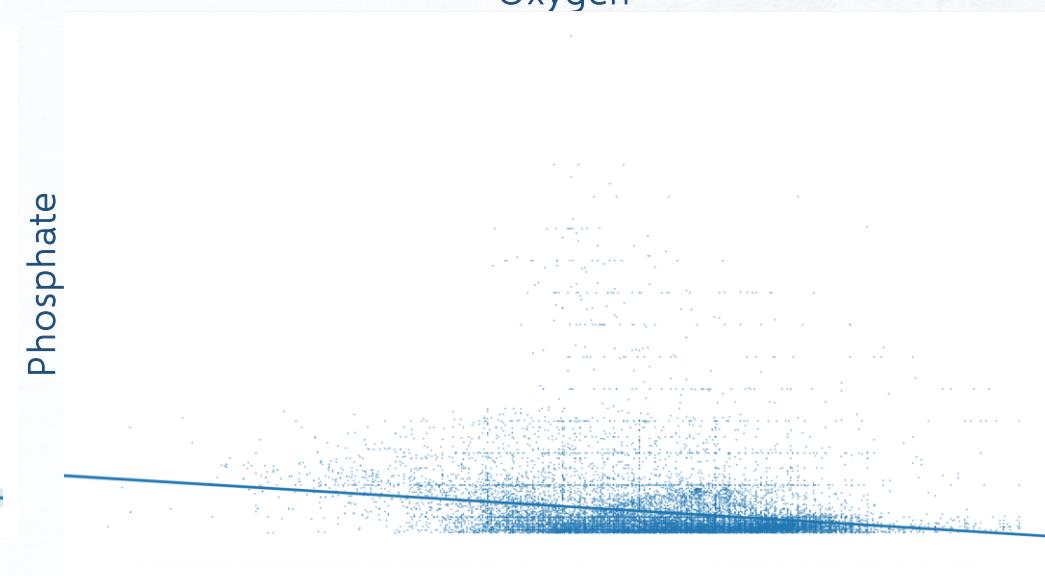
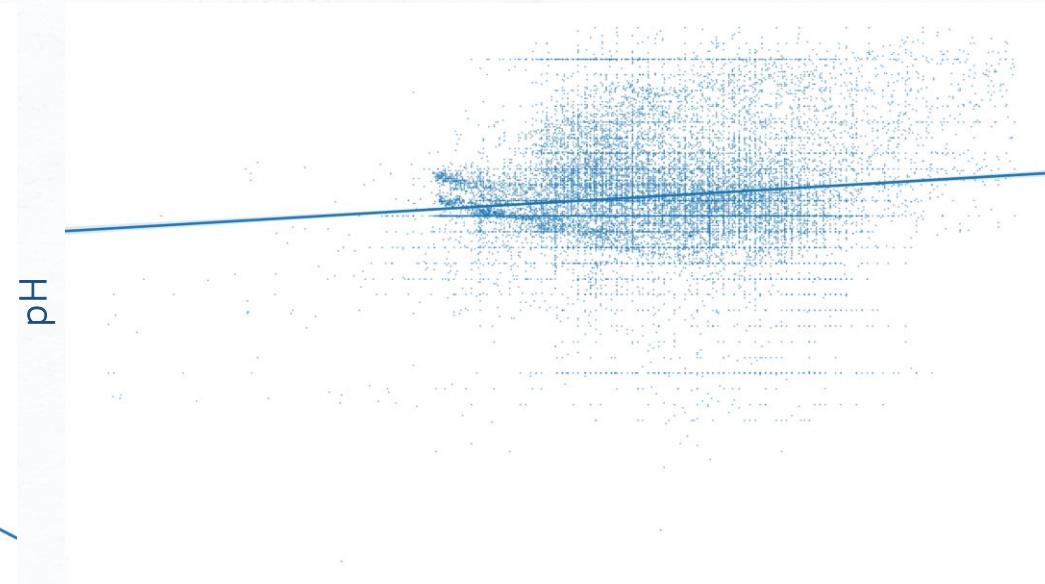
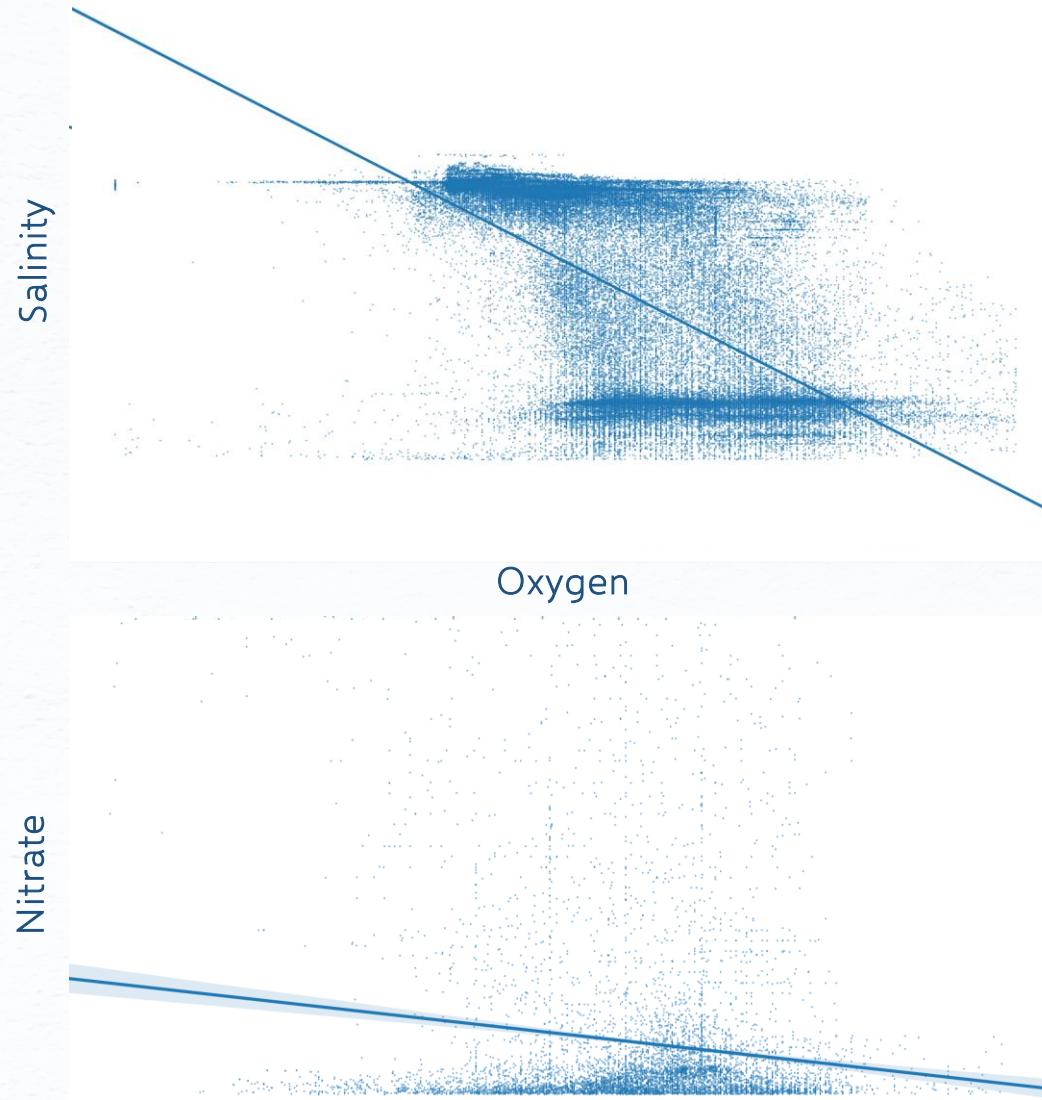
Phosphate

Biological Attributes

Plankton

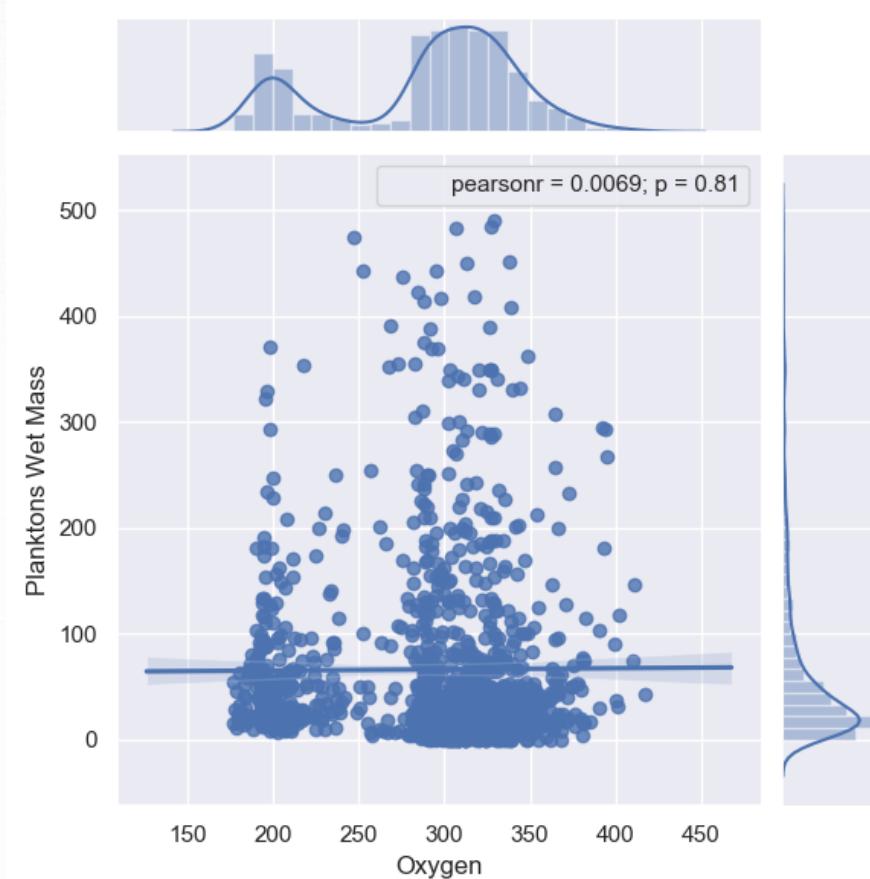
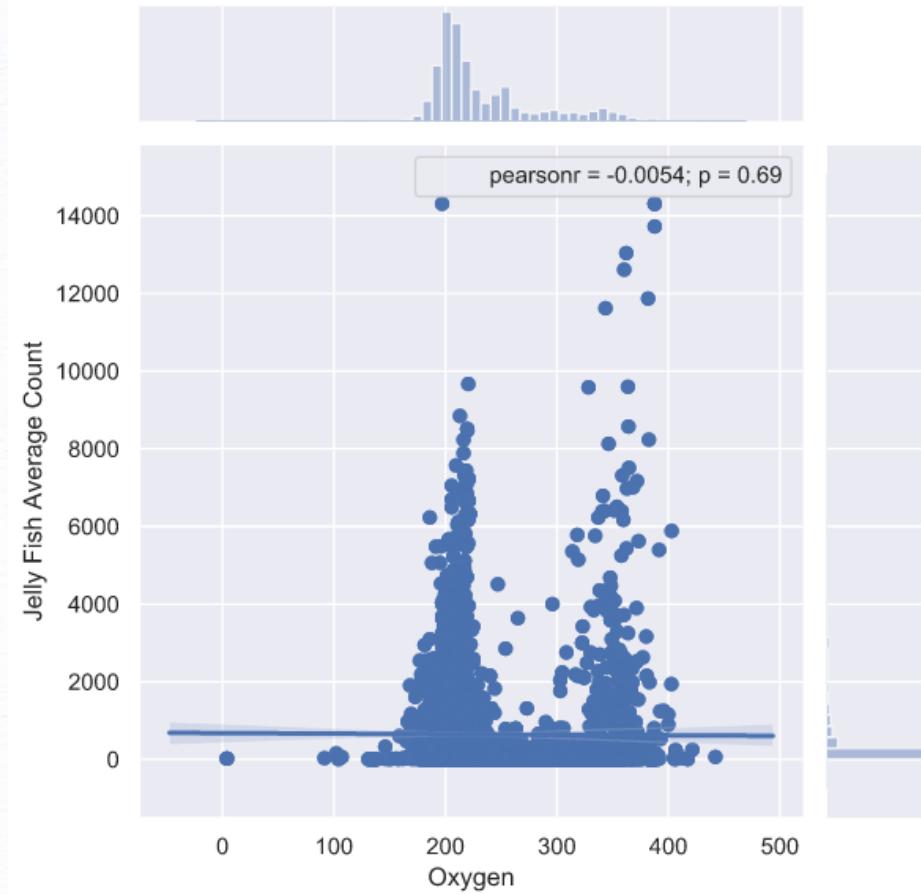
Jelly Fish



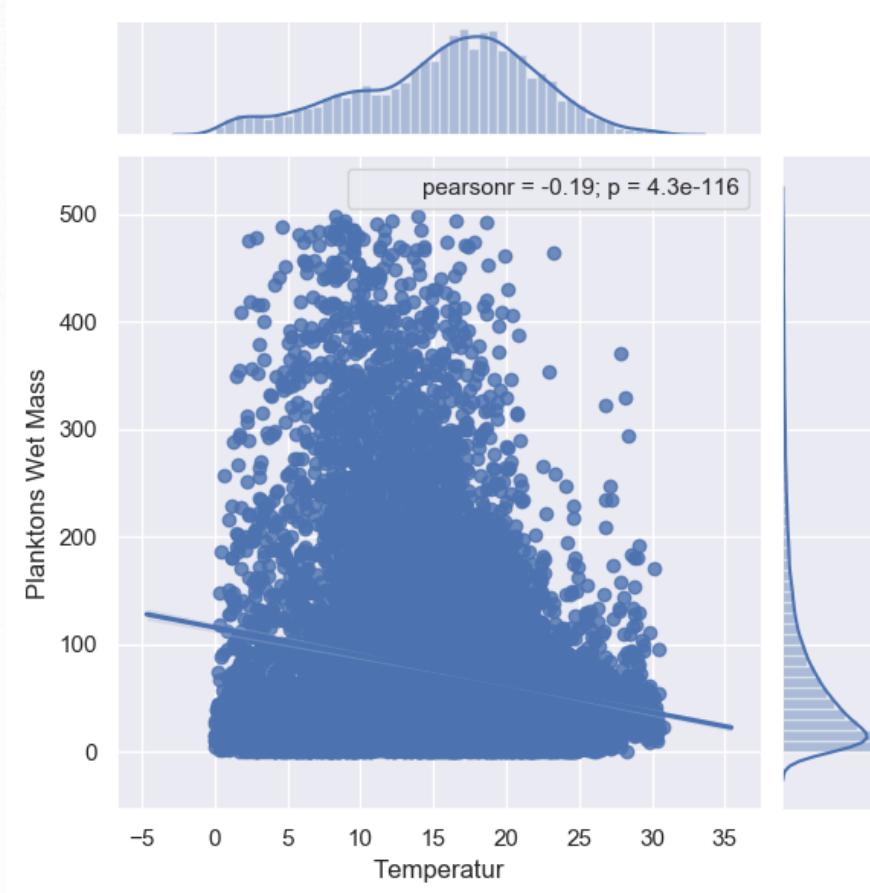
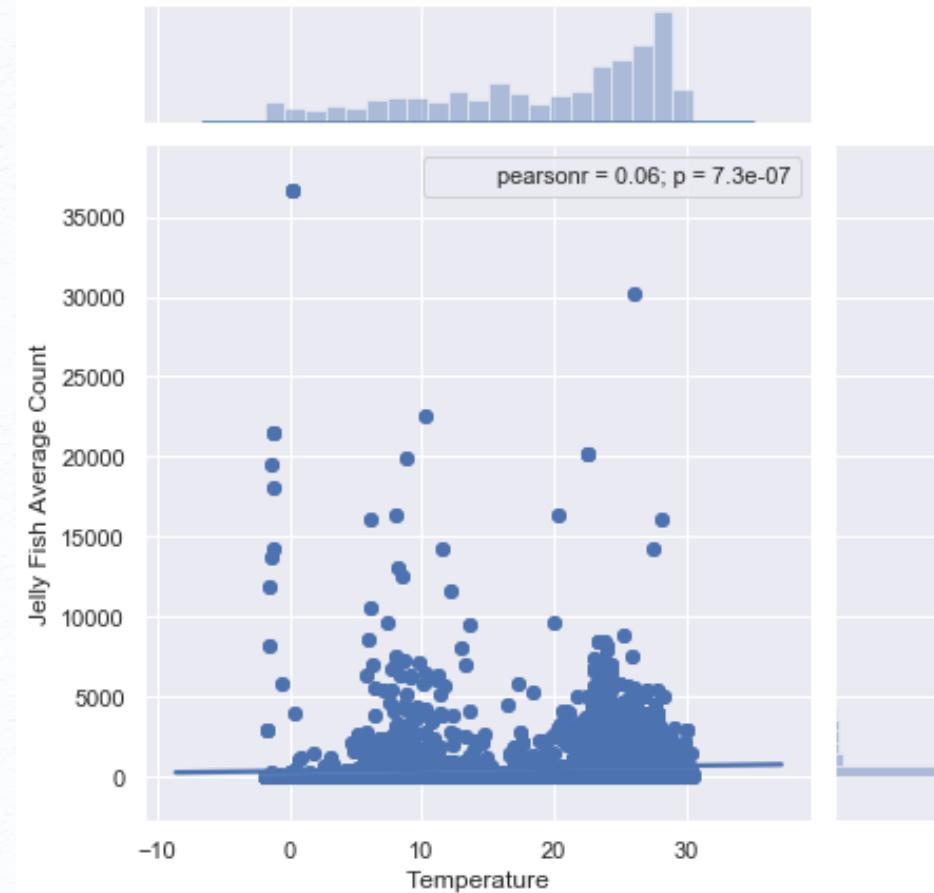


How does temperature and other non-bio-measurements are correlated to jellyfish and plankton's populations?

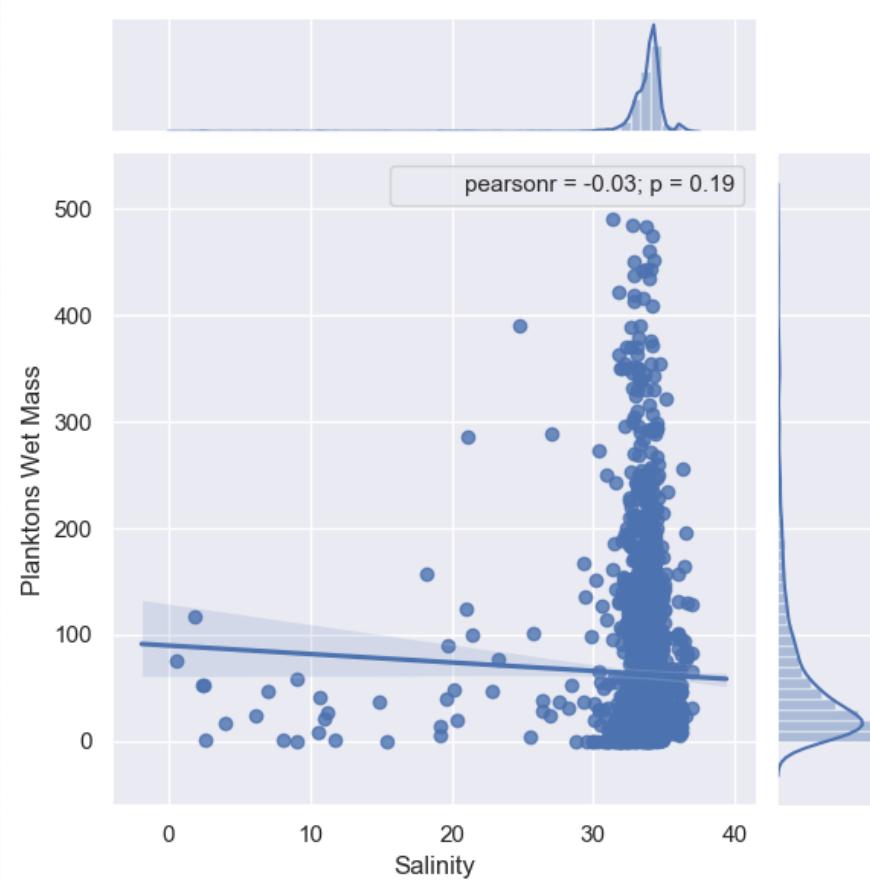
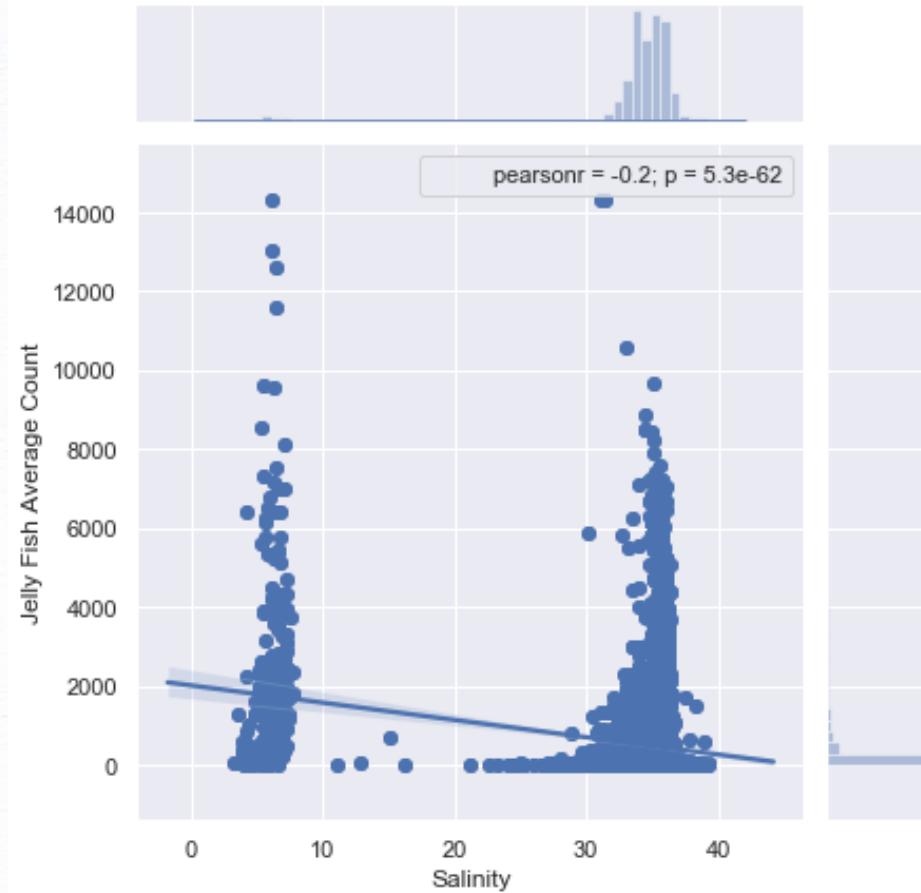
Correlation between oxygen level and Jellyfish and planktons population



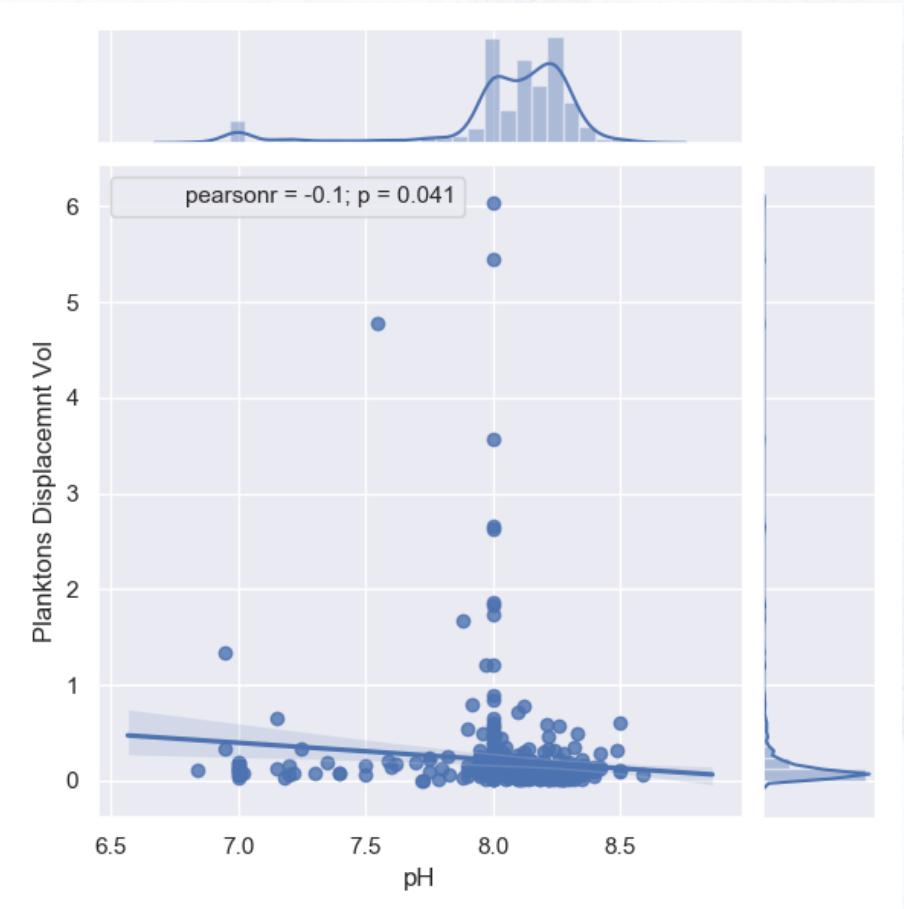
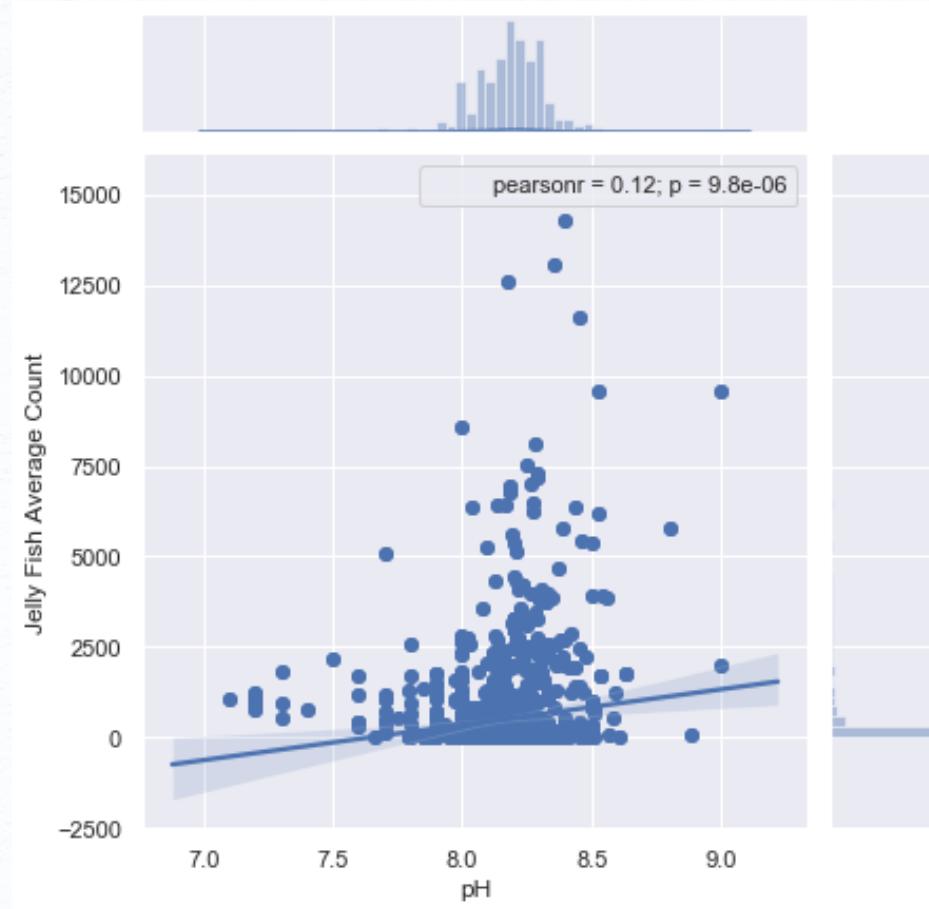
Correlation between temperature and Jellyfish and planktons population



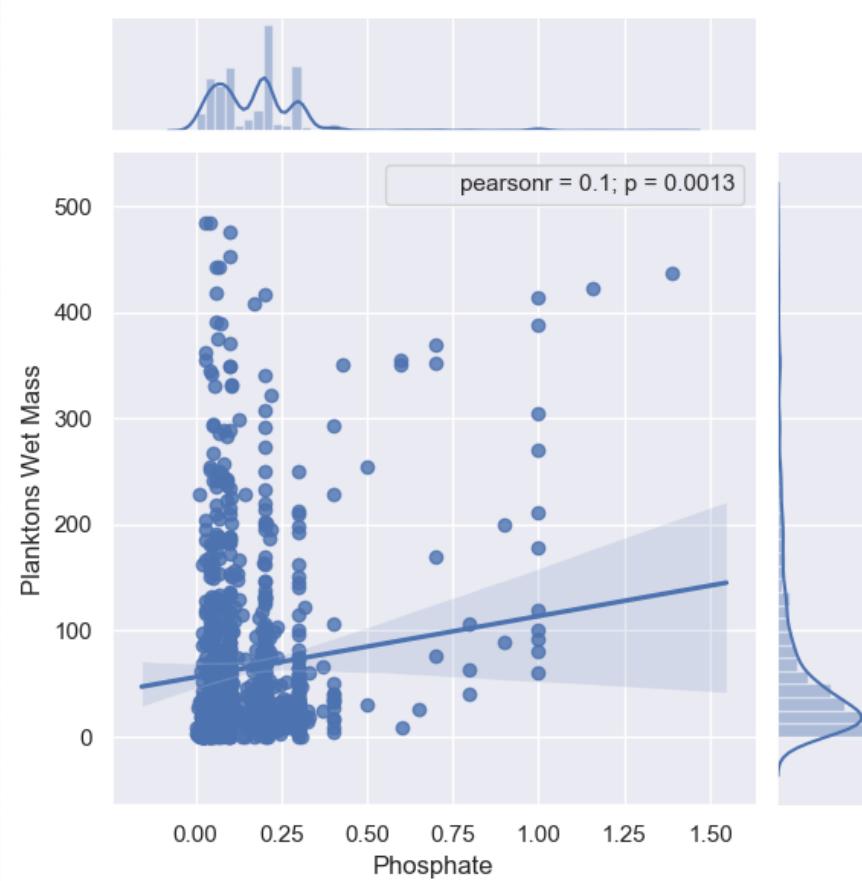
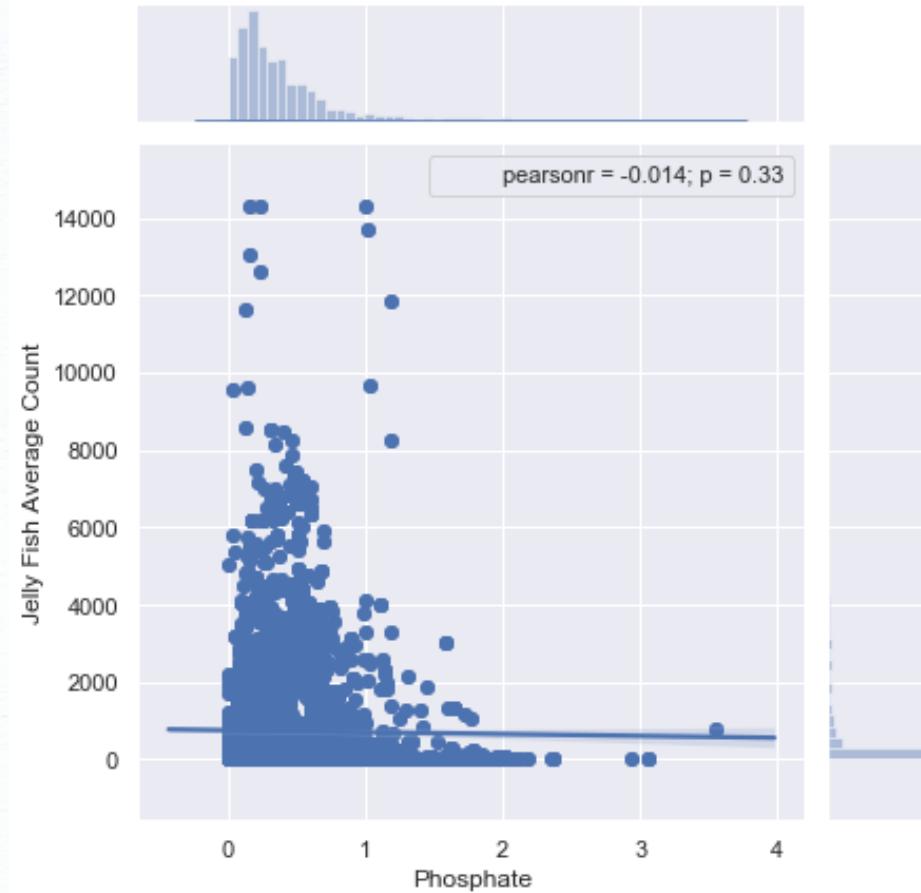
Correlation between *salinity* and Jellyfish and planktons population



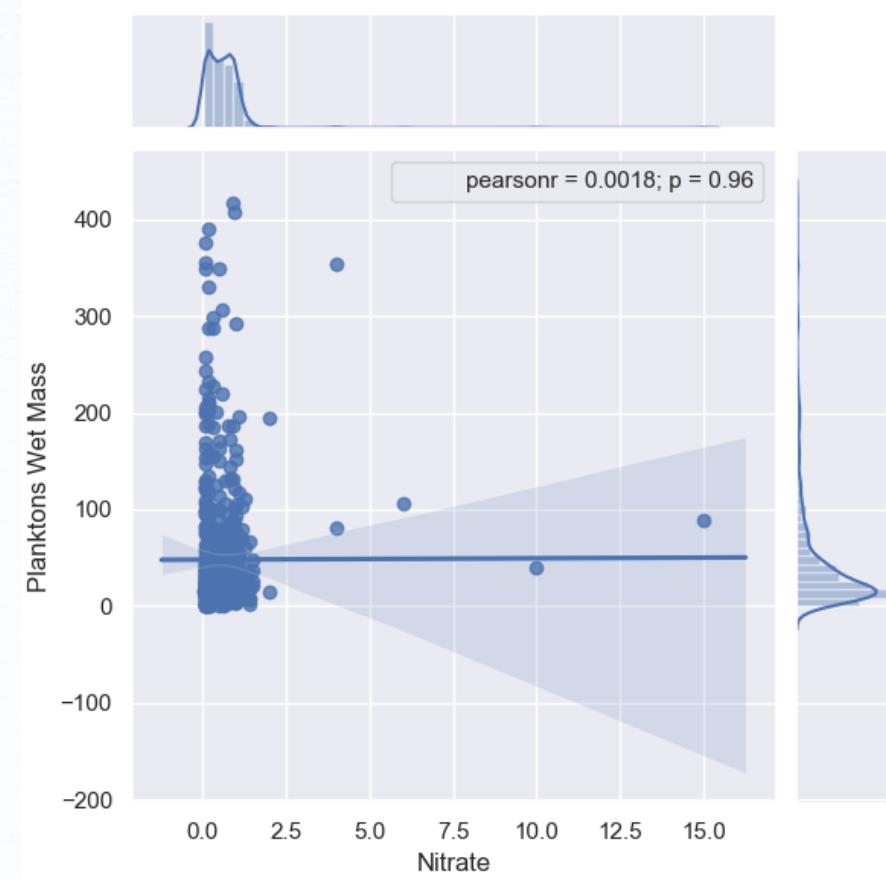
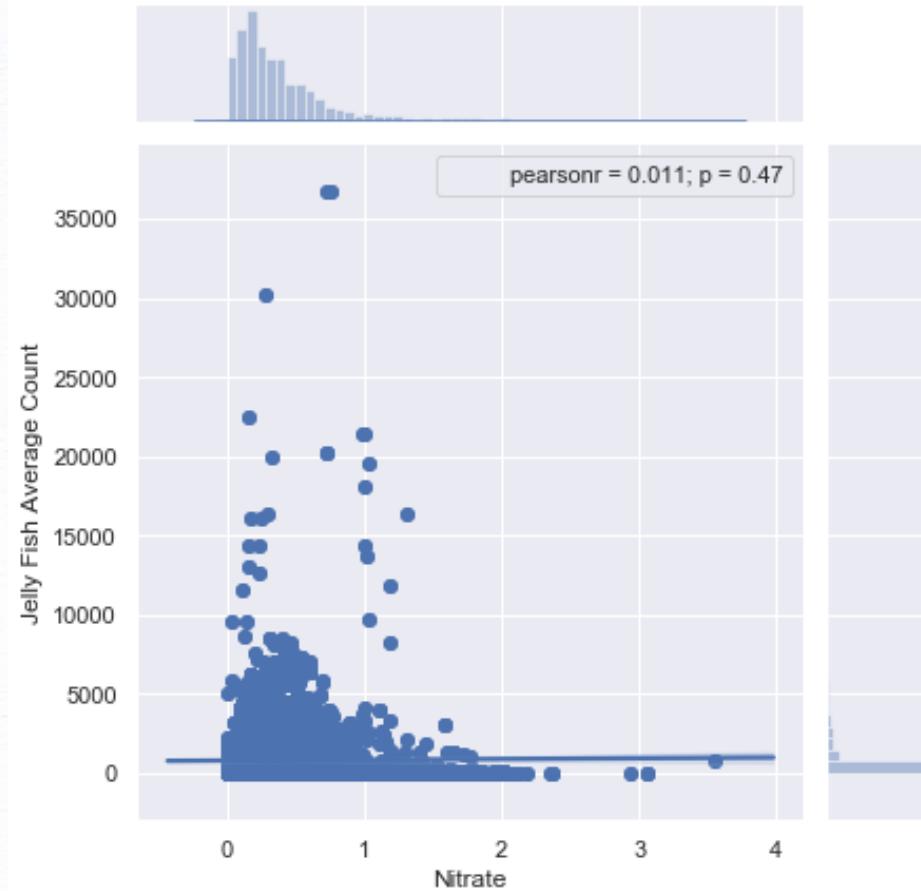
Correlation between pH and Jellyfish and planktons population



Correlation between phosphate and Jellyfish and planktons population



Correlation between nitrate and Jellyfish and planktons population



Temperature effects on jellyfish and planktons

- Unlike other ocean species, the warmer temperatures mean longer reproductive periods for jellyfish, as well as higher ingestion and growth rates.
- Another effect of warmer waters: less oxygen. The saturation of dissolved oxygen decreases as water warms, and for many fish and invertebrate species this makes the water inhospitable. While jellyfish are less abundant in waters with less oxygen, they do appear to be more tolerant of it.

Conclusions

- Can our oceans tell us anything about global warming and climate change?

Yes

- If yes, where and how is it present?

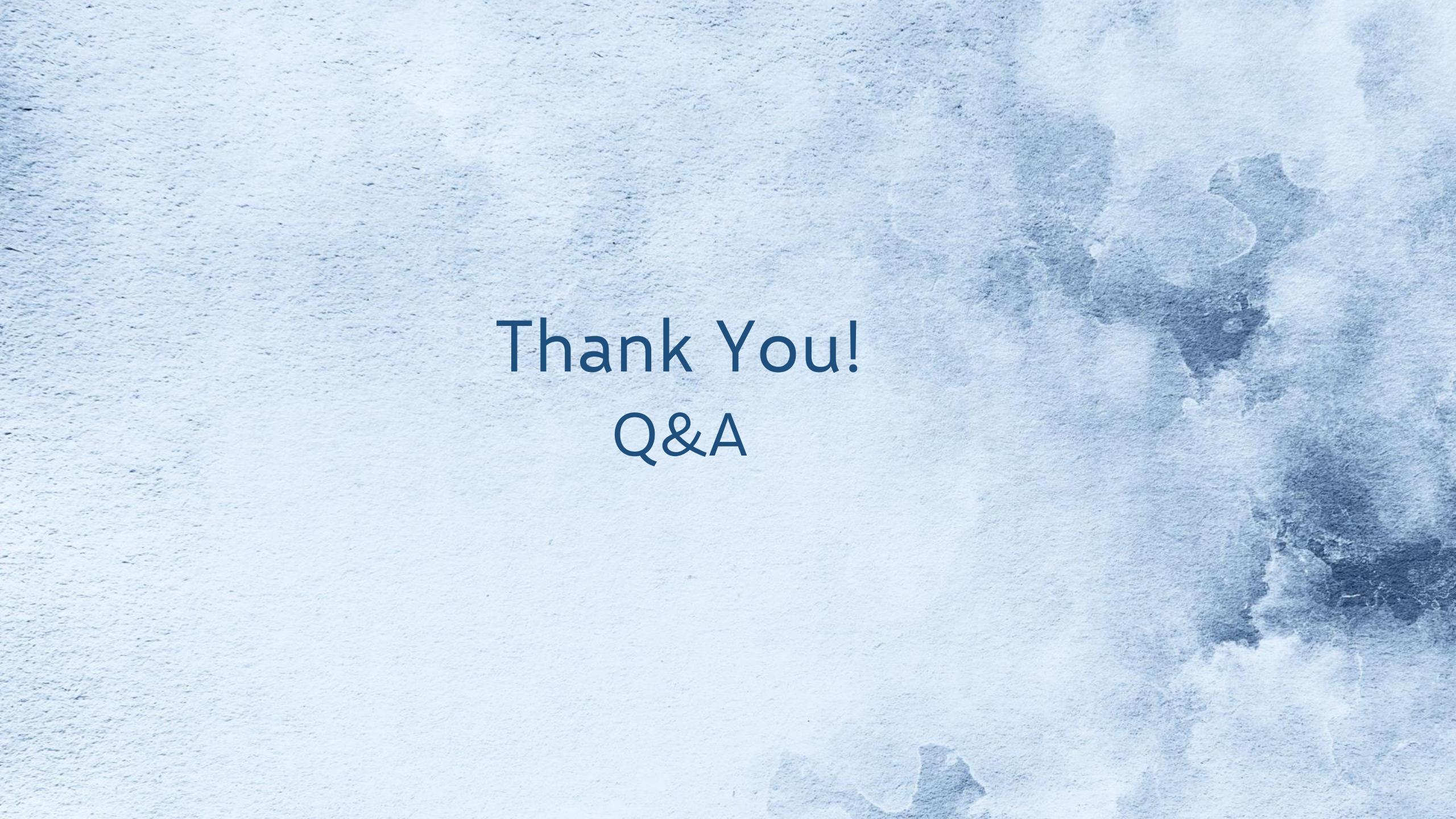
Globally in different ways

- Does it affect biological footprint and marine lives?

We couldn't see any

- Does California experience similar repercussions or trends?

Yes



Thank You!
Q&A