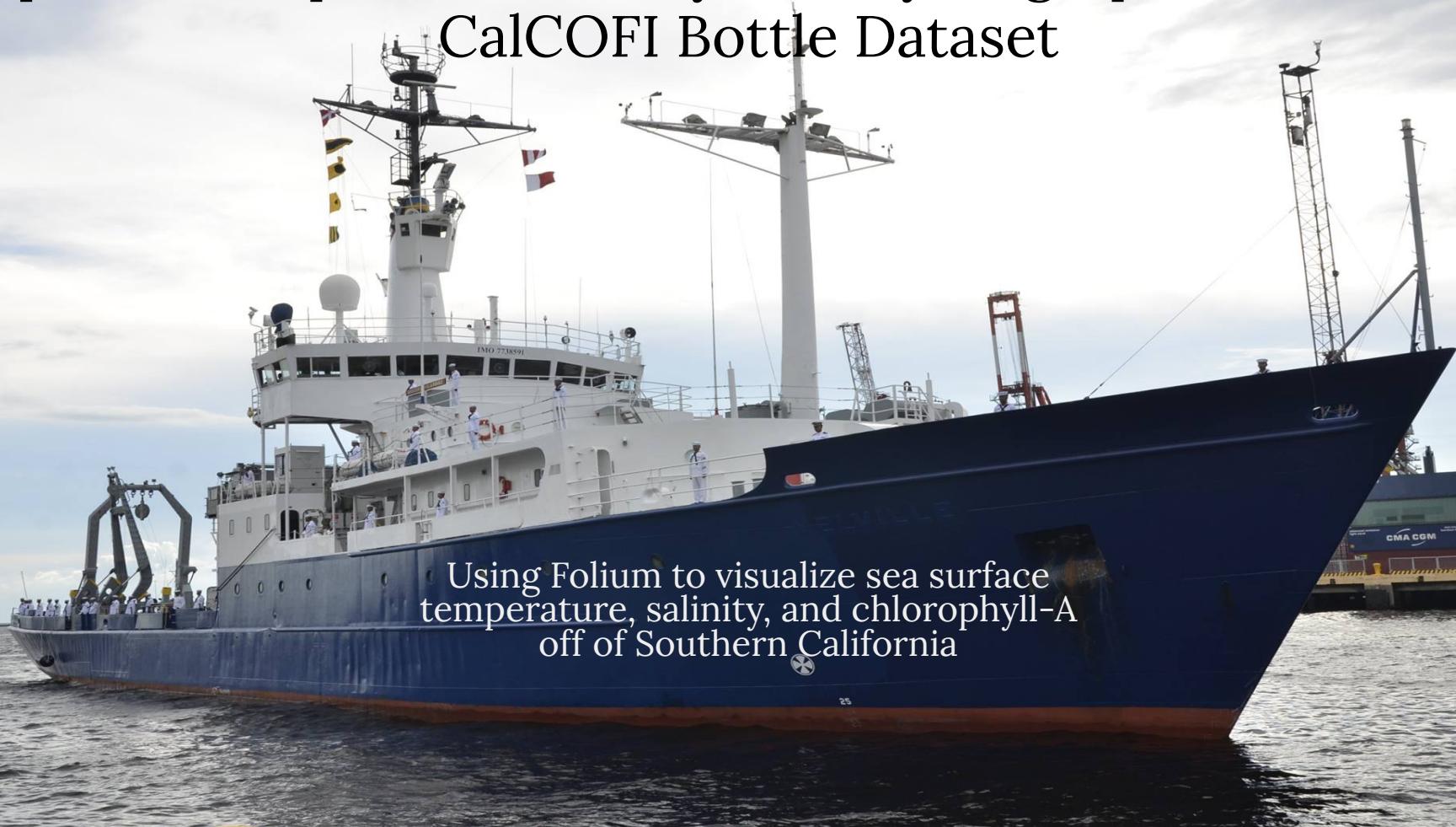


Spatial Comparisons of Physical Hydrographic Data from CalCOFI Bottle Dataset



Using Folium to visualize sea surface
temperature, salinity, and chlorophyll-A
off of Southern California

Introductions



Eudora Fong



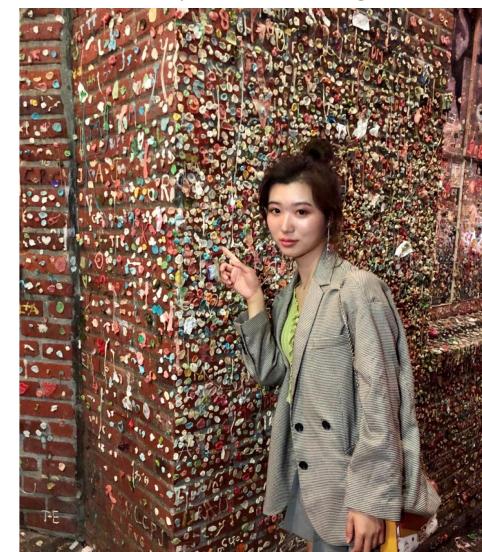
Emma Hoffman



Peicong Wu



Ziyuan Wu



Siquan Wang

Guiding Questions



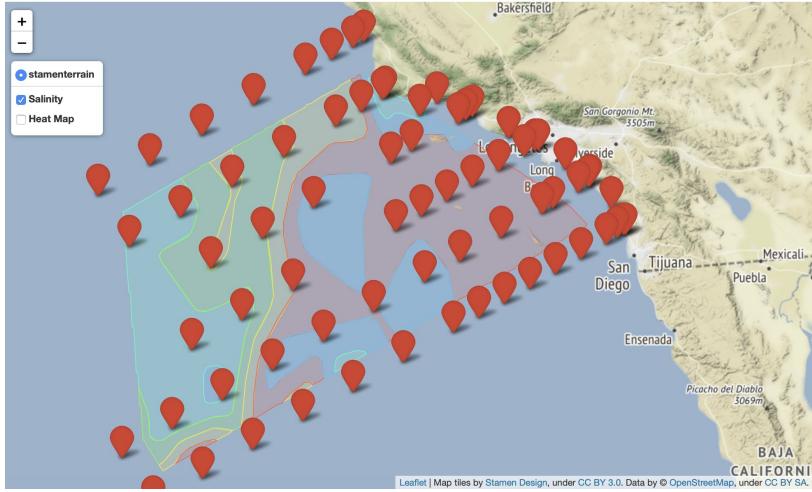
- ❖ How can we use this data to create a GIS type graph?
- ❖ What oceanographic data might be useful to include side by side?
- ❖ How can we convey this data in a way that is easy to understand?
- ❖ How can we visualize the relative magnitude of each measurement between stations?

Line	Sta	Sta_ID	Year	Month	T_degC	Salnty	O2ml_L	ChlorA	Lat (dec)	Lon (dec)	
0	76.7	49.0	076.7 049.0	2015	4	11.510	33.5598	7.114	22.632	35.08824	-120.77740
1	76.7	51.0	076.7 051.0	2015	4	12.675	33.3538	6.647	2.522	35.02158	-120.91782
2	76.7	55.0	076.7 055.0	2015	4	13.669	33.2469	6.210	0.717	34.88824	-121.19831
3	76.7	60.0	076.7 060.0	2015	4	14.151	33.2475	6.320	1.537	34.72158	-121.54828
4	76.7	70.0	076.7 070.0	2015	4	15.318	33.1735	5.876	0.271	34.38824	-122.24608
...	
65	93.3	90.0	093.3 090.0	2015	4	17.518	33.1430	5.647	0.073	30.84637	-121.58965
66	93.3	100.0	093.3 100.0	2015	4	17.338	33.2920	5.593	0.086	30.51304	-122.25760
67	93.3	110.0	093.3 110.0	2015	4	17.988	33.5507	5.483	0.068	30.17971	-122.92324
68	93.3	120.0	093.3 120.0	2015	4	17.792	33.3277	5.563	0.058	29.84637	-123.58661
69	93.4	26.4	093.4 026.4	2015	4	19.012	33.3314	5.941	0.706	32.94905	-117.27357

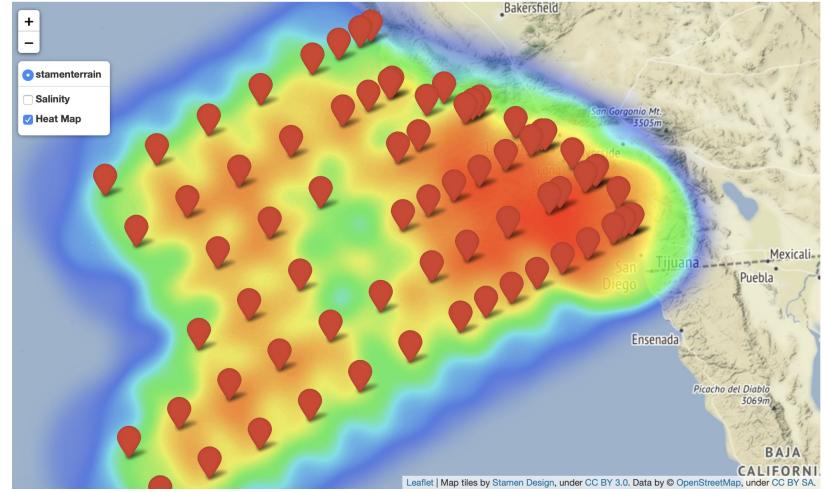
70 rows × 11 columns

Visualizations

Salinity



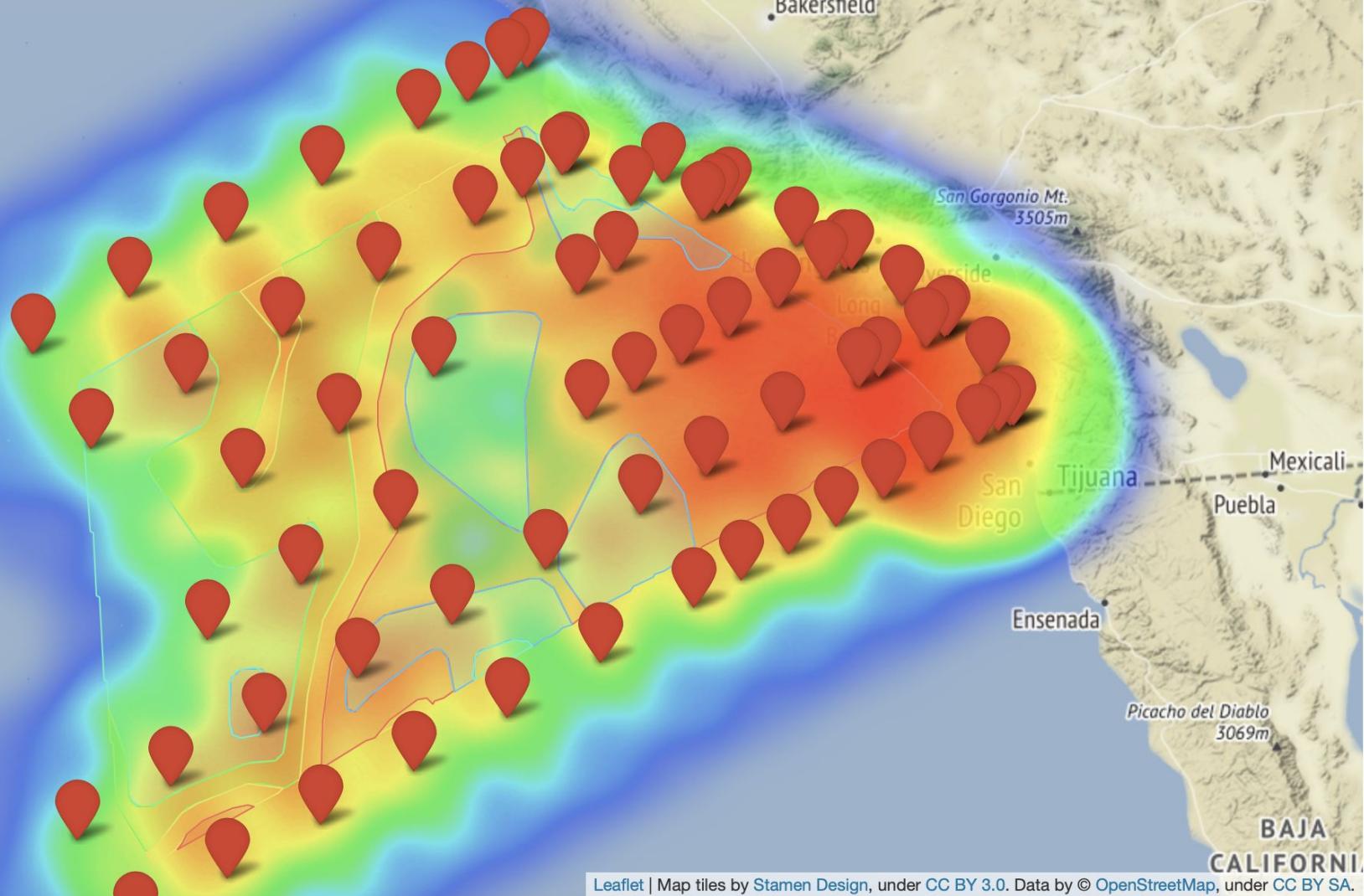
Temperature



- ❖ What types of graphs we desire to fulfill our purpose?
 - > Multi-layer interactive GIS graph
- ❖ What parameters are important and available to us?
 - > Temperature and salinity are vital to most oceanographic research, and chlorophyll is varied and interesting to visualize in this area, as well as being the basis of food webs, and therefore important to study

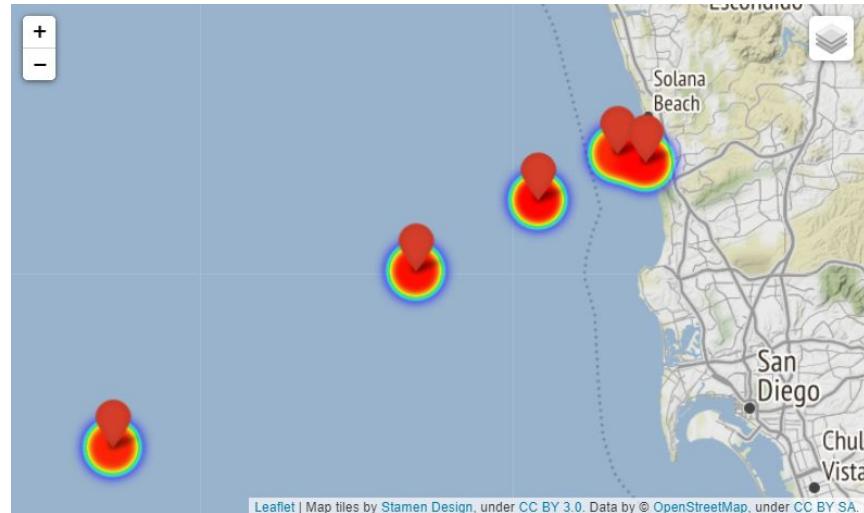
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Visualizations (🐞)

- ❖ Select appropriate and efficient visualization tools
 - Bugs
 - Original data included the station IDs but not the latitude/longitude necessary for the graphing
 - Folium temp scale wasn't sensitive enough to show the real temperature
 - The map doesn't include bathymetry



Key Findings

- ❖ Temperature tends to be warmer nearer the shore, low upwelling spring of 2015?
- ❖ Salinity also tends to be higher near shore and decreasing outward, with low salinity spots in the middle, as well as right along the shore
- ❖ More observations likely could have been made from chlorophyll data

Data+Code

- ❖ Bottle data from the CalCOFI dataset on Kaggle (easier to access) as well as the geographic coordinates for each of the stations from the CalCOFI website
- ❖ Code on GitHub, [CalCOFI-Hackathon-GIS](#)

With more time:

- ❖ Include layer for chlorophyll as originally planned
- ❖ Include temporal data, such as layers for different years, averages across years or decades
- ❖ Tidying up the bug in folium or choosing a different python package
- ❖ Including depth, allow users to see visualizations of different depths using a scroll bar
- ❖ Fully utilizing the abilities of folium and GeoJSON files along with shapefiles to create more detailed, easier to read visualizations

Thank You!