OOI Data Exploration: Thermohaline Circulation

What drives large-scale vertical circulation (ocean conveyor-thermohaline circulation)?

*We will first be working with the data in Exploration #1:* <https://datalab.marine.rutgers.edu/explorations/2019/thermohaline.php?level=exploration>

1. From what location is this data collected?
2. What changes or patterns did you observe in the water temperature graph across the years?
3. Does this change correlate with the surface wind speed data? How-Why?
4. What month(s) have the coldest water temperatures?
5. What is the coldest temperature of water recorded?

*Next, Go to Exploration #2:* [*https://datalab.marine.rutgers.edu/explorations/2019/thermohaline.php?level=exploration2*](https://datalab.marine.rutgers.edu/explorations/2019/thermohaline.php?level=exploration2)

1. What is the highest density recorded? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What is the lowest density recorded? \_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What is the difference between the two densities? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. What is the relationship between ocean water temperature and density?

*Now, go to Concept Invention:* [*https://datalab.marine.rutgers.edu/explorations/2019/thermohaline.php?level=invention*](https://datalab.marine.rutgers.edu/explorations/2019/thermohaline.php?level=invention)

***Click on the 90m-depth dataset button.***

*Here we want to look at how temperature and density change with depth.*

1. What is the highest Temperature at 90m-depth? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What is the lowest Temperature at 90m-depth? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What is the difference in temperature? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. What is the highest Density at 90m-depth? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. What is the lowest Density at 90m-depth? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. What is the difference in Density? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***Click on the 350m-depth dataset button.***

1. What is the highest Temperature at 350m-depth? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What is the lowest Temperature at 350m-depth? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What is the difference in temperature? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. What is the highest Density at 350m-depth? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. What is the lowest Density at 350m-depth? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. What is the difference in Density? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***Click on the 1000m-depth dataset button.***

1. What is the highest Temperature at 1000m-depth? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What is the lowest Temperature at 1000m-depth? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What is the difference in temperature? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. What is the highest Density at 1000m-depth? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. What is the lowest Density at 1000m-depth? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. What is the difference in Density? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. Overall, how does temperature and density differ at different depths?
8. Do you think the wind speed influences the temperature of water at the 30m surface?
9. Do you think the wind speed influences the temperature of water at depths >90m?
10. Describe in your own words how the winter/spring conditions in the Irminger sea produce the deep water flow that forms part of the Thermohaline Circulation.