**Processes that Change Salinity**

**Learning Goals:**

1. Understand processes that cause variation in sea surface salinity
2. Build confidence in reading graphs
3. Understand that real data can be messy and complicated
4. Create hypotheses on causality

This exercise aligns with Course Objectives 1 and 5.

Below is a simplified diagram of the hydrologic cycle (water cycle). There are processes that transfer water and processes that transfer water and solutes.

1. Label the processes that transfer **water** molecules between reservoirs on the diagram.

**Use:** Precipitation, Evaporation, infiltration, run-off, groundwater flow.



1. What do you think controls how active these transport processes are on Earth?—think about deserts vs rainforests.
2. Which transport processes in the hydrologic cycle do you think will transport just water?
3. Which transport processes in the hydrologic cycle do you think will transport both solutes and water?
4. Hypothesize which processes will have the greatest impact on forming higher than average salinity conditions (hypersaline)
5. Hypothesize which processes will have the greatest impact on forming lower than average salinity conditions.

Go to this website for the Data Exploration: https://datalab.marine.rutgers.edu/explorations/2019/salinity.php?level=invention

**Orientation Questions**

*Click on the None button so only Salinity is being shown.*

1. Where were these data collected--Location?
2. Across what time periods are you able to observe this variable (month/day/year)?
3. What is the highest salinity? What is the date of the highest Salinity?
4. What is the lowest salinity? What is the date of the lowest Salinity?
5. What season(s) tends to have the highest salinity?
6. What season(s) tends to have the lowest salinity?

**Interpretation Questions**

*Click on each parameter to add that parameter.*

1. What changes or patterns did you observe between Air Temperature and Ocean Salinity?
2. What changes or patterns did you observe between Sea Surface Temperature and Ocean Salinity?
3. What changes or patterns did you observe between Rain Rate and Ocean Salinity?
4. Bring it together!
	1. Increasing air temperatures will cause a(n)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of surface

salinities.

 Increasing or Decreasing or Unclear

* 1. Increase sea surface temperatures will cause a(n)\_\_\_\_\_\_\_\_\_\_\_\_\_ of surface Salinities.

 Increasing or Decreasing or Unclear

* 1. High rates of rainfall will cause a(n)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of surface salinities

Increasing or Decreasing or Unclear

1. Which variable appears to have a stronger control on sea surface salinity in the North Pacific Ocean?
2. For the variables you answered ‘unclear’, explain why the relationship was unclear.
3. Construct one or more hypotheses as to the reasons behind the relationships between variables, if any. *(think about the hydrologic cycle)*