

INVESTIGATING THE RELATIONSHIP BETWEEN THE SURFACE SALINITY OF THE OCEAN AND WORLDWIDE PATTERNS OF EVAPORATION

INTRODUCTION

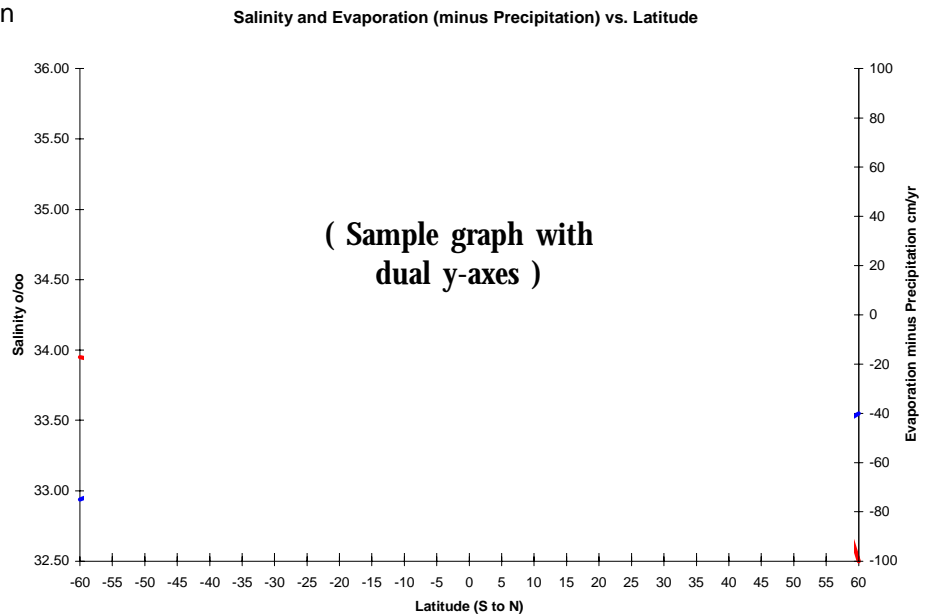
The salt content (or salinity) of the surface waters of the ocean is determined by the amount of rainfall (precipitation) and the amount of fresh water that evaporates from the ocean. In regions where the amount of precipitation is higher than evaporation (negative net evaporation numbers), the ocean surface becomes diluted with fresh water and the overall salinity goes down. Conversely, if the evaporation rate is higher than the precipitation (positive net evaporation numbers), then fresh water is lost from the ocean surface, which increases the salinity. In this investigation you will consider the world wide patterns of sea surface salinity and net evaporation (evaporation minus precipitation).

PROCEDURES

Using a single sheet of your own graph paper, plot the following two sets of data together on one graph. This will require the use of two different y-axes: calibrate the left y-axis in o/oo Salinity, from 32.50 to 36.00; calibrate the right y-axis in cm/yr Precipitation-Evaporation, from -100 to +100. Use a different color for each of the two lines.

DATA

Latitude S to N	Salinity o/oo	Evaporation cm/yr
-60	33.95	-75
-55	33.90	-70
-50	34.00	-62
-45	34.25	-50
-40	34.75	-12
-35	35.20	25
-30	35.60	50
-25	35.75	62
-20	35.65	61
-15	35.50	50
-10	35.30	37
-5	35.13	25
0	34.87	0
5	34.37	-57
10	34.37	-25
15	34.87	40
20	35.25	60
25	35.70	80
30	35.75	62
35	35.37	41
40	34.62	0
45	34.10	-37
50	33.58	-50
55	33.25	-48
60	32.50	-40



ANALYSIS OF DATA

1. What is the approximate worldwide range in sea surface salinity, in parts per thousand (o/o) ?
2. (a) At what latitudes are salinity values the highest ? (b) the lowest?
(c) mark or point to these locations directly on your salinity graph.
3. Pick a letter of the alphabet to describe the shape of the salinity graph.
4. What is the approximate worldwide range in net evaporation (evaporation minus precipitation), in cm/yr?
5. (a) At what latitudes do you see negative evaporation (the precipitation higher than evaporation) ?
(b) mark or point to these locations directly on your evaporation graph.
6. (a) At what latitudes do you see positive evaporation (the evaporation higher than precipitation) ?
(b) mark or point to these locations directly on your evaporation graph.
7. Pick a letter of the alphabet to describe the shape of the evaporation graph.
8. Describe any similarities you may observe between the shapes of the two graphs.
9. Write a summary paragraph describing the relationship between latitude, the salinity of the ocean surface and the net evaporation rate (evaporation minus precipitation).

ACKNOWLEDGEMENTS

The data for this investigation are taken from instructional material and graphs located on the web at:
<http://blitzen.sprl.umich.edu/PHAYS/Contents.html>