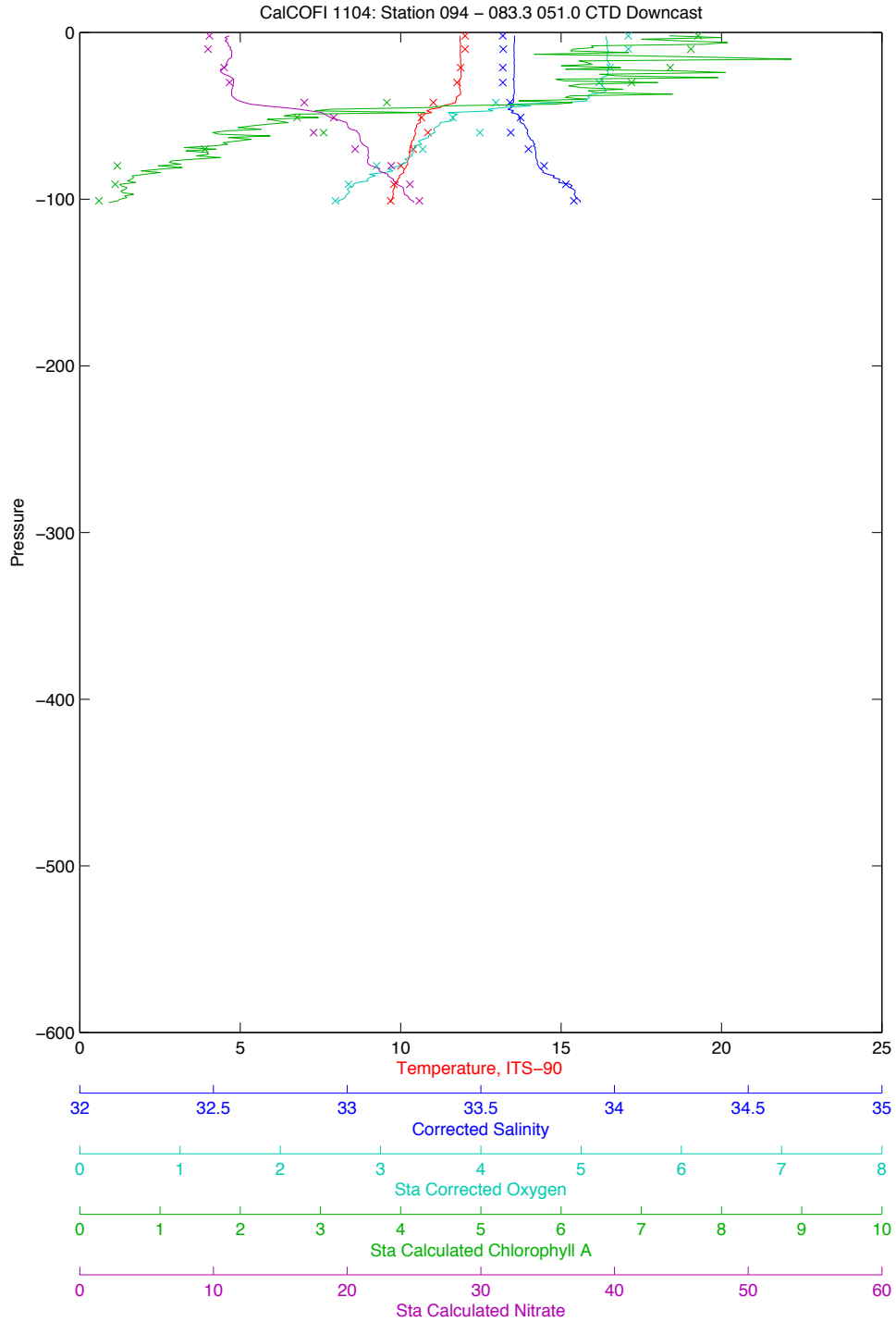


Water Column Properties Handout

These data were collected about 100 miles off the coast of San Diego as part of a long-term oceanographic study.

Your plot will look something like the plot below:



Your assignment is to plot the following data on graph paper. Copy the axes from the plot on the previous page, and plot each variable in a different color.

Data:

Depth (meters)	Temp (°C)	Oxygen (ml/L)	Nitrate (µmol/L)	Chl a (mg/m ³)
0	15.1	5.84	0.00	1.9
20	15.0	5.83	0.00	8.0
50	15.0	5.8	16.5	0.1
75	14.0	5.8	21.8	0.1
100	12.6	5.4	25.9	0.0
200	8.7	3.0	32.7	0.0
300	7.3	2.0	35.1	0.0
400	6.3	1.0	37.4	0.0
500	5.7	0.5	39.6	0.0

***NOTE:** Nitrate is a measure of the levels of nutrients that are in the water. Chlorophyll a is a measure of how much phytoplankton are in the water. Phytoplankton carry out photosynthesis- using sunlight as an energy source, phytoplankton take up nutrients and carbon dioxide and convert to sugars and other complex molecules to grow and reproduce.

Questions:

1) At what depth is the oxygen level the highest?

Surface (0 m)

2) At what depth is chlorophyll level the highest? Below what depth is there no longer any Chl? Why is that?

20 m

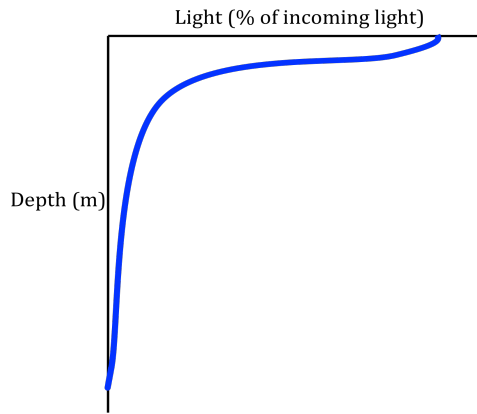
There is no chlorophyll below 75 m.

This is because there is not enough light below this depth to conduct photosynthesis.

3) Why is the concentration of nutrients so low near the surface? (hint: What do phytoplankton need to grow?).

The phytoplankton use the nutrients to grow.

4) Sketch a profile of how you think light level changes with depth.



5) What are the characteristics of nitrate, oxygen and chlorophyll in the mesopelagic zone (200-1000m) compared with the epipelagic (0-200 m depth)?

Nitrate: higher in mesopelagic

Oxygen: lower in mesopelagic

Chlorophyll: non-existent in the mesopelagic

6) Based on these observations, do you think there is much available food in the mesopelagic zone (hint: What kinds of organisms form the base of the food web and where do they live?)?

No. There is not much food in the mesopelagic, because there are no phytoplankton in the mesopelagic

7) A concentration of oxygen of 0.5 ml/L is considered to be a physiological limit for many organisms- they suffocate at lower oxygen levels. At what depth is this concentration?

500 m

8) Many mesopelagic fishes migrate to surface waters at night to eat. Why do you think they have to go to the surface for food? Why do you think they only go there at night? (hint: How would their predators find them?)

They migrate to the surface because primary production, the base of the food web, occurs near the surface, so there is more food near the surface.

They only go out night so that they can avoid being seen by their predators.