

Oceanography B Invitational Test

This event covers the fields of physical and geological oceanography.

Resources are limited to a single sheet of paper 8.5x 11 inches and a calculator of any type.

No other student resources are permitted.

The test is 50 minutes in length.

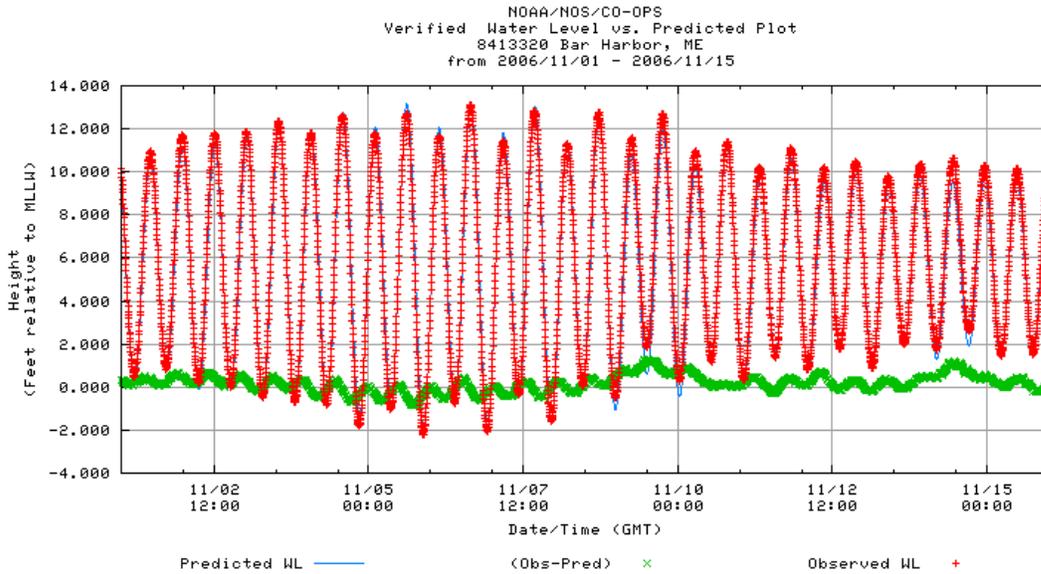
DON'T PANIC!!!

My tests tend to be very hard, with scores ranging from 20-80%.

Good luck!

A. Tides

The following picture shows the predicted water level (relative to mean low tide) at Bar Harbor Maine. The symbols on the curve show the actual water levels, the lower thick line is the difference between the actual water levels and the predictions from a tide model. The horizontal axis shows the time.

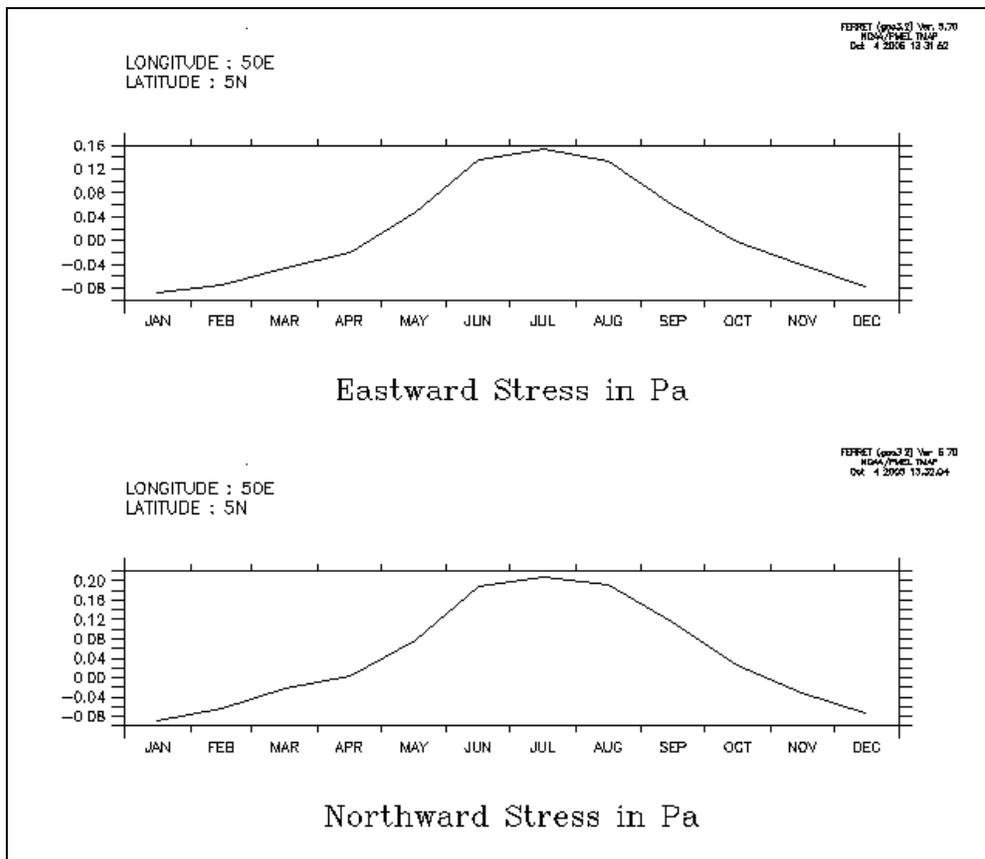


1. Identify on the plot examples of high, low, spring, neap, and flood tides. (2 points each)
2. What are the maximum and minimum tidal *amplitudes* seen during this time period? (5 points)
3. What is the dominant tidal component during this time period? How do you know? (5 points, T2)

4. Why does the tidal amplitude change over time? (5 points)

B. Air-sea fluxes

The questions in this section use the following plot which shows the stress towards the east and north off the coast of Somalia over the course of the year.



1. Describe what happens to the winds over the course of the year. (5 points)

2. Explain why the wind direction changes. (10 points)

C. Miscellaneous identification (2 points each)

1. Turbidity current:

2. Sea stack:

3. Chlorinity

4. Potential density:

5. Guyot:

6. Hydrogenic sediment:

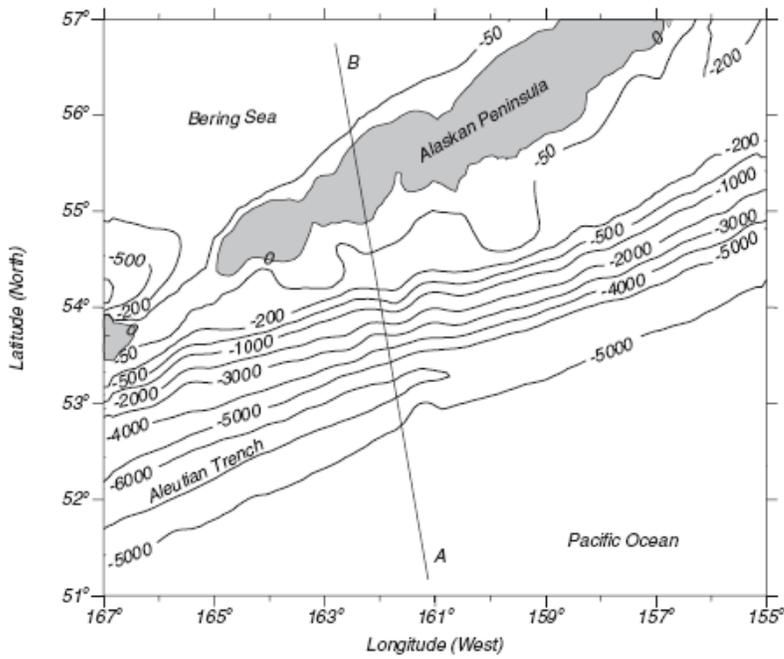
7. Agulhas current:

8. Rip current:

9. ARGO float:

10. Satellite altimeter:

D. Ocean topography



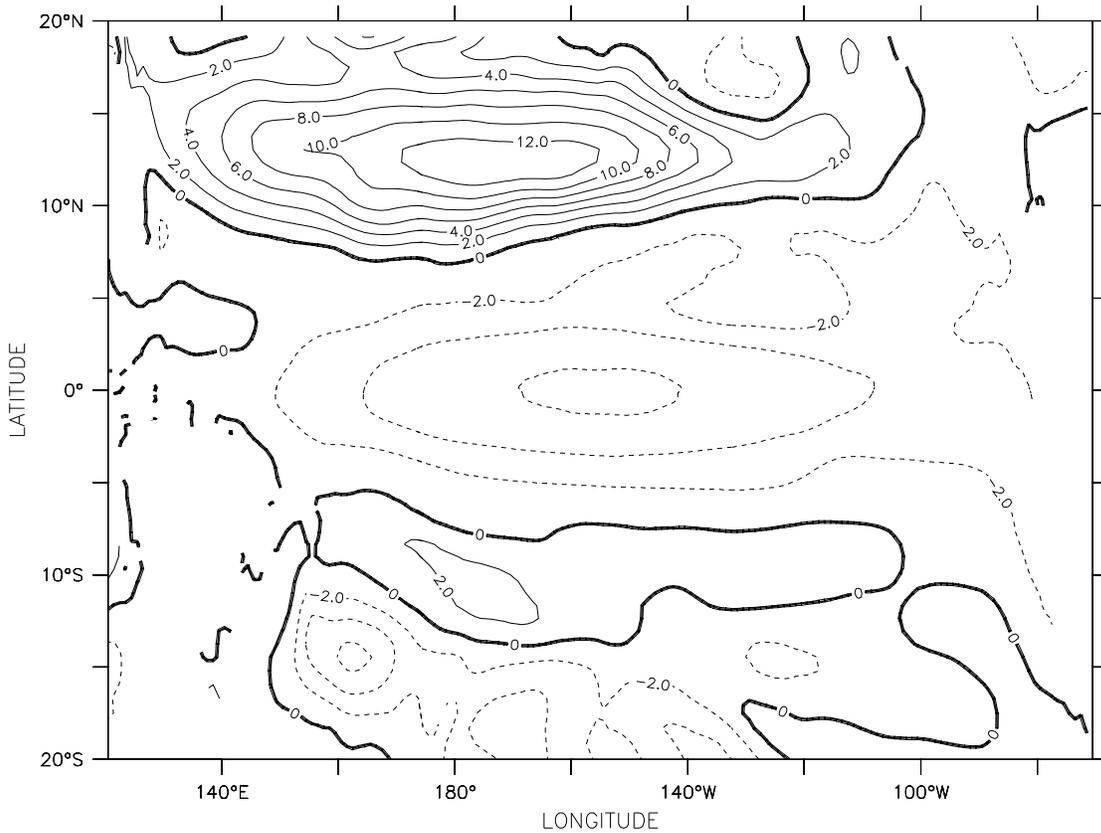
The plot above is a contour plot of the bathymetry off of Alaska.

1. Draw and label a plot of the bathymetry vs latitude along the line AB. (10 points)

2. This is an example of island arc. How do island arcs form? (10 points, T1)

E. Physical oceanography

The plot below shows an anomaly (deviation from normal conditions) of the sea surface height for a particular period of time over the tropical Pacific Ocean.



Anomalous Sea Surface Height in cm

1. What is going on in this picture? (What phenomenon would cause the sea surface height to be low in this region?). Explain. (10 points)

2. At points A and B draw vectors showing the geostrophic velocity that would be associated with this height anomaly. (10 points, T3)