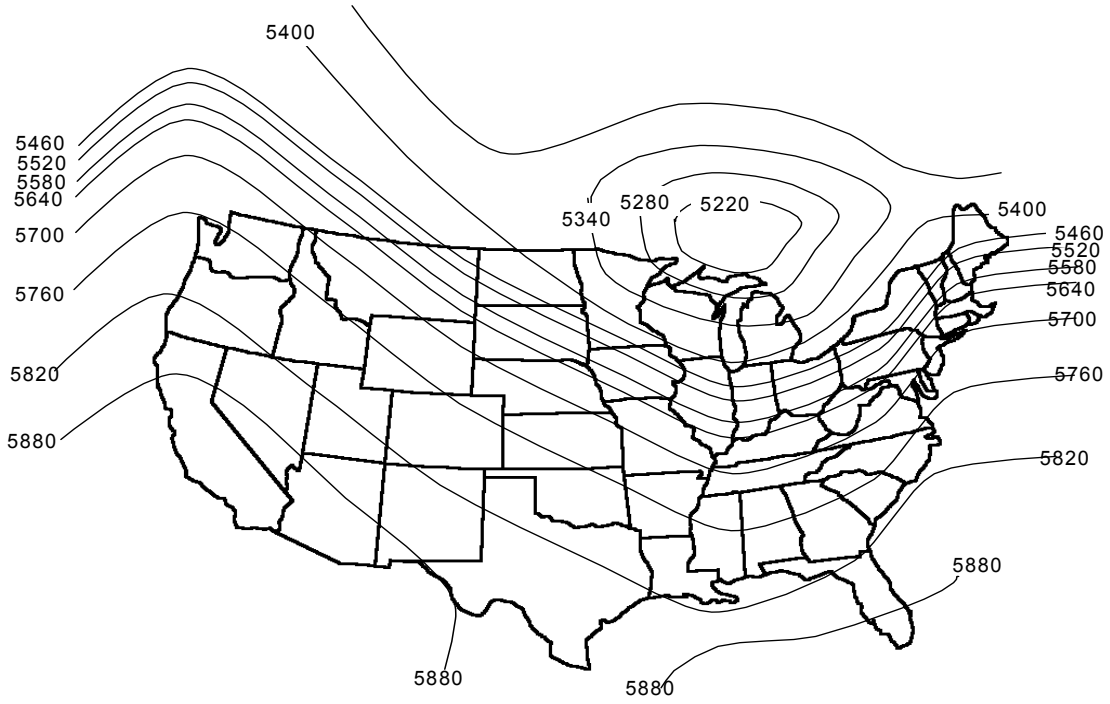
Name: _____ Section/TA: _____

Atmospheric Sciences 101, Spring 2003

Homework #3 – Due the beginning of section Thu/Fri, 1/2 May 2003

1.

a) Below is a contour map of 500mb heights. On the figure, 1.) draw the location of the jet stream (as a continuous line from the left edge of the figure all the way to the right edge of the figure) at the 500mb level on the map. 2.) draw an arrow indicating the direction of wind flow along the jet stream. 3.) explain why you drew it where you did.



b) Based on this 500mb map, would you expect the surface temperature to be greater in Idaho or Minnesota? Why?

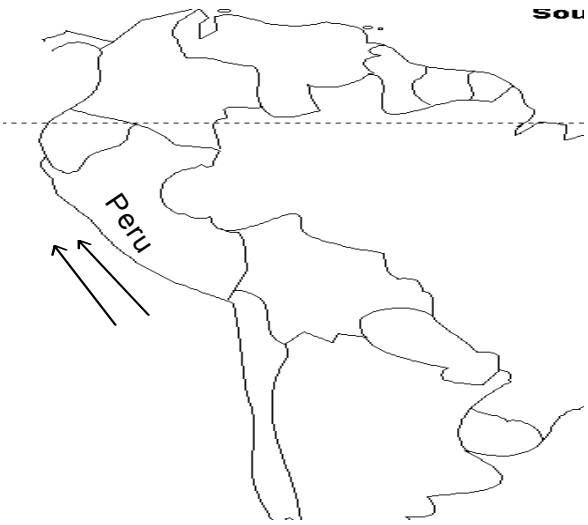
2.

a) **Coastal upwelling** is known to occur along the California coast during the summer months due to the prevailing wind direction during the time period. Based on the two figures shown below, decide which shows the most favorable wind direction for upwelling along the California coast to occur (Figure A. or Figure B.), and **explain** why that wind direction favors upwelling over the other.

Figure A:

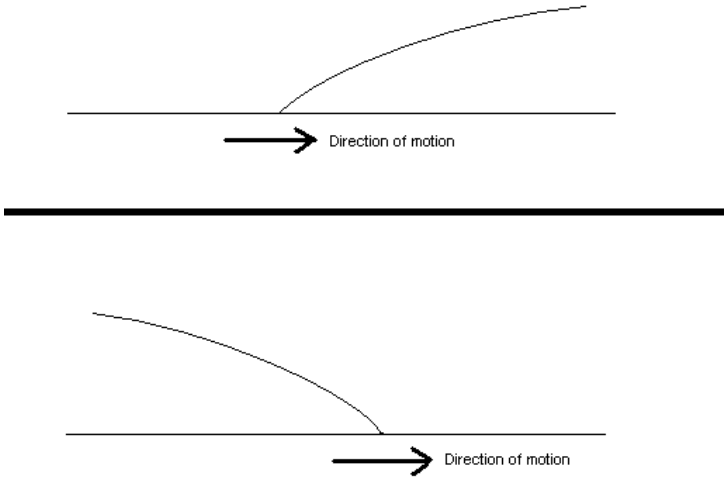
Figure B:

b) Off the western coast of Peru in South America, fishing is a very important industry. Local fishers are well aware that the nutrient-rich waters brought to the surface through upwelling enhance the amounts of fish they catch. Based on the figure showing the local wind patterns off the Peruvian coast, do you expect **good or bad** fishing at this time? **Explain** your reasoning.



3.

a) The following figure shows side views of two different kinds of fronts. The separation between the cold and the warm air masses is indicated by the curved line. Based on the direction of motion of the front (indicated by arrows below each figure), label the cold and warm air masses in each case and state which is a cold front and which is a warm front. Draw arrows showing regions of rising air.



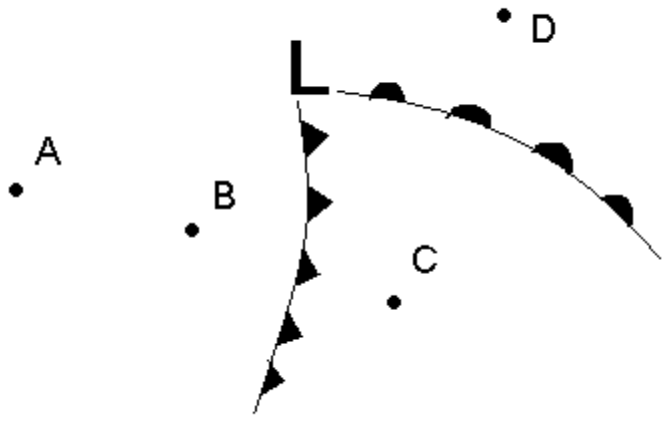
b) Below is a surface chart showing the locations of fronts associated with an extratropical cyclone. Use the stations labeled A, B, and C to answer the following questions.

i) On the figure, label the fronts as either warm, cold, occluded, or stationary.

ii) List the stations A – C in order of surface temperature from warmest to coldest.

ii) Sketch a configuration of isobars that might go along with this frontal configuration.

iv) Use an arrow to indicate the approximate wind directions at each of the stations.



4. Circle the word that appropriately completes the sentence in the event of a strong El Niño event.

a) Sea-surface Temperatures along the equator in the eastern tropical Pacific	increase	decrease
b) Upwelling in the equatorial eastern tropical Pacific	increases	decreases
c) Depth of the warm layer of water in the eastern Pacific	deepens	shallows
d) Amount of Rainfall over Indonesia	increases	decreases
e) Wintertime precipitation in Florida and the Gulf Coast	increases	decreases
f) Air pressure over the Eastern Pacific	rises	falls
g) Air pressure over the Western Pacific	rises	falls
h) The trade winds over the Pacific	strengthen	weaken
i) Winter Temperatures in W. Canada and the Pacific N.W.	increase	decrease
j) Rainfall in Peru	increases	decreases