Introduction to Oceanography
EAS 4300

Homework #4:

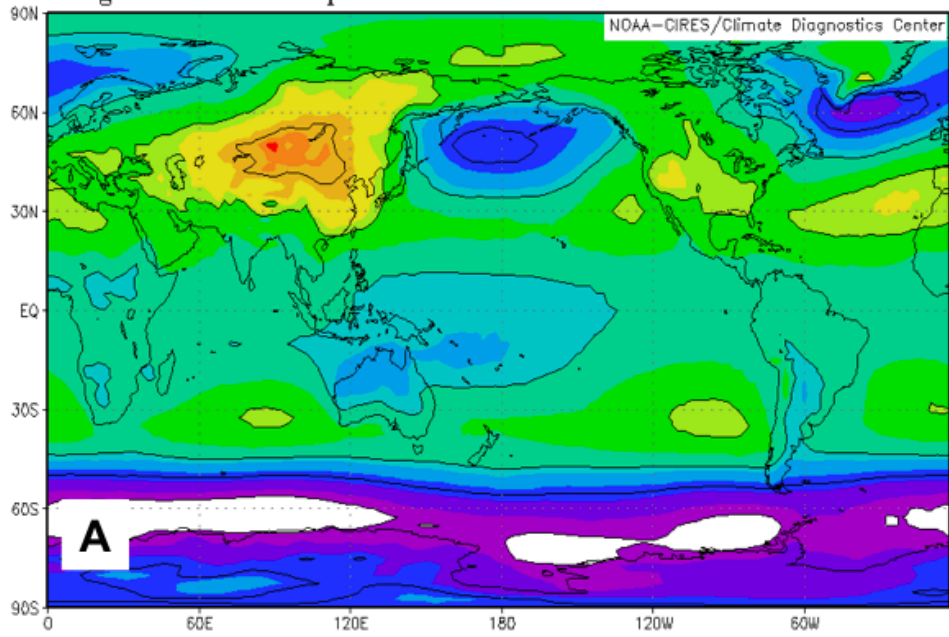Review the chapter 7 "Air-sea interaction" and the notes from recent lectures.

1. Figure 1 (A and B) shows the map of mean sea level pressure. The two maps come from two different seasons. Carefully inspect the patterns of the maps and answer the following questions.

1a) Draw the direction of the winds in the **North Pacific**, and label the **low** and **high** pressure systems (10 points).

1b) According to the maps, where do you expect the winds to be the stronger? Explain the reason for the stronger wind (10 points).

1c) Can you think of a way to determine which map is summer and which is winter in the northern hemisphere? (15 points)

Long Term Mean slp millibars

NOAA–CIRES/Climate Diagnostics Center

A

Long Term Mean slp millibars

NOAA–CIRES/Climate Diagnostics Center

B

MAX=1059.59
MIN=980.882

GrADS image

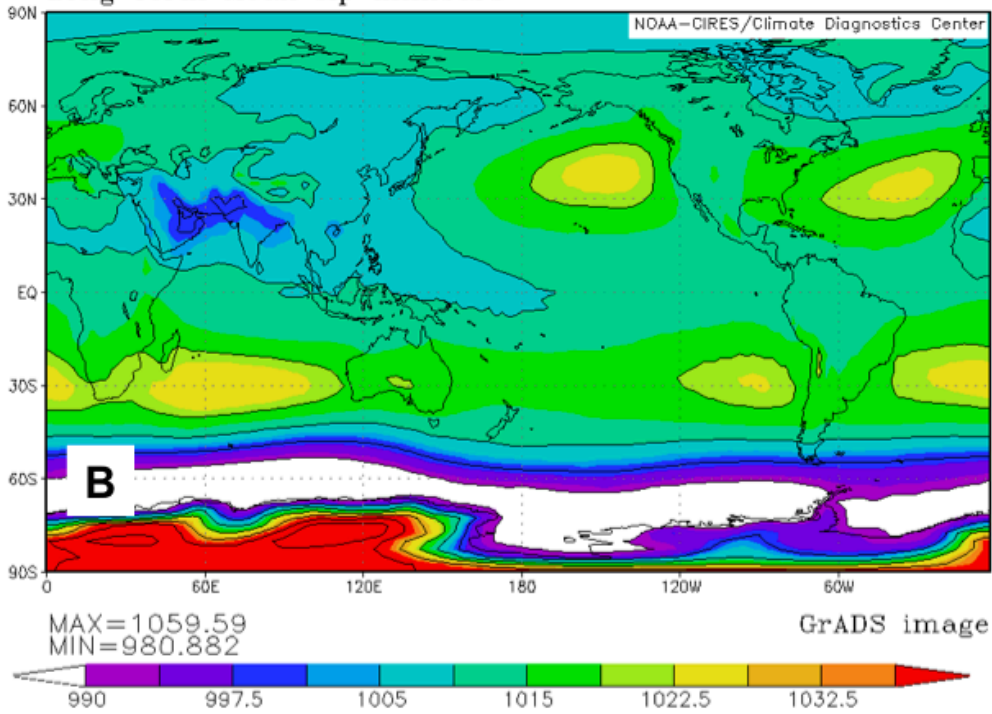990   997.5   1005   1015   1022.5   1032.5

Figure 1

2. Figure 2 shows two maps of mean precipitation. Again, the two maps come from two different seasons. Carefully inspect the patterns of the maps and answer the following questions.

2a) Label which map is the January mean and which one is the August mean. Explain how you determined your answer. Label the location of the ITCZ (15 points)
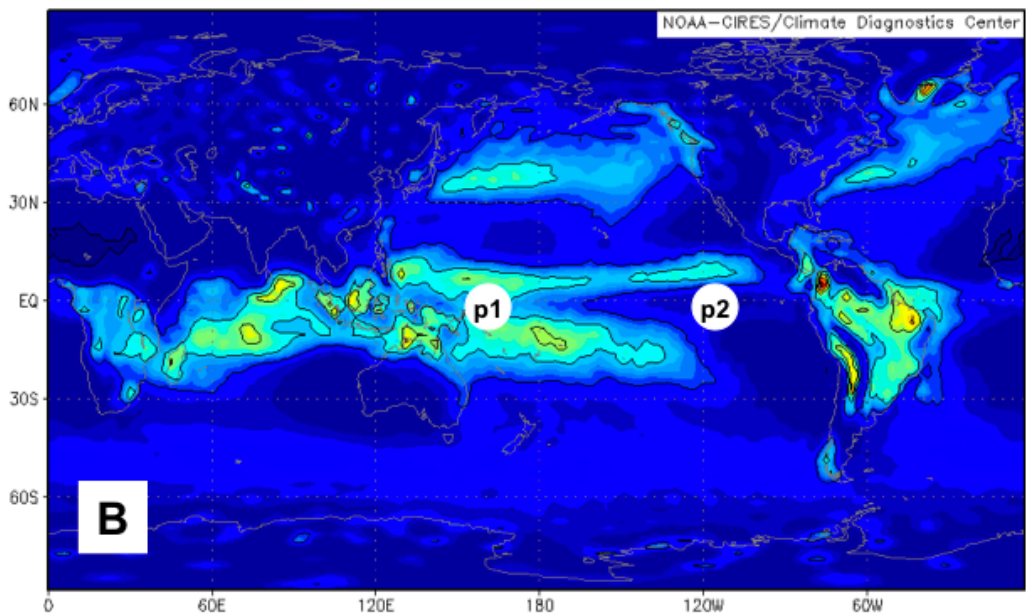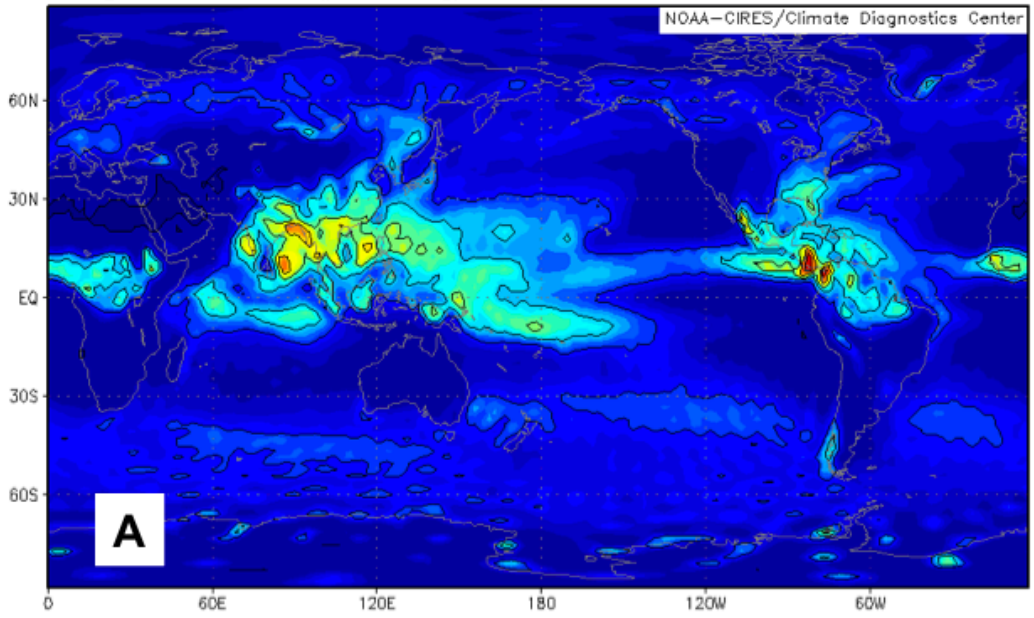
2b) Panel B shows two region of high precipitation in the North Pacific and North Atlantic. Which ocean currents are responsible for these features? How do these ocean currents influence the precipitation? (15 points)

2c) Why is precipitation on average more abundant over the oceans? (10 points)

2d) In panel B, if you were to guess the values for the Sea Surface Temperature (SST), would they be higher at p1 or p2? Explain the reason for the temperature difference (10 points)

2e) Evaporation cools the ocean by fluxing heat into the above atmosphere. Precipitation in turn cools the ocean. However the net exchange of heat during evaporation minus precipitation is usually positive toward the atmosphere, indicating that on average the atmospheric air gets warmer. What would be the impact of stronger westerly winds in the North Atlantic on the weather over Northern Europe? Would you expect dry/cold, wet/cold, dry/warm or wet/warm weather? Explain your reasons (15 points)

Long Term Mean prate Kg/m^2/s

Figure 2