Atmospheric Sciences 111 Homework 4 Due Tuesday July 20

**Floods and Droughts**

1) Give at least two reasons why it is difficult to determine if a given region is experiencing long term changes in the frequency and/or duration of floods. Explain your answer. (3)

2)
   A) What are the two most important ingredients for precipitation? (1)
   B) What regions of the world tend to be wet, and what regions tend to be dry? How does the atmospheric circulation make the wet and dry regions between roughly 30° N and 30° S? (3)
   C) Broadly speaking, what regions are expected to see increases in precipitation due to global warming, and what regions are expected to see decreases? (2)
   D) Mexico and the Sahel are both primarily arid regions. How is precipitation expected to change in those regions, and how confident are scientists in these expectations? Does the answer depend on the season? (3)

**Ice**

3) Why is the decrease in Arctic sea ice extent typically measured in September? (2)

4) Why does Arctic sea ice loss pose such a large problem for polar bears? (1)

5) A) By what processes do ice sheets such as those on Greenland and Antarctica gain and lose mass? (2)
   B) Based on information from class and the textbook, how likely do you think it is that Greenland's ice will completely melt this century? In centuries to come? (Assume that global greenhouse gas emissions continue to increase.) What about Antarctica? Explain. (3)

6) What are the relative contributions of ice melt from Greenland, Antarctica, and mountain glaciers to current sea level rise? Why might these relative contributions be expected to change in the future? (3)

**Discussion question**

7) Please write down at least one question from this week's material that you would like to discuss on Friday. This may be on a topic you don't feel you understand well enough, or it may be a topic you found interesting and would like to discuss more. (2)